# Bank and Financial Institution Management in Australia

## Preface

This e-book is intended as a freely available[1] reference/textbook for students of Australian banking and bank management (and hopefully of value to practitioners). It has been developed from various teaching and other notes – but is not aimed explicitly at any level of class or assumed knowledge, and the depth of analysis thus varies quite considerably. Regard the current version as a "beta" version – whether it ever will get to "alpha" status is anyone's guess.

The content covers areas which would be found in most banking texts, but is somewhat idiosyncratic, reflecting issues to which I think students of banking should be exposed (and which I, generally, find interesting). The objective is to provide exposure to financial institutions and their practices, regulatory arrangements, and relevant academic research literature. Regarding that latter topic, there will undoubtedly be many who feel that I have not given enough attention to their published research – I would welcome suggestions regarding such omissions (including a few words on how they might be incorporated). I would also welcome suggestions of errors of omission and commission. By making this available as an e-book, it is amenable to updating which I hope to do as appropriate (and the dates on each chapter indicate the last time any edits were made). The first draft went "live" on the web site in July 2021,

I have always struggled with maintaining consistent referencing, and so decided to largely abandon traditional practices and instead provide hyperlinks to references mentioned (albeit perhaps not always in a consistent fashion). The typical hyperlink will be of the form Jones (ER, 1952) where this gives some

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clues as to the author, journal (or other source), and year – details of which can be found via the hyperlink.[2]

In drawing upon various notes of mine, I hope that I have not "self-plagiarised" articles I have published in journals or books – I am sure I will be told if I have.

I would appreciate any emails giving suggestions to be sent to bankingbook@kevindavis.com.au (or alternatively to kevin.davis@unimelb.edu.au).

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19 September 2021

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[2] I plan to include a list of journal abbreviations as a section of the glossary. In some cases I have provided links to pre-publication versions of a journal article available on an author or organisation's website – which enables free access for those without a University (or other) subscription to the journal involved.

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## ACRONYMS

| | |
|---|---|
| ABCP | Asset Backed Commercial Paper |
| ABS | Asset Backed Security |
| ACL | Australian Credit Licence |
| ADI | Authorised deposit-taking institution |
| ADR | Alternative Dispute Resolution |
| AFSL | Australian Financial Services Licence |
| AIRB | Advanced IRB Approach |
| ALCO | Asset-Liability Committee |
| APL | Approved Product List |
| APR | Annual Percentage Rate |
| AT1 | Additional Tier 1 Capital |
| ATM | Automatic Teller Machine |
| AUM | Assets Under Management |
| B2B | Business to Business |
| B2C | Business to Customer |
| BAB | Bank Accepted Bill |
| BBSW | Bank Bill Swap Rate (for terms of 30,60, 90 days etc) |
| BNPL | Buy Now Pay Later |
| bp | A basis point. 1 basis point equals 0.01 percent |
| BSB | Bank State Branch identifier number |
| CCB | Capital Conservation Buffer |
| CCF | Credit Conversion Factor |
| CCI | Consumer Credit Insurance |

| | |
|---|---|
| CCP | Central Clearing Counterparty |
| CCyB | Counter-Cyclical Buffer |
| CD | Certificate of Deposit |
| CDO | Collateralised Debt Obligation |
| CDR | Consumer Data Right |
| CET1 | Common Equity Tier 1 Capital |
| CIC | Credit impairment charge |
| CLF | Committed Liquidity Facility |
| CP | Commercial Paper |
| CTI | Cost to income ratio |
| DDO | Design and Distribution Obligations |
| DRP | Dividend Reinvestment Plan |
| DSIB | Domestically Systemically Important Bank |
| DVA | Derivative valuation adjustment |
| EAD | Exposure at Default |
| EA | Economic Adjustment |
| EPS | Earnings Per Share |
| ESA | Exchange Settlement Account at the RBA |
| FCS | Financial Claims Scheme |
| FIRB | Foundation IRB Approach |
| FRA | Forward Rate Agreement |
| FSG | Financial Services Guide |
| FTP | Funds Transfer Price |
| FUM/A | Funds Under Management and Administration |
| GIAs | Gross Impaired Assets |
| GLAs | Gross Loans and acceptances |
| GFC | Global Financial Crisis of 2007-2009 |

| | |
|---|---|
| GSIB | Globally Systemically Important Bank |
| HQLA | High Quality Liquid Assets |
| IDR | Internal Dispute Resolution |
| IRB | Internal Ratings Based approach |
| IRRBB | Interest Rate Risk in the Banking Book |
| LATP | Loss absorption trigger point |
| LGD | Loss given default |
| LIC | Listed Investment Company |
| LCR | Liquidity Coverage Ratio |
| LMI | Lenders' mortgage insurance |
| LTM | Last twelve months (equivalent to Year to Date (YTD) |
| LVR | Loan to Value Ratio |
| MEI | Mutual Equity Interests |
| MIS | Managed Investment Scheme |
| MPOE | Multiple Points of Entry |
| MTM | Mark to market |
| NII | Net Interest Income |
| NIM | Net Interest Margin |
| NPP | New Payments Platform |
| NPS | Net Promoter Score |
| NSFR | Net Stable Funding Ratio |
| OIS | Overnight Index Swap |
| OOI | Other operating income |
| OTC | Over the counter |
| PD | Probability of default |
| PIP | Product Improvement Powers |
| PPF | Purchased Payment Facility |

| | |
|---|---|
| RE | Responsible Entity |
| RMBS | Residential Mortgage Backed Securities |
| ROE | Return on Equity |
| RSE | Registrable Superannuation Entity |
| RWA | Risk-weighted assets |
| SACC | Small amount credit contracts |
| SFI | Stable Funding Index |
| SFT | Securities financing transaction |
| SME | Small and Medium Enterprise |
| SMSF | Self Managed Superannuation Fund |
| SOA | Statement of Advice |
| SPOE | Single Point of Entry |
| SPV | Special Purpose Vehicle |
| SIV | Special Investment Vehicle |
| SVR | Standard Variable Rate |
| T1 | Tier One Capital |
| T2 | Tier Two Capital |
| TFF | Term Funding Facility |
| TFC | Traded market, foreign exchange and commodities (risk) |
| TLAC | Total Loss Absorbing Capacity |

## ACRONYMS – International Institutions

| | |
|---|---|
| BCBS | Basel Committee on Banking Supervision |
| BIS | Bank for International Settlements |
| BoE | Bank of England |
| FRB | Federal Reserve Board |

FSB Financial Stability Board

IAIS International Association of Insurance Supervisors

IASB International Accounting Standards Board

IMF International Monetary Fund

IOSCO International Organization of Securities Commissions

IADI International Association of Deposit Insurers

OECD Organisation for Economic Cooperation and Development

TCFD Task Force on Climate-related Financial Disclosures

UNEP FI United Nations Environment Programme – Finance

WB World Bank

## ACRONYMS - Regulators and Government Bodies

ACCC Australian Competition and Consumer Commission www.accc.gov.au

AFCA Australian Financial Complaints Authority https://www.afca.org.au

AFSA Australian Financial Security Authority https://www.afsa.gov.au

AOFM Australian Office of Financial Management https://www.aofm.gov.au/

APRA Australian Prudential Regulation Authority www.apra.gov.au

ASBFEO Australian Small Business and Family Enterprise Ombudsman www.asbfeo.gov.au

ASIC Australian Securities and Investments Commission www.asic.gov.au

AUSTRAC Australian Transaction Reports and Analysis Centre https://www.austrac.gov.au

ATO Australian Tax Office www.ato.gov.au

CFR Council of Financial Regulators https://www.cfr.gov.au/

FASEA Financial Adviser Standards and Ethics Authority Ltd

PC Productivity Commission www.pc.gov.au

RBA Reserve Bank of Australia www.rba.gov.au

RBNZ Reserve Bank of New Zealand www.rbnz.govt.nz

Treasury The Australian Treasury www.treasury.gov.au

## ACRONYMS – Australian Finance Associations & Organisations

ABA Australian Banking Association https://www.ausbanking.org.au/

ACDBA Australian Collectors & Debt Buyers Association www.acdba.com

ACSA Australian Custodial Services Association www.acsa.com.au

AFA Association of Financial Advisers https://www.afa.asn.au/

AFIA Australian Finance Industry Association https://www.afia.asn.au/

AFMA The Australian Financial Markets Association (AFMA) https://afma.com.au

AIA Actuaries Institute of Australia www.actuaries.asn.au

AIC Australian Investment Council www.ac.co

AICD Australian Institute of Company Directors https://aicd.companydirectors.com.au

AICM Australian Institute of Credit Management www.aicm.com.au

AIST Australian Institute of Superannuation Trustees https://www.aist.asn.au

APCA Australian Payments Council www.australianpaymentscouncil.com.au

ARCA Australian Retail Credit Association www.arca.asn.au

ARITA Australian Restructuring Insolvency & Turnaround Association www.arita.com.au

ASDAA Association of Securities and Derivatives Advisers of Australia www.asdaa.com.au

ASF Australian Securitisation Forum www.securitisation.com.au

ASFA Association of Superannuation Funds of Australia https://www.superannuation.asn.au

Auspaynet Australian Payments Network www.auspaynet.com.au

BCCM Business Council of Cooperatives and Mutuals www.bccm.coop

CAFBA Commercial and Finance Brokers Association of Australia https://www.cafba.com.au/

CHERPA The Consumer Household Equipment Rental Providers Association

COBA Customer Owned Banking Association www.customerownedbanking.asn.au

CPA CPA Australia www.cpaaustralia.com.au

FBAA Finance Brokers Association of Australia https://www.fbaa.com.au/

Fintech Australia https://fintechaustralia.org.au/

FPA Financial Planning Association of Australia https://fpa.com.au

FSC Financial Services Council https://www.fsc.org.au

FSU Finance Sector Union https://www.fsunion.org.au/

HIA Housing Industry Australia www.hia.com.au

ISA Industry Super Australia www.industrysuper.com

ICA Insurance Council of Australia https://www.insurancecouncil.com.au

IPA Institute of Public Accountants www.publicaccountants.org.au

MFAA Mortgage Finance Association of Australia https://www.mfaa.com.au

NCPA National Credit Providers Association https://smallloansbigneed.com.au/small-loans-big-need/what-is-the-ncpa/

NIBA National Insurance Brokers Association www.niba.com.au

PCA Property Council of Australia www.propertycouncil.com.au

PFAA Property Funds Association of Australia www.propertyfunds.org.au

SAFAA Stockbrokers and Financial Advisers Association https://www.stockbrokers.org.au/

SCA Super Consumers Australia www.superconsumers.com.au

SMSF Self Managed Super Funds Association https://www.smsfassociation.com

# 1. Functions and Structure of the Financial System

## Contents



## 1.1 Introduction

A number of well-known researchers have argued that it is helpful to examine the financial sector from a “functional” perspective – asking what are the economic functions which are provided to end users? This leads to analysis of (a) why financial institutions and markets are required to facilitate performance of those functions, (b) how the design and features of financial products and services enable provision of those functions, (c) what determines whether these functions are performed by particular types of financial institutions or markets, (d) what risks arise as a result and how they are managed.

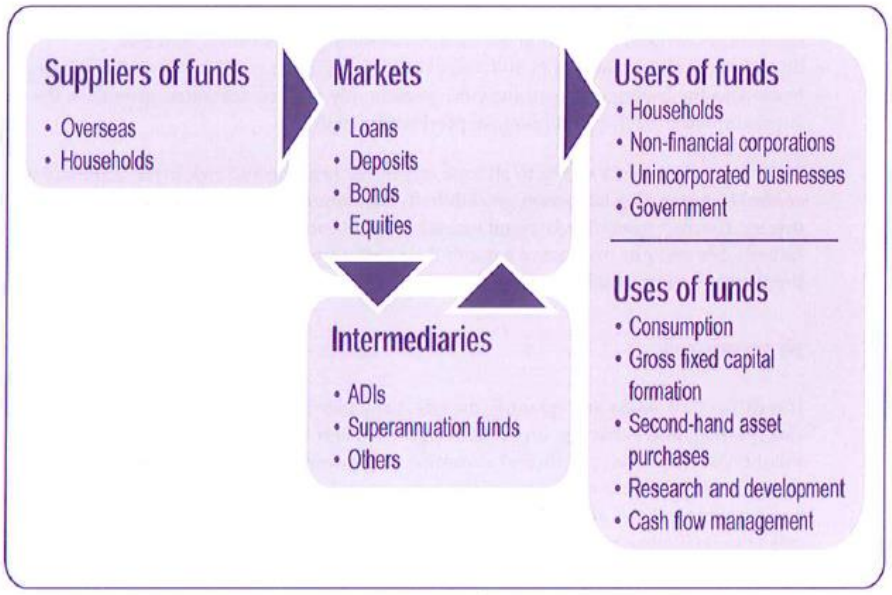
Underpinning this approach promoted by, among others, Merton and Levine is the view that the economic functions performed by the financial system are largely unchanging. They reflect types of activities which

aim to overcome the "financial frictions", such as imperfect information and transactions /search costs which impede economic activity. One example (others later) is the function of maturity transformation – such as when financial intermediaries provide short term deposits from savers and provide long term loans to borrowers, meeting the maturity preferences of both. How they are able to manage the risks associated with this activity, what rate of return for the intermediary is required to compensate for risks and operating costs, how technology and financial innovation affect the ways in which maturity transformation can be achieved are questions which naturally arise.

Note that these economic functions might be performed by a financial institution such as a bank, or through the operation of financial markets. Continuing the example of maturity transformation, an alternative to banks "borrowing short and lending long" is for savers to purchase long term bonds issued by borrowers which they can sell to other investors in the bond market prior to the bonds' maturity when they wish to recoup their funds. The risks and returns to savers and borrowers (often referred to as the "end-users") are likely to be different between these two alternatives, and much of financial regulation is focused on ensuring that end-users are aware of the risks and appropriately protected against unwarranted risks.

The AFSI Interim Report provided a simple depiction of a financial system as shown in Figure 1. It shows how markets and/or intermediaries can fulfil the role of connecting together the end-users of the financial system.

**FIGURE 1: FINANCIAL SYSTEM STRUCTURE**



Note, one simplification in that figure is that it reflects the overall net balance sheet position of the various end-users, ie the stocks of financial assets and liabilities in existence. And it reflects the Australian situation where the overseas sector is a net supplier of funds. Obviously, some countries must have the opposite position to Australia, where the overseas sector is a net user of funds.[1] Also note that in examining the flows of funds over a time period some businesses (non-financial corporations and unincorporated businesses) can at times also be suppliers of funds, as could a government running a budget surplus.

The distinction between stocks and flows in asset markets is important, and their relative importance in determining asset prices (interest rates and yields) has long been a topic of debate. (See, for example Tsiang). At the risk of generalising, flows are small relative to stocks in asset markets (for example, new equity or bond issues in a year relative to the stock on issue). If the new issues are essentially indistinguishable from the existing stocks, the flow supply will have little effect asset prices compared to shifts in the demand for the stock.

Jakab and Kumholf in a Bank of England 2019 Working Paper examine alternative models of role of banks in macroeconomic analysis which also highlights stock-flow issues. They contrast models in which the stock of deposits is determined by bank decisions to make loans (which they argue is a view found in many Central Bank publications), with a flow approach in which flows of deposits from savers lead to new loan approvals. They argue the former is more compatible with the evidence and implies a role for financial aggregates (as well as interest rates) in the transmission of shocks to the real economy.

This is also an important issue in considering how the size of the banking sector is determined.

## Core Financial Infrastructure Requirements

In performing underlying economic functions, the financial sector contributes to economic growth and development. There has been much debate about the precise contribution, and whether it is economic development which promotes the growth of the financial sector or vice versa. Regardless (and both directions of causation are surely relevant) financial sector growth and development depends on a range of institutional characteristics of the country.

It is conventionally accepted that minimum requirements for a sound and efficient financial system include

- Strong Corporate Governance Standards and Practices

[1] Although there have been various calculations showing discrepancies in national accounts consistently aggregate up to a surplus for the world as a whole (ie it is a net lender). Accounting errors and omissions are a better explanation than some sci-fi story about trading with the rest of the Universe!

- Effective Legal Protection and Enforcement of Property Rights
- Enforcement of Reliable Accounting and Auditing Standards
- Appropriate Information Disclosure Requirements and Practices
- Strong and Effective Supervisory Agencies

These are among the issues that the IMF and World Bank take into account when undertaking their Financial Sector Assessment Programs (FSAPs) of individual countries (and also relevant for assessments done by the more recently created Financial Stability Board (FSB)).

## 1.2 Functions of Finance

By understanding the needs of the end-users (suppliers and users of funds) and the impediments they face in dealing directly with each other, it is possible to identify the economic functions of a financial system. Suppliers of funds (often referred to as *surplus units*) want a reward for postponing consumption, but face risk in making funds available to others, have imperfect information about potential users of funds, and face transactions costs in dealing with them. Users of funds (*deficit units*) will have preferences for funding characteristics which differ from those of suppliers and need to expend resources to overcome information gaps which impede (and affect the terms of) their obtaining finance.

Because the functions are unchanging over time and fundamental to the role of financial institutions and markets, they provide a basis for development of theories about financial intermediaries which can assist understanding and development of regulation. Many of the influential models explaining features of banking and other financial firms focus upon one or more of the underlying economic fundamentals. A functional approach also assists in understanding how new business models (such as made possible by technological advances) may impact upon traditional suppliers of financial products and services.

Why are financial institutions and markets needed for performance of these functions, rather than end-users dealing directly with each other? The general answer is “financial frictions” – those characteristics of the economic environment which make direct interaction costly or infeasible. One financial friction is imperfect or asymmetric information. A second is transactions (real resource) costs. Developments in communications, technology, data capture, storage and processing are significantly affecting the relative importance and ways of overcoming these frictions.

As noted above, deficit and surplus units, and those wanting to change balance sheet structure, face market imperfections (impediments), or *financial frictions,* which markets may not overcome effectively. These include:

- search costs

- transactions costs
- mismatching preferences
- insufficient scale
- imperfect information
    - a priori
    - ex post
- uncertainty

In overcoming those imperfections, financial institutions typically undertake *asset transformation* (maturity, risk-bearing, etc) by issuing securities which have different characteristics to those they acquire. Consequently they take on a range of risks, for which they expect reward and need to manage those risks. Among the important management areas for financial institutions (discussed in later chapters) are:

- Asset - Liability Management
- Liquidity Management
- Interest Rate Setting
- Pricing of Products and Services
- Credit Evaluation and risk management
- Customer Relationships
- Capital Structure / Funding decisions
- Physical/Human/Knowledge Capital requirements
- Regulatory Compliance
- Institutional governance arrangements

While there is a wide consensus on the types of economic functions performed, there is no single agreed list which provides a definitive classification. One functional classification which focuses on the services provided to any end-user could be as follows:

- Storing/Investing of wealth to generate returns (with various resulting risk features)
- Financing expenditures (for those needing additional financial resources)
- Making payments / facilitating trade (although this is not directly related to the connection of suppliers and users of funds, it is generally accepted as a core economic function)
- Management of risks (economic and financial)
- Provision of information and advice

There are a range of other classifications of economic functions, among the best known are:

Merton framework with examples (also shown in Table 1) added. A financial system provides:

1. *a payments system for the exchange of goods and services* – involving Central Bank depository and settlement services, base money provision, bank provided payments and settlement arrangements, securities settlements services, credit card and EFT services, foreign exchange markets
2. *a mechanism for the pooling of funds to undertake large-scale indivisible enterprise* – involving banks and depository institutions, institutional investors and mutual funds, stock exchanges, capital markets, investment banks, private equity firms

3. *a way to transfer economic resources through time and across geographic regions and industries* – involving savings, depository and other financial intermediaries, pension funds, foreign exchange markets, capital and money markets
4. *a way to manage uncertainty and control risk* – involving insurance companies, financial intermediaries, forward markets, options and other derivatives markets.
5. *price information which helps coordinate decentralized decision-making in various sectors of the economy* – involving money and capital markets, stock exchanges, foreign exchange markets.
6. *a way to deal with the asymmetric information problems when one party to a financial transaction has information that the other party does not* – involving ratings agencies, credit bureaus, banking relationships, collateral, security and guarantee arrangements, auditing, disclosure requirements.

Levine framework (with explanatory notes added)

1. Facilitate the trading, hedging, diversifying, and pooling of risk (Since individuals are generally risk averse, risk reduction can increase willingness to save and invest).
2. Allocate resources (By providing funds to most productive uses, economic growth can be enhanced, and saving opportunities mean life-cycle consumption plans can be better achieved).
3. Monitor managers and exert corporate control (Ensuring that recipients of funds use them most productively and in the interests of the providers reduces risk of the latter and enhances growth).
4. Mobilize savings (typically the scale of funds for any physical investment is larger than the scale of individual savings and will involve different time horizons etc.).
5. Facilitate the exchange of goods and services (reducing the costs and risks of making transactions encourages investment in productive activities).

**Stevens** (RBA, 2010) – former RBA Governor: A financial system provides

1. a reliable way of making payments (that is, exchanging value);
2. a means for pricing and pooling certain types of risks;
3. a way of transferring resources from savers to borrowers;
4. a way of transferring the returns back again, which requires that the savers' money is not lost and which, in turn, requires monitoring of borrowers and managers; and
5. liquidity.

A comparison of these approaches is given below, showing their substantial overlap.

| Function | Levine | Stevens | Merton |
|---|---|---|---|
| | *Corresponding function number* | | |
| Payments & Exchange | 5 | 1 | 1 |
| Pooling risk etc | 1 | 2 | 4 |
| Price information | 2? | | 5 |
| Mobilizing savings | 4 | 3 | 2 |
| Monitor managers | 3 | 4 | 6 |
| Liquidity | | 5 | 3 |

It is relevant to note that these functions involve both *ex ante* and *ex post* considerations. The former relates to decision making about who to allocate funds to, based on assessment of risks and potential returns. The latter relates to management of risks arising after the contract has been entered into. As an old saying goes: " A debtor is someone who owes money. A creditor is someone who hopes to get it back."

**TABLE 1: PROVIDERS OF FINANCIAL SYSTEM FUNCTIONS**

| Financial System Functions, Institutions and Markets Function | Institutions and Markets Involved |
|---|---|

| | |
|---|---|
| Payments systems for the exchange of goods and services | Central Bank depository and settlement services, base money provision, bank provided payments and settlement arrangements, securities settlements services, credit card and EFT services, foreign exchange markets |
| Mechanisms for the pooling of funds to undertake large-scale indivisible enterprise | banks and depository institutions, institutional investors and mutual funds, stock exchanges, capital markets, investment banks, private equity firms . |
| Ways to transfer economic resources through time and across geographic regions and industries | savings, depository and other financial intermediaries, pension funds, foreign exchange markets, capital and money markets |
| Way to manage uncertainty and control risk | insurance companies, financial intermediaries, forward markets, options and other (including credit) derivatives markets |
| Generation of price information which helps coordinate decentralized decision-making in various sectors of the economy | money and capital markets, stock exchanges, foreign exchange markets. |
| Mechanisms for dealing with asymmetric information problems when one party to a financial transaction has information that the other party does not | ratings agencies, credit bureaus, banking relationships, collateral, security, and guarantee arrangements, auditing, disclosure requirements |

The fact that various institutions provide a range of economic functions may be one reason why the functional approach to finance has not had the effect its founders thought that it might. Wilson and Campbell (JEM, 2016) provide a recent analysis of the literature, and while emphasizing its potential benefits along a range of dimensions, highlight the limited influence it has played – despite regulators and others expressing a preference for adopting such an approach. However, it may be that it will assist in analysis and regulation of recently emerging fintechs.

## Finance and other economic services

An alternative form of division into functions is that involved in Figure 2 which divides them into provision of financial services in the form of a *brokerage* activity and provision of financial products involving *asset*

*transformation*. Financial intermediaries, such as banks, generally do both. At some risk of over-simplification, the provision of services via a brokerage activity generates fee income, while the asset transformation generates "spread" or "net interest income". Figure 2 focuses on services and products provided to clients, but it should not be forgotten that intermediaries also undertake transactions on their own account, such as proprietary trading.

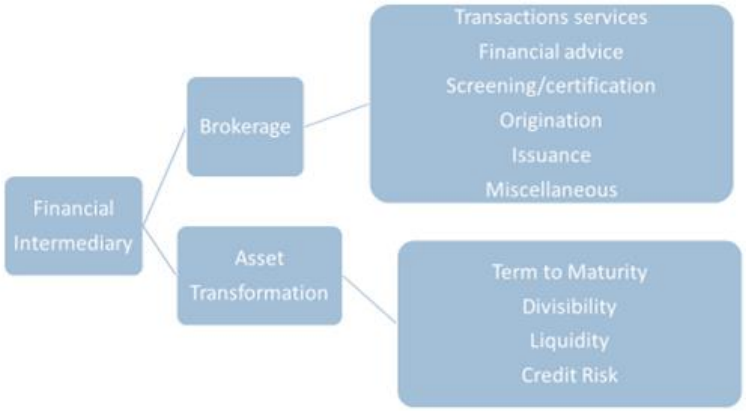



**FIGURE 2: INTERMEDIARY FUNCTIONS (SOURCE: BHATTACHARYA AND THAKOR (JFI, 1993))**

The financial intermediary role may also arise in association with provision of other economic activities

Traditionally fractional reserve banking is seen as having emerged out of the safekeeping role of goldsmiths etc., who recognised that not all customers would demand their gold back at once, and they could thus lend some of it out at a profit. Donaldson et al (JFE, 2018) present a model of banking based on this perspective which helps explain why "banks offer warehousing (custodial and deposit-taking) services within the same institutions that provides lending services and how banks create funding liquidity by creating private money".

Life insurance often historically involved entering a long term contract to make premium payments which were "smoothed" over the lifetime of the policy holder. Thus the initial year payments involved a savings element (because premium paid was greater than actuarial cost of insurance for that year) causing life offices to accumulate funds for investment.

Payments services. Because a provider of payments services will require the customer to have a positive account balance in order to make a payment, the institution will have a positive "float" (funds received but not yet paid out) which can be invested.

## 1.3 A Functional Approach to Regulation

One of the dilemmas in financial regulation is set out in Figure 3. Economic functions are fulfilled by the delivery of various financial products and services, and these, in turn, are provided by various financial institutions (or markets). Historically financial regulation has been directed at either or both of institutional types (including market operators) or products and services. Ideally, if two different products perform the same economic functions, then regulation (and taxation) should not inappropriately disadvantage the competitive position of one (and the institution involved).

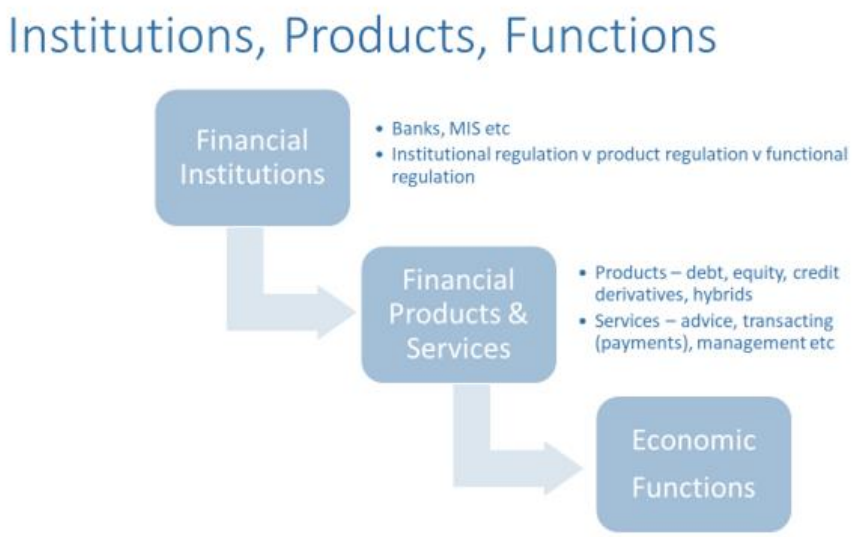



**FIGURE 3: INSTITUTIONS, PRODUCTS AND FUNCTIONS**

### Fintech, Economic Functions, and Regulation

Fintech firms are developing new ways for the performance of economic functions which often do not fit easily with traditional forms of regulation focused on either institutions or products and services. The ways in which fintech is transforming finance reflects four main developments have been summarised by various commentators as ABCD where:

- A = Artificial Intelligence (AI), enabling new machine based methods of performing complex functions and analysis
- B = Blockchain, enabling new methods of recording and accessing transaction and ownership information
- C = Cloud, enabling access to software services and data hosted by third parties
- D= Data, reflecting the increased ability to capture, store and manipulate large amounts of data and thus analyse the information contained therein.

Among the examples are innovations such as Peer to Peer Lending (Chapter 2), Buy Now Pay Later (Chapter 8), Banking as a Service (BaaS) (Chapter 5), Cyber-Currencies (Chapter 13). Focusing on the economic

functions performed and the risks that these new activities create can help identify how regulation needs to be appropriately adjusted. In doing so, regulators face the problems of being technologically neutral, while dealing with new forms of financing techniques where there is no history available to accurately identify likely risks.

## 1.4 Banks v Markets

There is an extensive literature seeking to explain what factors prompt greater emphasis on banks v financial markets in the financing process in different jurisdictions, the implications for economic growth, as well as whether market-based or bank-based systems have differential implications for financial stability. (See, for example, Boot and Thakor (SSRN, 2018)). Of course, all jurisdictions have some mix of market and bank based financing. The USA, UK and Canada are more market-based, whereas Europe, Japan and Australia are more bank-based.

Among the factors affecting both the growth of the financial sector and the relative role of banks v markets are the following.

- Legal systems - property rights and investor protection will affect the willingness of individuals to engage in certain forms of transactions
- Taxation – the structure of taxation can make certain types of transactions and activities more or less profitable
- Innovation / Technology – by finding new ways to overcome financial frictions (transactions costs and information imperfections) the profitability of different types of financing is affected
- International Integration / Segregation – international barriers can prevent the transmission from overseas of both financial resources and techniques which assist financial and economic development
- Regulation & Policy – as well as attitudes towards the role of the state versus private enterprise in providing financial services, regulation impedes some activities and induces innovations to avoid its effects
- Effects and Response to Financial Crises – a long international history of financial crises and their costs influences policies towards financial sector development and change

History is also an important, often neglected, factor. It is impossible to explain the current structure of financial systems and financial institutions without being aware of the historical influences that led to the current situation.

The Australian situation, based on asset size, is shown in Figure 4. The first obvious feature is the dominance of banks, both overall and relative to other intermediaries. Bank assets are around double the market capitalisation of the Australian Stock Exchange, and the memo item (showing the small size of the corporate bond market – excluding bonds issued by banks and other financial institutions) indicates that other market-based financing is relatively small. The size and growth of the

superannuation sector is noticeable, particularly when the self managed super funds (SMSFs, shown in the memo item) are added to the institutional sector shown in the graph. These long-term (retirement) savings vehicles invest in assets such as Australian and overseas equities and fixed interest securities, bank debt and deposits, property and infrastructure.

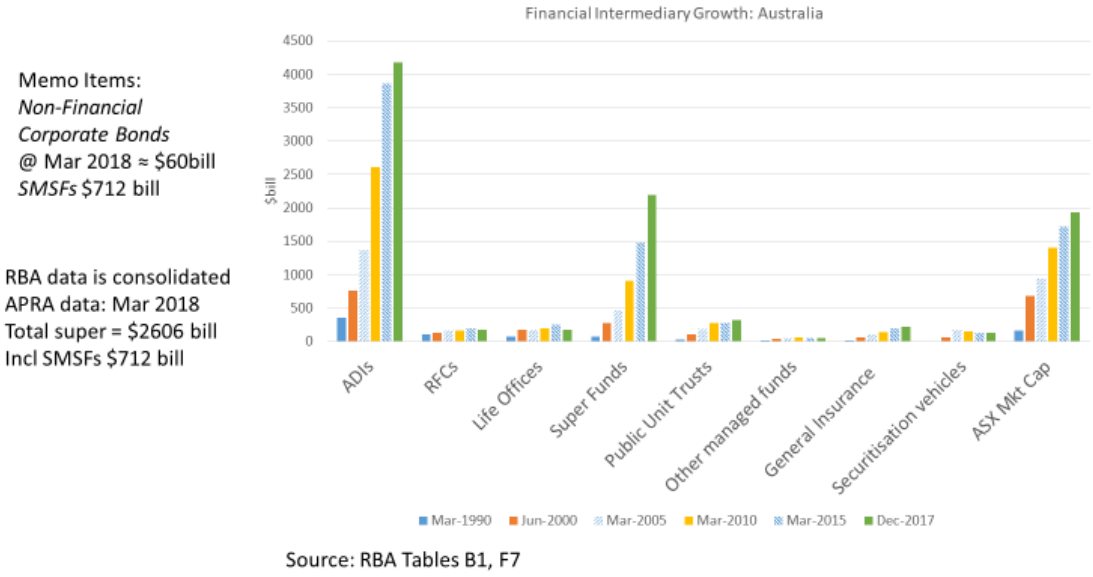



FIGURE 4: AUSTRALIAN FINANCIAL SECTOR AND INSTITUTIONS

Aggarwal and Goodell from the FRBC note the arguments advanced earlier in papers by Rajan and colleagues that "bank financing is based mostly on relationships and collateral, while market financing is based mostly on social trust among strangers, high levels of disclosure, and faith in contracts" and that "bank financing is more suitable for physical industries that are well understood". They examine the role of cultural tolerance for uncertainty and find evidence that bank-based financing is relatively higher in countries where there is less tolerance for uncertainty. (Bank financing involves relationships and collateral, whereas market financing relies on trust in contract enforcement – and thus is more common in jurisdictions with good property /creditor rights and information disclosure enforcement).

Bats and Houben in a 2020 JBF article argue that prior to the GFC, studies had generally suggested no systematic superiority of one system over the other, but that the post-GFC literature suggests that bank-based systems have greater risk of financial instability and crisis. Arguments include: bank tendency to over-extend credit in financial upturns; high bank leverage and balance sheet structures magnifying adverse (interest rate, liquidity, economic) shocks (including via contraction of credit, fire sales of assets, "runs" of creditors); interdependencies between banks leading to spillover effects.

In their empirical work Bats and Houben use bank credit to the private sector relative to the sum of stock market capitalisation plus debt securities on issue. Various measures of systemic risk are considered, including estimates of the capital shortfall (eg relative to regulatory requirements) of the financial sector if the stock market fell 40 per cent over a six month period. This measure (SRISK) has been developed by Robert Engle and colleagues and is explained here. They find, *inter alia* that "bank financing may contribute more to systemic risk than market financing" and that "markets can provide 'spare tire' insurance". But this is unlikely to be the last word on this issue!

## 1.5 The Australian Funds Management Sector (An overview)

Figure 4 illustrates how the importance of superannuation funds has grown in the Australian financial sector. They interact with banks and markets and are a major part of the funds management sector which is relatively complex involving a large number of different types of entities. Even though the focus of this book is on banks, it is worth providing a brief overview here.

Figure 5 provides a schematic overview of the funds management industry in Australia. At the top of the figure are "end user" investors such as individuals/households, businesses, charities, etc., with financial wealth to be invested. Some part of that wealth might be invested directly in financial institution liabilities (such as bank deposits) or company shares listed on the stock exchange – thereby bypassing the funds management sector. Some part of it will be held in accounts with superannuation funds whose trustees have responsibility for investing that wealth in financial and real assets (such as property) in a manner consistent with the member's wishes.

Institutional super funds generally utilise the services of "asset consultants" who provide advice on expected returns and risk associated with different classes of assets and desirable allocations of portfolios. The funds may make and implement investment decisions in-house, or outsource some of those decisions by giving specific mandates to funds management firms.

Some "end investors" will use the services of a financial adviser (who is often part of a "dealer group") for the management of their wealth, including accountants qualified to give such advice. Not only do advisers provide advice, they generally provide services for the actual management of an investor's wealth across a range of investments, generally using one of the "platforms" (software) available from various providers. (This is also the case for many investors who establish Self Managed Superannuation Funds (SMSFs) and outsource the administration and management to an adviser). Funds under Management (FUM) by an advice firm are allocated across various managed funds and end products with the platform facilitating record keeping and management of cash flows associated with the investments.

There is a variety of funds management firms. “Boutique” firms may specialise in taking mandates from investors (including super funds) to decide on and manage investments in one asset class such as equities, or across several asset classes. Hedge funds offer specialised services (usually completely unrelated to “hedging”). Large firms (such as Vanguard or State Street) not only manage money for their direct clients, but create and market managed funds – which may be listed on the ASX, or available only to wholesale investors. Private Equity firms obtain funding from large investors (including superannuation funds) to buy companies where they see opportunities for improving performance under their management and subsequently selling for a profit.

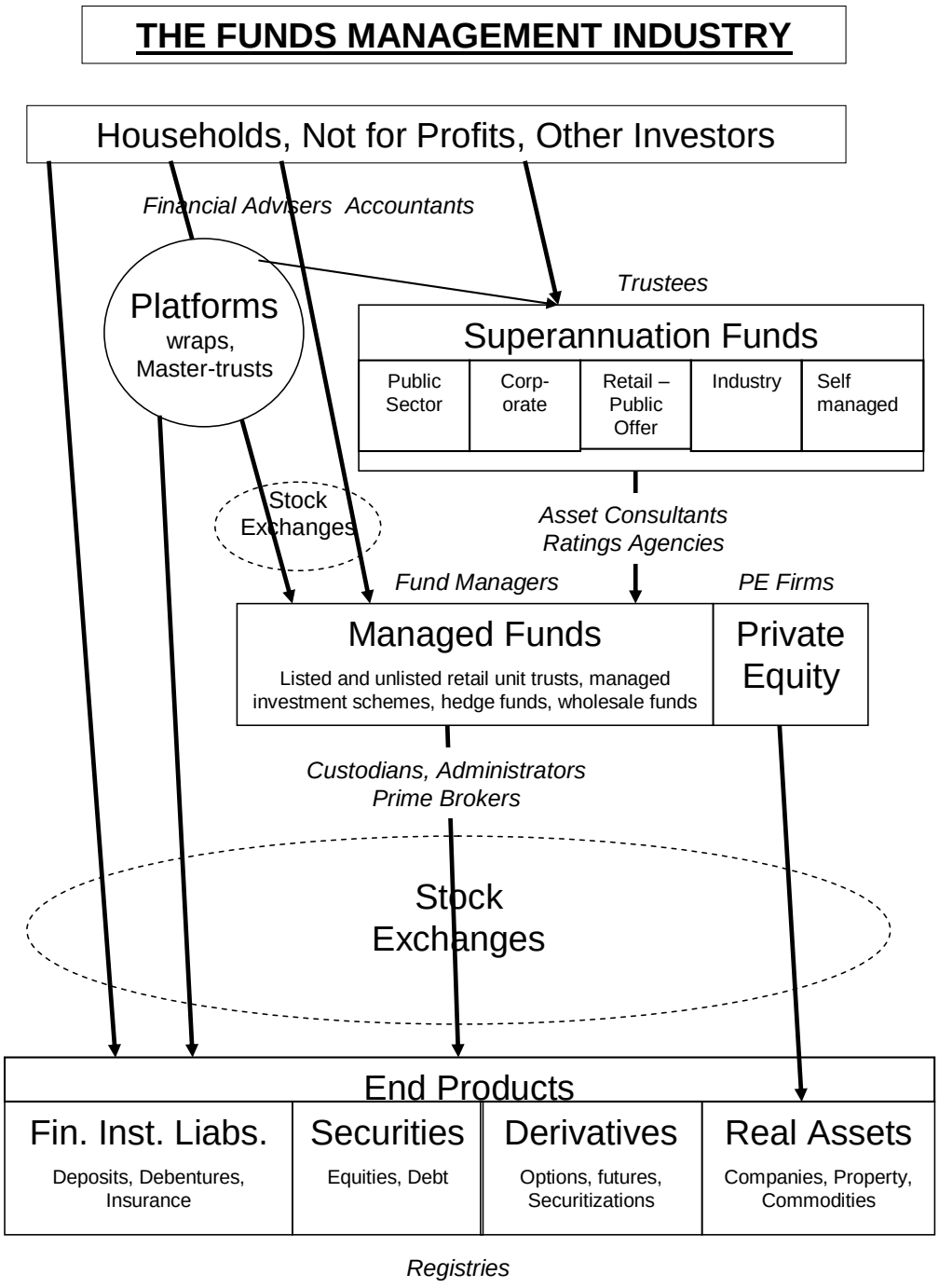



Figure 5: An overview of the Funds Management Industry

## 1.6 Finance and Grogwth

The contribution of the financial sector to economic growth and development has been long recognized. Financial institutions and markets perform a range of valuable economic functions (as

discussed earlier) which facilitate "real" activity. And the consensus regarding finance prior to the Global Financial Crisis (GFC) was essentially "the bigger the better".

For example, Levine (NBER 2005) in a comprehensive review of the literature on "finance and growth" argued that a causal link from financial sector development to economic growth is well established (in contrast to an earlier, alternative, view that financial sector growth and development was essentially a consequence of economic development). But as Wachtel (FRBA, 2003) noted (and Levine made similar observations), "the research does not yet tell us enough about development strategies and processes. It provides little in the way of rigorous guidance about how best to develop the financial sector." (But note the need for core "infrastructure" discussed earlier).

Since the GFC there has been the emergence of research questioning the benefits for economic growth and development of an ever larger financial sector. This is in addition to the literature asking questions about how modern financial sectors may contribute to instability. As Lord Turner, Chairman of the UK FSA noted in a speech at Bloomberg on 24 Jul 2012, some part of financial sector activity may be "not innovative in a social value sense – but dedicated to either regulatory, accounting, or tax arbitrage… [while] … there is much greater opportunity than in other sectors of the economy for purely rent extracting activity"

And the research interest reflects community concerns. Lord Turner argued; "Trust in banks and bankers has eroded… people have come to doubt the economic benefits of financial liberalisation and of much banking activity….."

## Empirical Evidence

One strand of this literature has involved statistical studies reassessing the link between financial sector size and economic growth.

Cecchetti and Kharroubi (2012) from the Bank for International Settlements study 30 years of data from 50 developed and emerging countries. They conclude: "the level of financial development is good only up to a point, after which it becomes a drag on growth. Second, focusing on advanced economies, … a fast-growing financial sector is detrimental to aggregate productivity growth." The turning points at which larger financial sector size ceases to be beneficial to productivity and economic growth they estimate to be where private sector credit is larger than GDP and where financial sector employment exceeds 3.5 per cent of the total.

Arcand, Berkes and Panizza (J.Econ.Growth, 2015) from the IMF also study the same issue with results that "suggest that finance starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP".

Beck, Degryse and Kneer (2012) "find that intermediation activities increase growth and reduce volatility in the long run. An expansion of the financial sectors along other dimensions has no long-run effect on real sector outcomes." They distinguish between two views of financial sector activity as an "intermediation or financial facilitator" role and a "financial centre" role – with the latter focusing upon financial activities such as trading, market making, advisory services, as being a business in itself. As they note, the latter activity has grown relative to the former in recent times, particularly in advanced economies. Notably, the impact of non-intermediation activities appears to have some positive impact on economic activity, but at the expense of higher volatility in advanced economies.

Panizza (CES, 2018) surveys the large empirical literature which has developed on this topic, which he argues supports the "too much finance" hypothesis. He also considers arguments as to how a very large financial sector could have adverse effects on growth.

## How can the financial sector be "too big"

Correlations between financial sector size and performance of the economy are informative, but do not provide an explanation of how, in a competitive economy, the sector could become "too big". If financial services were "underpriced" in some sense, high demand could lead to output which is socially excessive. But that sits starkly at odds with the general perception that the sector has, generally, made excessive profits.

One response to this apparent inconsistency is that suggested by Haldane (BOE, 2010) that financial sector output has been mismeasured. National accounts essentially measure financial sector output by the sum of fee income and the net interest margin between loan and deposit rates. In the run up to the GFC high apparent margins and fee income disguised risk taking and potential future losses, which turned into actual losses during the GFC.

Another story is told by Bolton et al (JOF, 2016) who argue that asymmetric information and opaqueness enable participants in over the counter markets to extract rents from entrepreneurs seeking financial services, which also attracts talented (rent seeking) individuals into the sector.

Another aspect of the rethinking about finance has been related to the possible existence of a tradeoff between competition and stability in the banking sector. Vives (OREP,2011) notes that the era of financial deregulation was accompanied by a change in official attitude towards competition in banking towards a pro-competitive stance no different to that applied in other sectors of the economy. The greater incidence of financial crises since that time, and particularly the GFC, has prompted a reassessment of whether competition in banking increases the risk of financial instability. If so, and the evidence is mixed, banking regulation needs to reflect implications of competition policy

in banking. Moreover, less competition can be expected to lead to lower levels of output of financial services.

Philippon makes several contributions to this literature, including a focus on the relative growth of funds-management activities relative to intermediation. In a recent (2019) paper he considers how returns to scale and big data and machine learning may impact the growth of fintech and financial inclusion.

Panizza summarizes the main features of the "too much finance" perspective as:

- Frequency and consequences of financial crises
- Misallocation of talents – high financial sector remuneration not reflective of social value
- Different types of finance (intermediation – "good" v speculative/risk-taking – "bad"
- Financial System structure – larger/concentrated financial institutions (less competition/efficiency) and more market based
- Political capture – undue influence of finance sector participants on the formulation and implementation of policy

# Appendix 1.1

## Examples of Alternative Methods of Financial Function Delivery

The same economic functions can often be performed in a variety of ways, in some cases with more emphasis on one particular function than another. In this example we consider possible ways of overcoming imperfect information about credit risk and connecting those who need finance with those requiring it.

***Example 1: Credit Risk & Funding***

Traditional Approach: Financial Intermediary assessed credit worth of borrower, raised deposit funds and advanced funds to borrower.

***Example 2: Guarantees***

Alternative Approach: Financial Intermediary guarantees primary security of borrower (for a fee) which is issued into the market.

Consequently, Credit Risk and Funding Risk are separated

Examples: Bank Accepted Bill Financing; Letters of Credit for Trade Financing

***Example 3: Underwriting v Loan Sales***

Traditional Underwriting: Advise borrower on terms, conditions; guarantee a minimum price; place bond issue in market, take up any residual

Loan Sales: Make loan directly to borrower on agreed terms; subsequently sell security into market at best price

Both separate "pricing" risk from long term funding risk. Blurs investment/commercial banking distinction

***Example 4: Loan origination, servicing and funding v Securitisation***

Traditional Approach: Bank originates loan (receives, assesses loan application), provides funds, holds loan on balance sheet and receives loan repayments (servicing), and faces default risk.

Securitisation: Mortgage broker originates loan, arranges funding via “warehouse” facility, and loan eventually bundled together with others and securities sold to investors giving claims on the cash flow stream from those loans. Origination, funding, servicing, risk bearing separated.

***Example 5: P2P (Platform) lending***

Both involve provision of loans to households/SMEs

Traditional Approach: Bank takes deposits and originates and holds loans

Depositors promised specific return, have liquidity, at risk if bank fails

P2P: Investors have interest in a portfolio of loans approved by P2P manager

Investors face risk of actual return on loan portfolio, illiquid investment

## Appendix 1.2: How Tax Distorts the Financial Sector

Tax policies have a major influence on the shape of the financial sector and the pattern of financial flows. Sometimes these are deliberate government policies – such as the preferential tax treatment of superannuation or that of owner-occupied housing. In other cases it may be unintended, such as taxation of nominal returns in a time of high inflation. The Australian dividend imputation tax system and reduced tax rate for long-term capital gains are also particularly important. The following section provides an illustration of the outcome of various features of the Australian tax system.

### An Australian Illustration

Consider an individual on a tax rate $t = 0.45$, who earns \$181.81 before tax, giving \$100 after tax. Assume inflation is $p = 0.03$, and the real return on risk free assets is $r = 0.01$

Investment options are: buy own house; superannuation contributions; bank deposits; shares etc.

Tax treatment of the various investments:

- House: no tax on imputed rental value nor on capital gains

- Super: contributions taxed at 15% from pre-tax income; earnings at 15%; capital gains at 10% (zero tax if post retirement)
- Bank deposit: interest taxed at 45%

Assume a five year investment horizon and consider how real-after-tax-rates of return differ.

Note that $181.81 pre-tax income is needed for $100 post-income-tax investment (except in the case of super contributions where a concessional 15 per cent tax rate applies).

The outcomes are as follows:

House: $100 grows to $121.84 = $100*[(1+p)(1+r)]^5$

There is no taxation, and the real (inflation adjusted) value = $105.10, giving a real after tax rate of return = 0.01 (1.00%) p.a.

Superannuation: with $181.81 pre tax income, the individual can invest $154.54 = (181.81(1-0.15)) in super. Assuming super is invested in bonds, and interest taxed at 15% each year, this grows to $182.89. The real return is (182.89/100(1+p)^5))^(1/5) -1)

and the real after tax rate of return = 0.0955 (9.55%) p.a.

Bank deposit: nominal interest rate 4.03% p.a. Interest taxed annually at 45%, grows to $111.58 giving a real return = -0.76% p.a.

(With 3% inflation would need $100(1.03)^5$ = $115.93 to break even in real terms).

Super in equities – assume returns are via capital growth and thus are untaxed until realization (year 5) when the capital gain is taxed at 10% (the concessional rate). The value grows to $184.92 (after capital gains tax). The real rate of return (compared to the alternative of investing $100 after tax) = 9.79%

Summary: The returns are: House 1%; super 9.55% or 9.79%; deposit -0.76% , for these specific assumptions (no difference in pre-tax rates of return, five year holding period etc)

- Distortions greater for longer holding period
- Distortions greater for higher tax-rate individuals
- Dividend imputation creates further complications
- Ability to leverage investment with debt with tax-deductible interest expense creates further distortions. (eg: “negative gearing” where interest expense exceeds asset income generating an allowable tax deduction against other income, and asset returns are via capital gains (tax deferred and favourable rate)

The "Henry" White Paper on Tax Reform adopts a different (more comprehensive) approach to derive the results in Figure 6.

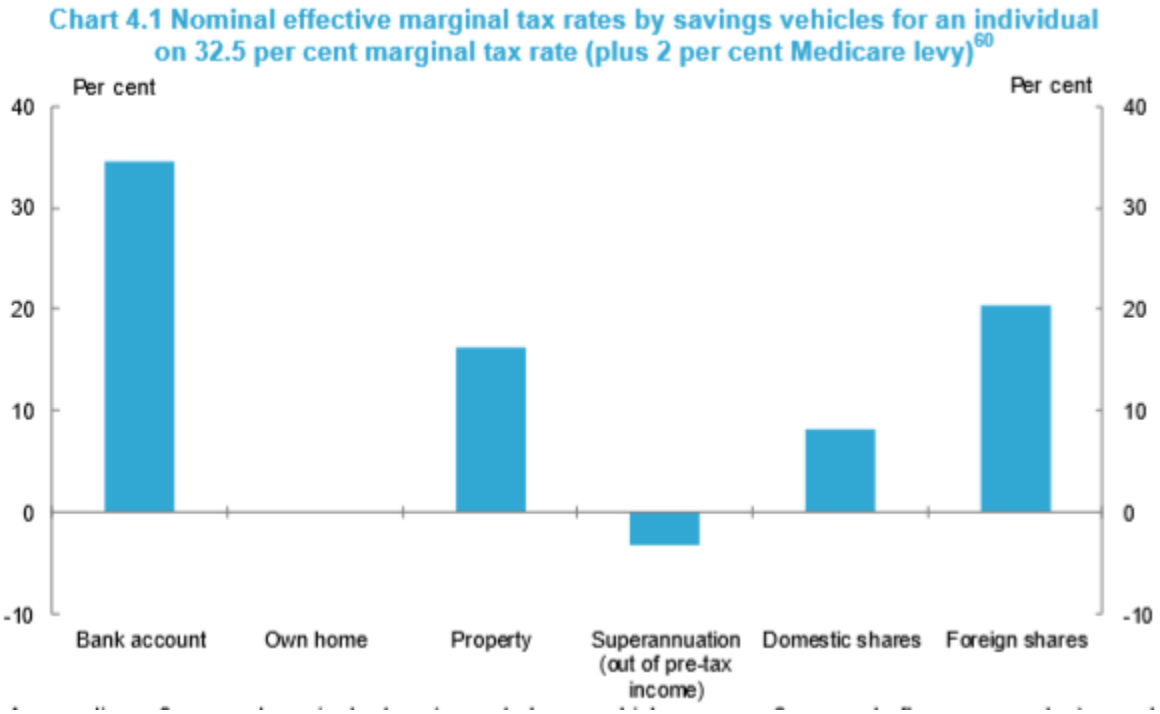



FIGURE 6: TAX DIFFERENTIALS FOR DIFFERENT SAVINGS (SOURCE: RETHINK (TAX DISCUSSION PAPER) P60

The White Paper assumptions are:

- 6 per cent nominal return (except shares, which assumes 6 per cent after company tax);
- assets are all held for 25 years,
- for rental property, 50 per cent of the return is attributable to capital gain and 50 per cent to rental income
- superannuation contributions do not exceed the prescribed contribution caps.
- No assets have been negatively geared.
- The own home has a nominal effective marginal tax rate of zero, as it is purchased out of after-tax income, but subsequent returns on it are not taxed.
- Bank accounts, property and shares also use after-tax income but their returns are taxed depending on the vehicle.

The nominal effective marginal tax rate for superannuation is negative because contributions to superannuation are made pre-tax and are only taxed at 15 per cent. For example, $100 of pre-tax labour income would result in a super contribution of $85 (after 15 per cent tax) but an individual would only receive $65.50 if they put it into other saving vehicles because of the application of their marginal tax rate (34.5 per cent in this case).

## Tax and Business Structures

Another important consideration is how taxation of (non-operating) trusts relative to companies can affect choice of business structures.

If a trust only holds/manages assets (and distributes all income), it becomes a "pass through" vehicle for tax, and is not subject to company tax. The investors pay tax on distributions at their individual tax rate (and can use any franking credits attached to the distribution), but there is a 15% withholding tax on distributions to foreigners. The investors are entitled to long-term capital gains tax concessions on any distributions which reflect income from sale of assets (held for more than one year) by the trust

In contrast a company is subject to company tax (30%, or lower for smaller companies) but shareholders are able to use franking credits distributed with dividends under the Australian dividend imputation system. The company does not get long-term capital gains tax concessions on sales of assets.

This has led to use of "stapled structures" (analysed by Davis (ATF, 2016) by many Australian Real Estate Investment Trusts (AREITS) and some infrastructure funds whereby investors hold units in a trust (which holds the assets) stapled to shares in a company (which leases the assets from the trust).

Businesses can also be operated as sole-proprietorships or partnerships, in which business income is considered to be part of the individual income of the owner or partners (and thus not subject to company tax but only individual income tax). One innovative structure is Limited Liability Partnerships (LLPs) in which a general partner who manages the entity is subject to unlimited liability and other limited partners, who are investors not involved in management, have limited liability. In many overseas jurisdictions, these are taxed the same as a partnership (and commonly used by hedge funds), but that only applies in Australia when the entity is a venture capital firm.

## Appendix 1.3: Some Definitions

*Deficit units* - expenditure exceeds income, therefore borrow (issue securities) or run-down assets

*Surplus units* - income exceeds expenditure, therefore lend/invest (acquire securities) or reduce borrowings

*Primary Markets* - where new securities are created by deficit and surplus units coming together

Overcome impediments to deficit and surplus units transacting

Enable raising of capital and allocation to best uses

Provide securities for investment for wealth accumulation

Create securities giving investors particular control/governance rights

*Direct financing* - where securities issued by deficit unit acquired by surplus unit

*Indirect financing* - where third party (financial institution) acquires deficit unit securities and issues its own securities to finance acquisition

*Secondary Markets* - where existing securities are traded

Facilitate trading, wealth reallocation, risk management

Generate price information / signals which influence resource allocation

Enable investors to influence governance – “exit”, “takeover”

*asset transformation* - (maturity, risk characteristics, etc) by intermediaries issuing securities which have different characteristics to those they acquire. Consequently they take on a range of risks, for which they expect reward and need to manage those risks.

# Types of Financial Institutions

## Contents



## 2.1 Australian Financial Institution Types: Information Sources

There is a wide range of different types of financial institutions operating in Australia. While banks (ADIs), superannuation and other managed funds (unit trusts) and insurance (life and general) funds are the most well known, there are many other types. A list, provided by the RBA, giving current information about size, numbers of institutions, and types of activities is available here. Data about prescribed types of institutions began to be collected in 1974 (under provisions of the *Financial Corporations Act,* and since 1982 has been collected under the provisions of the Financial Sector (Collection of Data) Act 2001. A list of such *Registered Financial Corporations* is provided by APRA here. One difficulty with such *institutional type* listings is that new types of business models which do

not fit neatly into existing categories, keep emerging, particularly with the FinTech revolution currently underway. The Australian Bureau of Statistics (ABS) also produces some statistics about the finance sector. Currently this information includes publications relating to: Lending Finance; Securitisation; Managed Funds; Venture Capital and Private Equity.

In 2019 APRA began collecting and reporting information about ADIs and RFCs under its new Economic and Financial Statistics (EFS) collection.

In the following sections, major types of Australian financial institutions are briefly described. Others are considered in subsequent chapters.

## 2.2 Banks and ADIs

In Australia, the term Authorised Deposit-Taking Institution (ADI) was introduced in 1998 to cover banks, credit unions and building societies, and distinguish between banks and the others, even though all undertake "banking business". It was then, and is more so now, an unhelpful label – confusing and not found elsewhere internationally, particularly now that credit unions and building societies can call themselves "mutual banks". (More detail on the institutions can be found in Chapter 6-1).

Banks are typically thought of as institutions which

- take deposits and make loans
- provide payments services

Generally they are engaged in a wider range of activities (including wealth management, trustee services, insurance, advice, trading and market making, investment banking, and off-balance sheet (OBS) activities), although Australian banks have recently divested themselves of some of these activities.[1] The balance sheet funding of banks will generally involve a range of debt and hybrid securities as well as deposits and equity.

There are a variety of (often complex) organizational structures found internationally. In the USA, many banks are subsidiaries of a non-operating holding company which may control multiple banks, and raises equity and debt and allocates it to the bank. In some other countries, such as Australia, it is more common for the bank to be an independent entity, with its own equity base raised from shareholders and raising debt etc in its own name, and allocating capital to subsidiaries, which may include differently named banks operating domestically or internationally. In Australia, Macquarie, Suncorp, AMP are holding company structures.

[1] Relbanks website provides lists of the world's largest banks (using various measures of size.

In many countries there will be some form of ownership restrictions. In some cases this reflects long-standing concerns about the separation of banking and commerce (which also is reflected in restrictions on banks having significant equity interests in non-financial companies). In other cases it reflects concerns about concentrated ownership and control of banks by particular parties and takes the form of ownership diversification requirements or maximum ownership limits. (In the USA, small banks have often been owned by individuals or families).

In Australia, the Financial Sector (Shareholdings) Act 1998 specifies that there is a 20 per cent maximum shareholding limit (except with the Treasurer's permission) for ADIs and insurance companies.

The Australian Banking sector is relatively concentrated, but this is common internationally, with the USA (and China) being significant exceptions. (See here for a (now somewhat dated) discussion). The four-pillars policy limits the extent to which concentration might be increased by preventing mergers between the four large major Australian banks and has been criticised by many such as the Productivity Commission, but supported by others. (The four-pillars policy does not prevent takeover of a major bank by a foreign bank).

Building Societies (Savings & Loans) and Credit Unions (some now called Mutual Banks) are examples of mutual or cooperative institutions, which are owned by their customer members and are "not-for-profit" entities. (However, some building societies are organised as joint-stock companies). They generally undertake a more limited range of activities (raising deposits, making loans, providing payments services) to individuals (and small businesses). In the early 1950s there were around 700 Australian credit unions (mostly very small), but declining numbers due to mergers, mean there are now less than 50. Similarly Building Society numbers fell from around 30 in early 1990s to 3 in 2018. (Similar experience has occurred internationally, particularly in the USA following the S&L Crisis in the late 1980s-early 1990s when around 1,000 of 3,000 S&Ls failed! The FDIC has a comprehensive website with information). Worldwide, there around 85,000 credit unions with 274 million members (WOCCU provides information).

One innovation has been the conversion of a number of smaller credit unions into, effectively, franchisees of Bendigo and Adelaide Bank, similar to its Community Bank model. In 2015, four credit unions became part of an Alliance Bank network, involving transferring loans and deposits to Bendigo but retaining ownership of members reserves, operating under Bendigo's banking licence, and providing the operational activities (under an Alliance Bank trading name). Details can be found here. A major factor driving this change was that ADI regulatory and compliance requirements were now

undertaken by Bendigo. “Profits” of the Alliance members could be used to support social and community activities – consistent with the spirit of the mutual model.

Banks and ADIs are subject to prudential regulation to protect depositors and avoid systemic instability. In Australia this is undertaken (since 1998) by APRA, a specialised prudential supervisor, which also supervises life and general Insurance companies, institutional superannuation funds, friendly societies, health insurers. Internationally, there is a range of structures for regulation with prudential regulation sometimes being the responsibility of the Central Bank. See Masciandaro and Romelli for an analysis of allocation of prudential regulation responsibilities worldwide.

Whereas government owned banks were once a significant part of the banking system, there are no longer any Federal or State government owned banks. At the start of the 1990s, several State government owned banks effectively failed (although no depositors suffered losses) and these were taken over by the other banks. The Commonwealth Bank was privatised by the Federal Government in a staged process beginning in 1991 and completed in 1996.

There had been no new banks registered in Australia between 1945 and the early 1980s, with the first of many entrants in the 1980s being the Australian Bank in 1981 (which was subsequently acquired by the State Bank of Victoria in 1989). Smaller Australian banks have evolved since 1981, many of which were former building societies. Information about the changing nature of the Australian banking sector between 1980 and 1990 can be found here. In recent years APRA has allowed mutual ADIs to rebrand as banks and provided new licenses (including restricted licenses) to new entrants (eg Xinja, Judo Bank). APRA maintains a register of current ADI license holders. In 2021 some consolidation occurred: Citigroup announced in April that it was selling its Australian retail operations conducted by its subsidiary; in February, Bank of Queensland announced an agreed acquisition of Members Equity Bank; Xinja bank relinquished its restricted licence and NAB announced acquisition of *64 800.*

Foreign owned banks' subsidiaries have been allowed entry to the Australian market since 1984, (although three long-standing foreign banks existed prior to that) and foreign bank branches have increased in numbers. There are restrictions on foreign branch retail banking activities and different supervision arrangements. (International practice is for branches of foreign banks to be supervised by their parent’s home country supervisor).

Cull et al from the World Bank provide a recent survey of literature on relative performance of foreign and government owned banks from an international perspective.

## 2.3 "Shadow" Banking

This term has become popular to refer to non-prudentially regulated credit providers, and institutions which undertake credit, maturity, and liquidity transformation. It was defined by the Financial Stability Board as "credit intermediation involving entities and activities (fully or partially) outside the regular banking system". But in October 2018 the FSB announced it would "replace the term "shadow banking" with the term "non-bank financial intermediation" in future communications", partly because the former term carried a pejorative association. The FSB regularly monitors the sector, looking at three levels – the broadest encompassing all non bank intermediaries (including for example equity funds), a narrower set of, generally non-prudentially regulated, financial intermediaries, and a narrower set of NBFIs (OFIs) whose activities involve credit intermediation activities possibly generating bank-like financial stability risks and/or regulatory arbitrage.

Figure 1 shows the FSB depiction of the composition of financial systems in a range of advanced economies (AEs) and emerging economies (EMEs). For Australia (represented by AU) the size of OFI assets as a proportion of GDP (shown as the diamond) is significantly below some other countries (such as UK, Canada, China, USA) but similar to many other advanced economies.

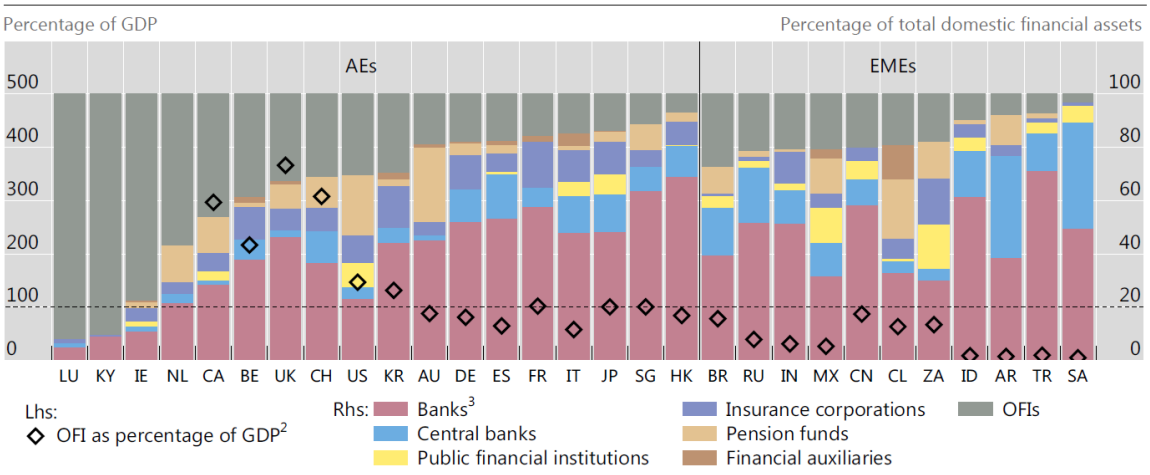



**FIGURE 1: SHADOW BANKING AROUND THE WORLD**

The FSB focuses on five types of entities in that last narrow group (OFIs) based on their classification of relevant economic functions:

- Collective Investment Vehicles (by far the largest sector) which have features making them susceptible to runs
  - MMFs, fixed income funds, mixed funds, credit hedge funds, real estate funds
- NBFIs engaged in loan provision and dependent on short term funding

- Finance companies, leasing/factoring companies, consumer credit companies

- Market intermediaries that depend on short-term funding or secured funding of client assets
  - Investment banks, Broker-dealers, Securities finance companies

- Entities engaged in facilitation of credit creation
  - Merchant banks, Credit insurance companies, financial guarantors, monolines

- Entities engaged in securitisation-based credit intermediation.
  - Securitisation vehicles, structured finance vehicles, asset backed securities

The entities involved, such as Investment Banks often have activities beyond being alternatives to bank financing.

## 2.4 Investment banks/Securities Firms/Stockbrokers

These entities are engaged *inter alia* in

- fund raising (debt, equity) for clients; financial innovation; underwriting
- Property investments; venture capital; bridging finance (merchant banking)
- Brokerage and Trading
- Securities transactions for clients, own account trading;
- Other financial services: Asset management accounts, funds management, advisory services, prime brokerage

Now, they are often part of large financial conglomerates including banks, but historically were often partnerships. (Morrison and Wilhelm, 2007) discuss reasons behind the shift from partnership to joint stock form in the 1970s and the increase in risk taking resulting which has been seen by some as one of the factors causing the GFC.

Historical (and current) examples (have) included

- USA : Merrill Lynch, Goldman Sachs, Shearson Lehman Hutton, Salomon Smith Barney, Paine Webber, Morgan Stanley
- Australia: J.B. Were, Macquarie Bank

Compared to Banks, they are not prudentially regulated (although commercial banking activities conducted under a banking licence will be), but are regulated by securities regulators such as the SEC in the USA or ASIC in Australia. Note that in Australia, organisations which are not part of a Bank or

ADI are not permitted by legislation to use the term "Investment Bank" as part of the restrictions on the use of the term "bank". Among the restrictions they face on activities are:

- A requirement to segregate customer funds from the firms' own funds
- liabilities are not deposit obligations, they are generally dated, debt instruments such as commercial paper, collateralized loans, repurchase agreements, or claims that have a pay-off contingent on the performance of the firm.
- A need to generally hold liquid, tradable assets that are marked to market daily.

Systemic risk has emerged as an important issue associated with large Investment Banks because of:

- The scale of their global activities including OTC derivatives
- Them being increasingly affiliated with commercial banks and/or insurance companies as financial conglomerates.
- Their large scale.
- Absence of capital adequacy requirements which had been designed primarily for depositor customer protection
- Problems of orderly exit and wind up without disruption of markets and spill-overs to other financial institutions, which was highlighted in the GFC.

## 2.5 Trustee Companies

Somewhat confusingly for non-lawyers, a trust is not a legal entity, even though it is treated for taxation purposes as a separate entity, albeit with special rules. A trust is a legal arrangement whereby assets are held and managed on behalf of the beneficial owner by a designated trustee. The trustee has a fiduciary duty to act in the interest of the beneficiaries of the trust.

Trustee companies perform a wide range of functions. At one level, they provide services to families to help manage wealth, including acting as executors of deceased estates. At another level, they may be appointed by companies raising funds to act as a trustee on behalf of investors and providing administrative functions such as distributing payments. The Corporations Act (Section 6-1RAC) refers to traditional trustee company service and estate management functions as encompassing the first group of activities, but not the second (ie not operating a scheme, providing custodial services, acting as a trustee for debenture holders etc).

In 2009, regulation of Trustee companies switched from State and Territories to the Federal Government with the passing of the Corporations Legislation Amendment (Financial Services

Modernisation) Act 2009. This required, *inter alia,* Trustee companies to hold an appropriate AFSL, imposed minimum capital requirements, and being subject to the regulation of ASIC.

As well as specialised trustee companies, banks also provide trustee services to their customers. Some Australian banks have, however, moved away from the trustee business. For example, in September 2017 NAB sold its National Australia Trustees Limited business to Australian Executor Trustees, while in April 2014, ANZ Trustees was sold to Equity Trustees Limited. The largest private specialist trustee companies in Australia are:

- Equity Trustees (subsidiary of ASX listed EQT, formed in 1888)
- Australian Executor Trustees (owned by IOOF)
- Trustees Australia (ASX listed)
- Perpetual Trustee Company (ASX listed, formed in 1886, acquired *The Trust Company* in 2013)
- Sandhurst Trustees (owned by Bendigo andAdelaide Bank)
- Australian Unity Trustees (licensed in 2017, owned by Australian Unity, the first new license since the 2009 legislation)

In addition to these private trustee companies there are government owned ones in most states, such as State Trustees in Victoria, which focus mainly on providing services to individuals.

A peculiarity of the Australian financial system is that public investment trusts (managed investment schemes/funds) are not required, since the passing of the Managed Investments Act (MIA) in 1998 to have a trustee separate from the manager of the fund. Rather, a *Responsible Entity (RE)* is required who can simultaneously be the manager of the fund but who is required to put the interests of the investors first. The large trustee companies often assume the role of the RE when marketing to investors managed funds operated by foreign fund managers.

The MIA was repealed in 2016 (but the RE requirements persist in Part 5C.2 of the Corporations Act).

## 2.6 Collective Investments (Managed Investment Schemes)

Managed Investment Schemes accept funds from investors which are pooled for particular forms of investment specified in their constitution (or other legal documents) such as: shares, money market and debt securities, real estate (A-REITs), agricultural ventures.

They are often referred to as mutual funds. Investors have pro rata claim on assets of the fund and income generated from those assets based on the size of their investment. ASIC provides information about legal issues involved in managed fund operation, and a list of types of schemes, here and Mees, Wehner and Hanrahan (undated) provide a comprehensive historical overview of the funds management sector in Australia from the 1950s to the early 2000's.

MIS are established and run by a manager/trustee (for a fee). In Australia a unit trust model has been common. This involves a tax "pass through" structure, such that earnings are not taxed in the fund as long as the trustee distributes all earnings to investors. The 1998 Managed Investment Act (now part of Corporations Act) in Australian led to a Responsible Entity (RE) model, in which the need for a separate trustee was abolished and the RE acts both as the manager and trustee. The RE has fiduciary responsibility, and is required to act in the best interests of the members (investors), even though this may be in conflict with their own best interests.

Other vehicles are found overseas, generally not using the trust structure but instead some collective corporate investment vehicle (CCIV). An exposure draft of legislation to introduce such a form for Australian collective investments has been available since early 2019 but still not enacted as at March 2021. (ASIC has, however, provided regulatory guidance regarding establishing a CCIV in anticipation of passage of the legislation). One rationale for this change is to allow structures more familiar to foreign investors as part of the introduction of Asian regional funds passports enabling fund managers to more easily operate in other jurisdictions by recognising the regulation of the home jurisdiction.

Also common are limited partnerships (often used by hedge funds, in which the manager is a "general partner", responsible for decision making and not protected by limited liability. The investors who are "limited partners" do have limited liability protection by virtue of having little or no "voice" (participation in management). Moreover "exit" (withdrawal of funds) is likely to be constrained by the terms of the investment agreement. In Australia, except for venture capital funds, there is not the "pass-through" tax treatment commonly found overseas (although see here for discussion of recent court rulings which complicate matters).

An important distinction is between "closed end" and "open end" funds. "Closed end" funds issue a fixed number of units to investors and these can then be bought or sold on the stock exchange. The unit price varies with demand/supply pressures and may vary from the underlying Net Asset Value (NAV). New funds may be raised from time to time by the issue of more units

"Open end" funds involve a variable number of units. Investors can buy & sell units from the manager, typically at a small spread to the end of day price. The unit price generally equals NAV as a result. The potential for a "run" of unit holders means that liquidity management is important.

Exchange Traded Funds (ETFs) were introduced in the 1990s and are structured to allow exchange based trading, with a mechanism incorporated to ensure that price equals NAV. Retail investors buy and sell on the exchange, like a closed end fund, but designated market makers can create additional units by delivering underlying assets to manager (when price moves above NTA, or extinguish existing units by delivering existing units to manager in exchange for underlying assets (when price falls below

NAV). The mechanics are explained by Vanguard Investments (one of the major providers of ETFs) here.

## 2.7 Cash Management Funds (CMTs)

CMTs are open-ended funds often known in other jurisdictions as Money Market Mutual Funds. They are mutual funds that specialise in investing member's funds in short term securities, such as bank deposits, promissory notes, government treasury notes etc. Their rationale for existence is that by aggregating funds from retail investors they are able to access wholesale market interest rates. With CMTs having relatively low operating costs, the retail investors should obtain better returns than they could from making direct investments in short term liquid securities or bank deposits, while still having virtually immediate (next day) access to their funds. Investors may also benefit from the ability of the specialist managers to identify opportunities to purchase undervalued securities, without taking on significant risk – although the evidence does not support such arguments. Indeed, one concern is that managers may invest in short term securities of issuers with higher default risk in search of higher returns – to attract investors and grow funds under management (and thus fees). In general, the constitution of the fund will specify limits on acceptable investments.

CMTs should be a source of competition for retail bank deposits, since they offer liquidity and potentially higher returns. And when CMTs were growing strongly, banks responded by creating new forms of deposits known as Cash Management Accounts (CMAs). These may limit the number of withdrawals per period and typically offer a "tiered" rate structure of higher interest rates for larger balances, and which may be changed at any time in response to movements in wholesale market rates.

It can be seen from Figure 2 that Australian CMTs grew quite rapidly in the 1990s and early 2000's up until the time of the GFC, since when the sector has general declined in size. The number of CMTs in operation also followed a similar pattern. The Macquarie Bank CMT was closed in 2010 and client funds transferred to a Cash Management Account.

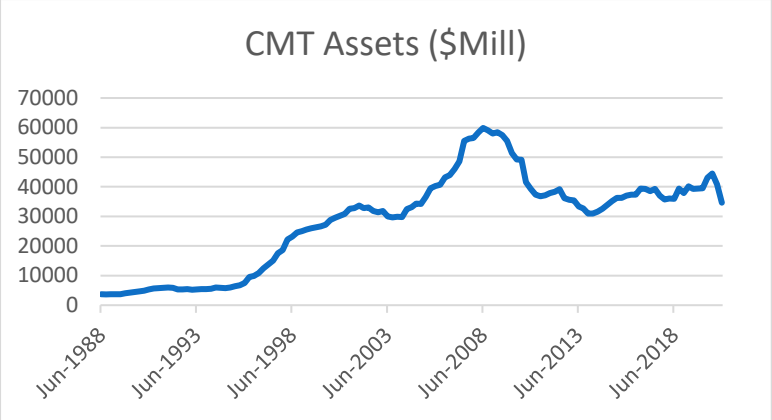



**FIGURE 2: CMT GROWTH (SOURCE ABS CAT 5655.0)**

Behind this marked decline in CMT market size following the GFC was the introduction of the Financial Claims Scheme in 2008 which initially provided insurance protection to ADI deposits of up to $1 million and to $250,000 after 2011. Faced with a choice between protected bank CMA deposits and unprotected CMT investments, it is hardly surprising that CMTs became less attractive to retail investors with amounts to invest below those insurance caps. Investors with larger sums to invest (and not wanting to diversify across deposits at a large number of banks) may still have found CMTs attractive if rates were better than available in bank CMAs. However, as this article in ANZ's *Blue Notes* explains, liquidity regulation introduced as part of Basel 3 in 2016 created further handicaps for CMT growth. Because deposits made by CMT's with banks are treated as potentially volatile, their use by the bank is in effect limited to investing in low yielding liquid securities rather than higher yielding loans. Consequently banks offer low rates to deposits made by CMTs, reversing what was a typical pattern of large deposits receiving higher interest rates than smaller (retail) deposits. To offer better rates than bank deposits, CMT managers are therefore essentially forced to focus on alternative securities investments. These do include, however, bank negotiable certificates of deposits (NCDs) which may have longer term maturities, and thus not being affected by the liquidity regulation. While investing in longer term maturities creates interest rate risk, the NCDs can be traded in the secondary market.

## 2.8 Pension Funds (Superannuation)

These are collective investment vehicles accepting long term retirement savings with limits on the minimum ("preservation") age at which a member can withdraw their investment (unless transferring

to another fund).[2] Concessional tax rates apply on employer contributions on behalf of employees to the fund, earnings within the fund, withdrawals in the retirement phase.[3]

Most funds in Australia are "accumulation" (defined contribution) funds where the value of the member's investment is determined by their pro rata share of the value of assets in the selected investment portfolio operated by the fund. "Defined benefit" funds (becoming less common and covering only about 10 percent of fund members) involve the operator of the fund giving a promise of a guaranteed amount (generally linked to time in the fund and some level of salary during (or at the end of) that time (and contributions made) to the member on retirement. The operator (often the company or government body employing the members) has an exposure to differences in the value of fund assets and the value of promises made.

In many countries (see here for comparative information) there is compulsory membership of some pension scheme for employees. Voluntary contributions may be possible and there may be significant tax concessions associated with contributions, fund earnings, and payouts.

Australian Types include:

- Retail (operated on a for-profit basis by banks or other financial institutions)
- Industry funds (operated on a not for profit basis by a board of trustees selected by the relevant union and employer associations)
- Corporate funds (operated for its employees by a company)
- Public Sector Funds (for government employees), and
- Self Managed Super Funds (SMSFs) of four or less members where the members are also the trustees of the fund.

The main activities of superannuation funds are the provision of long term retirement savings schemes involving investment of members' funds, and retirement income products. They perform valuable economic functions. First, they reduce transactions costs associated with the process of collecting, managing, and ultimately drawing down long term savings (and complying with regulations associated

[2] In 2020, the Covid19 crisis led the Federal Government to permit limited access (maximum $20,000) for individuals below the preservation age in financial hardship.

[3] In discussions of pension fund taxation, a triplet such as (t,t,0) is used as shorthand for tax rates applying respectively to contributions, earnings in accumulation phase, and retirement phase, where "T" stands for full taxation, "t" for concessional taxation, and "0" for no taxation. For Australia the triplet is (t,t,0) – where t = 15%, although (as in most cases) there are other complicating tax factors such as a lower tax rate (10%) applied to earnings in the form of long term capital gains, and ability to use franking credits attached to dividend income to reduce the effective tax rate below 15%. (It is generally around 10 per cent).

with any preferential tax treatment accorded to such savings). Second they pool funds from multiple contributors and are thus able to provide access to a broader and diversified investment universe. Third, they provide access to specialized investment knowledge to manage risk and possibly generate higher risk-adjusted returns for savers. Fourth, the range of financial products offered by pension funds increases the opportunity set available to individuals, and may involve risk transformation and risk bearing by the fund managers (such as in the case of defined benefit products). Fifth, their investment activities transmit any specialist information they have generated into financial market prices and may also involve governance and monitoring activities over firms in which they have equity investments.

This sector was given a significant boost when compulsory superannuation was introduced via the Superannuation Guarantee (Administration) Act in 1992, and the current regulatory framework established via the Superannuation Industry (Supervision) Act in 1993. Figure 3 illustrates its growth. As at 2021, the compulsory contribution rate was 9.5 per cent of salary, with legislation having been passed earlier for eventual increases to 12 per cent. There is ongoing debate about fund performance and fees, member choice of (or allocation to) fund, tax concessions for superannuation, suitable retirement income products, and a range of other issues. The 2020 Retirement Incomes Review provides a wealth of information, as does the 2019 Productivity Commission Report.

Four main types of funds exist. *Retail Funds are* operated (for profit) by (subsidiaries of) life companies, banks and other financial institutions acting as SRE's (Superannuation Responsible Entities). Many not for profit *Industry Funds* were created following the 1986 Accord (Mark II) agreement whereby unions agreed to forgo a 3 per cent wage rise in exchange for employer contributions to superannuation. (See here for a chronology of superannuation up till 2010 and here for more recent information). The Industry funds are governed by Boards of Trustees provided by employer groups and unions for the industry sectors they were associated with, although most have since become "open offer" funds available to workers from any occupation. Corporate Funds operated by single employers for their employees have declined in relative importance. Some of these operated as *defined benefit* funds which promised a guaranteed amount (or pension) linked to final salary (or some other metric) of the member. Similarly public sector funds operated by governments and their agencies were often defined benefit, but (as with corporate funds) have generally switched to *defined contribution* for new entrants over recent decades. As well as these "Institutional Funds", Self Managed Super Funds, available to groups of up to four (typically family) members have grown significantly while, at the same time, mergers between institutional funds (in search of economies of scale) are an ongoing occurrence.

While in accumulation mode, members of institutional funds are also provided with life and TPD insurance, with annual premiums (determined by insurance company providers of the group insurance on a community rating basis) taken out their accounts.

In retirement mode, members in defined contribution funds can withdraw lump sums and/or draw funds down from their managed account (at a rate at least equal to the government-prescribed minimum drawdown rate for their age).

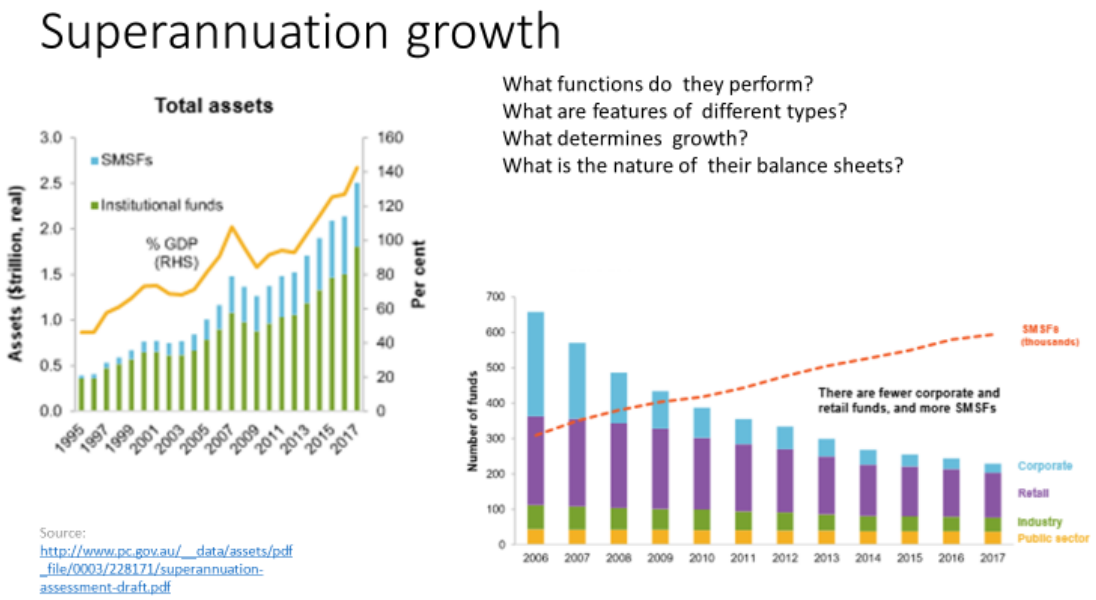



FIGURE 3: SUPERANNUATION GROWTH

## 2.9 Life Offices[4]

These specialise in the provision of life assurance – directly for individuals and via group policies through super funds. They also operate superannuation funds, and are involved in the provision of financial advice and other financial service activities (including general insurance) via subsidiaries. APRA's register lists approximately 30 Australian life offices, including AMP, CML, MLC, and NML which were originally, but are no longer, mutual organisations and historically dominated the industry. Australian banks entered, and became a dominant part of the industry in the late 1990s, in some cases via acquisition of life offices, but began to exit the market from 2017. Many of the participants are subsidiaries of foreign financial services firms.

Life assurance policies can provide cover (involving payouts by the insurer to the insured) against events such as death, total and permanent disability (TPD), income protection, and critical illness or

[4] Background papers for the Hayne Royal Commission, available here, and a PJCCFS Inquiry into Life Insurance provide much information about the industry and products.

trauma. Generally, life cover in Australia is now via annually renewable policies. Historically (and still common in some other jurisdictions) whole of life/endowment policies were common and included a savings component. For such policies, rather than a premium schedule which increased with age (reflecting risk), a level schedule was used meaning that premiums in the early years exceed the cost of cover for that year. The residual was a form of savings which the life office could use to invest in assets to generate earnings accruing to the policy holder (or their estate) at death or some specified age. This long term savings/investment feature was a key feature, but its attractiveness disappeared when tax deductibility of premiums was abolished in the 1980s. (High operating costs in the form of commissions to agents and brokers selling life insurance policies led to relatively poor returns for policy holders). Some life companies (Challenger in particular) provide annuities but these have been out of favour over recent decades (although there has been some growth in recent years).

Some life companies came in for considerable criticism from the Hayne Royal Commission, particularly over unfair claims settlement practices, and also for failures in their advice activities.

## 2.10 Friendly Societies

Wettenhall (Pursuit, 2018) provides a concise overview of the history of friendly societies in Australia, noting that "Before governments stepped in to provide welfare, friendly societies provided vital financial and social support to many Australian communities". The benefits they provided included medical care coverage, funeral benefits, sick pay insurance. Downing (2012) examines how friendly societies changed in Australia in the half century prior to the First World War.

Nowadays, the small number remaining are a form of insurance company. Their main activities involve raising and investing funds from members as well as specific purpose activities (such as health insurance and long term specific savings). The main product is Friendly Society (Insurance) Bonds which are primarily a long term savings vehicle with a specific tax treatment (which is attractive for high marginal tax rate investors). (See here for analysis of their characteristics and role in saving for life-cycle events). There are now a relatively small number of small societies, some such as Australian Unity remain as mutuals. Others such as IOOF demutualised and expanded activities into a broader range of financial services.

## 2.11 General Insurers[5]

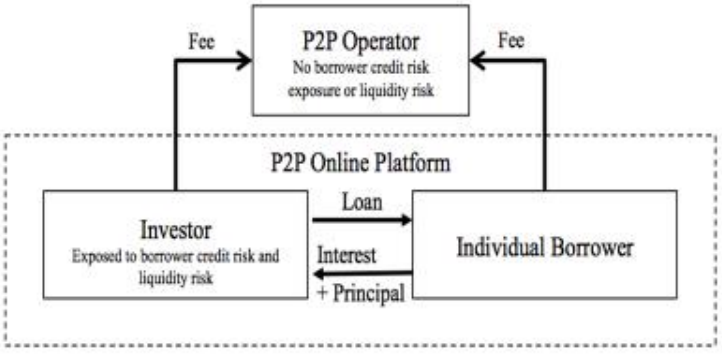
These are referred to in some other jurisdictions as Property & Casualty Insurance. They provide house and contents insurance (theft, fire, flood), Car insurance, Professional Indemnity, Third-party liability, Workers Compensation insurance, Business Interruption Insurance, Pet Insurance etc. Some of these types of insurance (3rd party, workers comp) are mandatory for individuals or businesses and in some States are provided by a government insurance agency rather than a private insurance company.

[5] The background papers (Nos. 14, 26, and 27) for the Hayne Royal Commission provide information on general insurance.

There are a large number of general insurance companies in Australia (some are subsidiaries of overseas insurers). A list of those who are members of the industry association *The Insurance Council of Australia (ICA)* can be found here.

## 2.12 New innovations: Platforms - Crowd-funding, P2P/Market-place lenders

"Platform based financing" refers to situations in which the platform operator acts as a broker in bringing together those with funds to invest and those seeking funds, via use (typically) of a web site market place. Figure 4 illustrates the structure. It encompasses peer to peer (or market place lending), crowd-sourced equity funding, and other potential activities such as sale of existing securities (trade debtor obligations) by current holders to third parties. Within each sub-category there are a range of different business models and proprietary algorithms used.




*Often referred to as "Market place lending" –*
*where institutions rather than individuals are the investors*

FIGURE 4: PLATFORM BASED LENDING STRUCTURES

The Platform Operator will

- Assess borrower creditworthiness, advertise loan opportunity to investors
- Allocate interested investors to (many) borrowers
    - Determine interest rate which funds loan and satisfies investors and borrower
- Transfer loan funds from investors to borrowers, collect borrower repayments and remit to investors

The Investor bears risk of non-repayment by borrower and has funds invested for term of loan. The platform operator, in a "pure" model bears no credit (default) risk or liquidity risk - although many structures will involve special features which can create such risks. Figure 5 illustrates the risks for participants in platform lending arrangements.

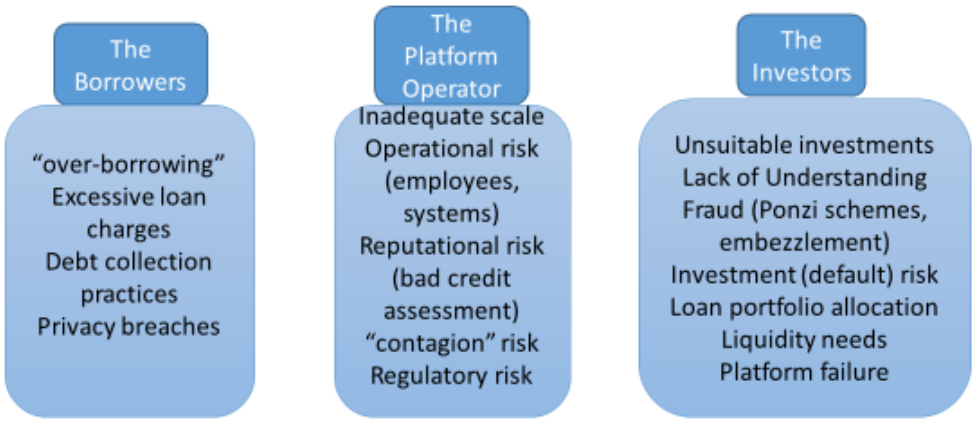



FIGURE 5: PLATFORM LENDING RISKS

Actual and potential business model structures for platform lending businesses include the following.

- Segregated client account models, in which investor funds are applied directly to funding the borrower
- Unit trust structures
- Notary arrangements in which a bank makes the loan on behalf of the platform and immediately provides investors with note giving partial ownership of the loan
- Guaranteed return models in which the platform operator provides a guaranteed return to investors.

Potential benefits from growth of Platforms are:

- Increased access to debt finance for borrowers – financial inclusion
- Wider range of investment opportunities for saver/investors
- More efficient allocation, involving risk based pricing, of finance
- Increased competition for incumbents – pressure for increased efficiency, lower margins, benefits for consumers of financial services

Impediments to growth include

- Unclear regulation
- Regulatory barriers to entry
- Unreliable telecommunications networks
- Inadequate access to credit information

- Customer identity verification problems
- Scale economies and start-up funding

Regulation of Platform Financing is challenging, because it is a relatively new form of financing activities not easily fitting existing regulatory arrangements (which are often based on pre-existing institutional characteristics). P2P operators perform functions similar to: Market (exchange) operators; Provider of individual managed accounts – like stockbrokers; Credit broker; Investment banking (loan "IPOs", issuer of securities, "private placements"); Financial advice; Credit rating agency; Securitiser (pooling loans for investors); Managed investment scheme. (See Murphy and Davis (JASSA 2016) for a discussion)

There are a number of typical types of regulatory approaches found globally (see Figure 6) – although the pace of change is such that any taxonomy is likely to quickly become out of date.

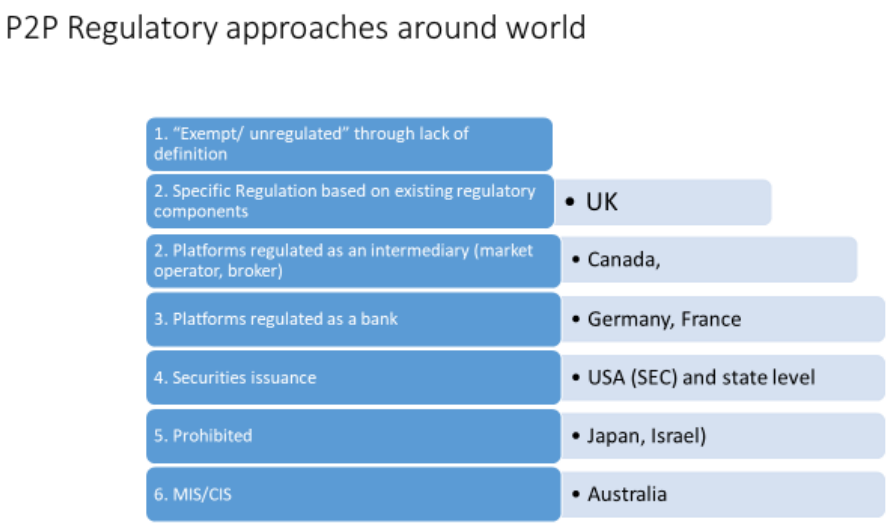



FIGURE 6: REGULATORY APPROACHES TO P2P LENDING (AS AT 2017)

In Australia, P2P platforms have tended to adopt the label of "market-place" lenders. This reflects the fact that loan funding occurs via their marketplace, but that most of the funding comes from institutional lenders rather than individuals (peers of the borrowers). Indeed a number of institutions have found P2P operators a useful vehicle for expanding their loan portfolios. Credit Unions with members who are primarily savers rather than borrowers have found investing in loans via the P2P platform valuable. This does, of course, raise the issue of whether they can have confidence that the P2P platform is (a) appropriately identifying borrower risk and (b) meeting responsible lending requirements. Other non-bank lenders such as Liberty Finance, which is using MoneyPlace's platform,

have done similar. However, in some of these cases, they will simply outsource the handling of loan applications they receive to the P2P operator.

## 2.13 Custodians[6]

Custodians provide various services associated with asset (cash, shares, bonds, etc) safekeeping and trade settlement to institutional investors such as superannuation funds and fund managers. Table 1 provides a list of custodians operating in Australia and their relative size. They can be seen as a specialised outsourced back-office service, enabling separation of duties between investment managers and brokers and ownership of client assets. Master/Global custodians operate across borders with their sub/domestic custodian arms providing domestic services.[7] Principal services include:

- Custody – asset safekeeping, trade settlement, dealing with corporate actions
- Accounting and valuation, tax reporting, unit pricing (providing "books of record")
- Regulatory reporting
- Performance measurement and analytics
- Data management
- Trade support

Other services may include such things as securities lending, hedging, collateral monitoring trade execution.

Custodians may establish special purpose vehicles as "nominee companies" to hold client assets. (Consequently, aggregated holdings of their clients' holdings of shares in particular equities typically show up in the lists of top shareholders in Australian companies – hiding the identities of the ultimate beneficial owners).

[6] More information available at the Australian Custodial Services Association (and a detailed document here) and also The Clearing House White Paper

[7] **Domestic Custody**: Australian assets held directly in the capacity as custodian or sub-custodian.
**Global Custody**: The safekeeping of assets (other than Australian) either directly through a proprietary global custody network or via a global sub-custody network. Includes managed funds/unit trusts domiciled offshore and held by Australian clients.
**Master Custody**: Includes assets held for Australian domiciled clients for which an organisation performs any value added services, where value added is defined as being anything in addition to core custody. Assets included in this category are likely to have also been included in the Domestic Custody and Global Custody categories. To prevent double counting, where value add services are being performed for multi-tiered/fund-of-fund structures assets are only included once, and not duplicated at each level of the structure.

With the significant growth of investment funds in recent decades, Australia has become a major regional hub for custody and investment administration services. Total assets under custody for Australian investors reached $4066 billion at December 2019 up from $1,360 billion, as at 31 December 2006[8]. Around ¾ of those assets were domestic (versus foreign) assets. Custodian services for Australian assets of foreign investors are also provided.

Most Custodians are typically bank-owned entities, and those operating in Australia must have an AFSL. The custodian is a trustee of assets and must act on instruction from the beneficiaries.

**TABLE 1:AUSTRALIAN CUSTODIANS AND AUSTRALIAN INVESTOR ASSETS UNDER CUSTODY (SOURCE: ACSA)**

| Rank | Provider | 31-Dec-19 |
|---|---|---|
| 1 | J.P. Morgan | 866.7 |
| 2 | NAB Asset Servicing | 578.0 |
| 3 | Northern Trust | 576.0 |
| 4 | Citigroup | 575.4 |
| 5 | State Street | 511.4 |
| 6 | BNP Paribas | 511.0 |
| 7 | HSBC Bank | 200.3 |
| 8 | RBC Investor & Treasury Services | 129.3 |
| 9 | Ausmaq | 64.5 |
| 10 | Netwealth | 28.5 |
| 11 | BNY Mellon | 24.6 |
| | **Total** | **4,065.7** |

## 2.14 Islamic Finance

The two per cent of the Australian population who want financial products which are Sharia-compliant face significant problems in accessing such products.

Islamic Finance has a number of characteristics, the best known one being a prohibition on interest. Others include limits on acceptable insurance arrangements and restrictions (which look much like Socially Responsible Investment criteria) on acceptable investments. This video lecture by Prof Mervyn Lewis provides an overview, while this paper by the same author provides an analysis of Islamic banking.

Personally, I don't see the point of these religious-based constraints – but in a free society governments should not put unnecessary impediments in the way of those who want to adhere to

[8] The Australian Custody Services Association (ACSA) Statistics Report (Dec 2006)

them. More importantly, it should be a concern that some regulations, such as compulsory superannuation, and institutional indifference, virtually force individuals into financial products not compatible with their beliefs. Taxation laws and policies can also be an issue, and this was investigated in a 2016 report by the Board of Taxation

Among the various problems which exist, two in particular stand out. The first is the question of designing Islamic financial products enabling families to buy homes. Because interest is prohibited, a conventional mortgage loan is not acceptable.

As in many other situations, Islamic finance works around this by some simple financial engineering. The financial institution buys the house an individual wishes to own, and leases it to the individual on agreed terms in a long term contract. At the end of the contract the ownership of the house is transferred to the individual.

The impediment to this simple work-around has been double stamp duty, once on the initial purchase by the financial institution and second when the house is transferred to the owner at the end of the lease. Under conventional mortgage finance, stamp duty is only levied once when the house is initially purchased. And stamp duty, levied by State governments has been significant – up to 6 per cent of the house value!

While the Victorian government has removed this impediment, by allowing house purchase under Islamic financing arrangements to only incur one lot of stamp duty, other State governments have been unwilling to take that step. Perhaps it is the potential revenue cost – although if double duty prevents use of the Islamic finance approach, there is little revenue actually to be lost!

An alternative design, whereby the homebuyer is registered as owner when the property is bought is a form of “rent to buy” scheme. The rental payments made repay the amount borrowed plus some profit fee for the provider of the funds.

The same problem of obtaining loan finance arises for Islamic financing of small business enterprises, and may be compounded by tax and legal issues.

A second area warranting attention is superannuation. All employees, regardless of their religious faith (or lack thereof) have compulsory contributions paid by their employers into a super fund of their choice. And, there are significant tax advantages for voluntary contributions as well.

But what does the typical institutional super fund’s portfolio allocation look like? Even allowing for the provision of member choice between different investment options, the only portfolios generally available will have a significant fixed interest component.

This portfolio allocation is based on the widely held view of trustees that prudent asset allocation involves a significant share of investments paying interest. That is not particularly comfortable for the member wanting to have only Sharia-compliant investments. Another problem arises from the prohibition of investments in certain types of activities (including businesses generating income from charging interest, alcohol, tobacco, gambling etc).

In principle, it would be possible to construct portfolios which do not have an interest component but which have some "fixed-interest like" investments. Established infrastructure assets are one example. Lease income is another example, such as might flow from Islamic financing of home ownership as discussed above. But more relevant is whether conventional institutional norms about what are acceptable portfolio allocations for super, and institutional inertia, should prevent or inhibit Sharia-compliant super options being offered to individuals forced to invest in super.

One response may be that self managed super is always an option – but that is only a cost-effective option for individuals with substantial super savings. While it does look as though some institutional super offering of Sharia-compliant super is now emerging – the impediments and lack of institutional interest have apparently been substantial.

Will Islamic finance grow in Australia? Probably yes, but primarily in the context of what is needed to make investment in Australia attractive to wealthy international Islamic investment houses – because that caters to the interests of, and potentially benefits, the financial community. That issue is worthy of attention, but there is probably more value in focusing on whether impediments to providing suitable savings and funding vehicles affecting this group of individuals and businesses can be reduced.

There are a number of Islamic financial institutions operating in Australia. These include Islamic Co-operative Finance (IFCAL), IBA, MCCA, Crescent Wealth. In late 2020 the ABC reported on plans for the establishment of an Islamic bank, with the promoters hoping to receive a banking licence from APRA in 2021. Several of the major banks have offered Shariah-compliant products for use by Islamic financial institutions and individuals.

## 2.15 Other types of financial institutions

Any attempt to provide an exhaustive list of financial institution types is confounded by changing practices including developments in fintech. As well as those relatively well known types considered above, others described elsewhere in this book are:

- Payday lenders (see section 8.5)
- Pawnbrokers (see section 8.4)
- Buy Now Pay Later (see section 8.7)

- Supply Chain Financiers (see section 8.3)
- Microfinance institutions (see section 8.8)
- Remittance providers (see section 14.4 and here)
- Central clearing counterparties (CCPs) (see section 26.7)

# 3. The Changing Financial System

## Contents



## 3.1 Introduction

The last forty years or so have been ones of great change for banks and other financial institutions and their staff. They have had to cope with the impact of deregulation (and

subsequent re-regulation)[1], increased competition (both with traditional competitors and with other financial service providers), and explosive growth in new technology – prompting the recent growth of "fintechs".[2] The outcome has included a widely expanded range of financial products, new methods of delivering financial services, and increased attention to costs, risks, and profit contribution of various activities. In Australia, the major banks have recently been in the process of divesting themselves of insurance and wealth management activities, after expanding into those areas of "bankassurance" in the latter decades of the twenty-first century.

Change will continue, affect the structure of financial institutions, the range of financial products and services produced, and methods of delivery used (particularly the use of electronic communications and documentation). As well as technological change, and partly reflecting that, the regulatory environment will continue to change. Like a dog chasing its own tail it will continue to adapt in response to changes in financial markets which it in part induces, a process labelled the "regulatory dialectic" by Professor Ed Kane. Competition will continue to be pervasive as financial service providers mutate and seek to invade the turf of non-traditional rivals. The types of competition will continue to change as the technology explosion alters the costs of different ways of creating and delivering various financial products via financial innovation.

An implication of this is that knowing how financial institutions are currently structured and operate may be of limited use several years hence, as financial institutions and products evolve in response to innovations. But, it is useful to understand how the current structure of the Australian financial system emerged, since that can also provide insights into future possible changes (as well as explaining why the system and institutions are structured as they currently are). So, the following section provides a brief outline of the recent history of Australian financial sector development incorporating an overview of regulatory change over that period.

[1] Typically referred to by policy-makers as "reform".

[2] The potential for the "tech giants" such as Apple, Google, Microsoft, Amazon etc to expand into the provision of banking and other financial services should not be underestimated.

## 3.2 Financial Sector Evolution in Australia

A fundamental change occurred in the Australian financial sector as a result of substantial financial deregulation starting at the end of the 1970s. This reflected a wide-spread ideological shift towards acceptance of the free-market economics paradigm, but also the result of the 1970s stagflation demonstrating inadequacies of the highly regulated financial system.

### The Pre-deregulation landscape

Prior to the late 1970s the Australian financial system was heavily influenced by regulation introduced at time of World War II. The focus of financial policy was on monetary policy with banking sector safety based on a policy of limiting the risk-taking ability of banks. There were a small number (12) of trading banks, with a significant role for government owned (savings) banks[3], and preclusion of foreign banks. The trading banks were subject to extensive direct controls including

Interest rate controls (including zero interest on chequing (transaction) accounts)

Lending directives

Liquidity ratio requirements (the variable reserve requirement known as the Statutory Reserve Deposit (SRD) ratio

Portfolio controls – involving required minimum holdings of government debt and liquid securities (the LGS ratio) and a minimum 30 day maturity for term deposits for Trading Banks.

Limits on activities

The savings banks were restricted by:

Deposit raisings were restricted to the personal sector and subject to interest rate ceilings

Asset portfolios were restricted essentially to government paper and household mortgage debt

An LGS type requirement of initially 70 per cent applied which was gradually reduced to 40 per cent by the end of the l970s.

[3] Until 1960 the Government-owned Commonwealth Bank undertook both savings and trading (commercial) bank activities and also acted as the Central Bank. The private banks were permitted to have Savings Bank subsidiaries in 1956.

Mortgage interest rates were subject to government imposed ceilings.

Only "at call" and "notice of withdrawal" accounts were permitted (although the state savings banks were permitted to offer chequing accounts).

But the banking groups also had finance company subsidiaries (accounting for over 50 per cent of that sector's assets) and were allowed minority interests in money market corporations (merchant banks). Through their finance company activities the banking groups were able to partially avoid government regulation, since Federal government powers to control NBFI activities contained in the l974 Financial Corporations Act had never been proclaimed.

Interest rates were pegged and government bond issuing procedures were structured to be consistent with that, and the exchange rate was fixed. Life Insurance companies (with the industry dominated by four large mutual companies) faced significant portfolio restrictions (involving required amounts of investment in government debt). The insurance companies were relatively important savings vehicles through the savings element in whole of life and endowment insurance policies, and managed the bulk of the very small amount of superannuation savings which existed outside of public sector and company based schemes. However, their growth was relatively slow particularly in the 1970s when inflation reduced the real returns on the large proportion of fixed rate assets in their portfolios. Regulation of non-bank financial institutions, and of companies and securities markets, was divided between State and Federal Governments. Foreign banks provided finance for companies and institutions via representative offices and merchant banking and other non-bank structures – often operated in conjunction with local entities.

Notably, while competition between stockbrokers was restricted, the securities (stock) markets were subject to very little effective regulation.[4]

Bank regulation led to the growth of unregulated (or less regulated) financial institutions, creating complications for monetary policy. In particular, retail lending constraints on banks

[4] Mees and Ramsay (2008) provide an historical overview and analysis of the development of securities regulation in Australia, highlighting the lack of effective government (or self) regulation – especially prior to the establishment of the National Companies and Securities Commission (NCSC) in 1980. They also highlight many of the major corporate finance and securities market scandals which occurred over the years.

led to the growth of finance companies, building societies, and credit unions, while interest rate controls prompted the growth of cash management trusts (money market mutual funds). Automatic teller machines began to appear, phone banking became a service offered, and the Australian banks rolled out a new credit card (BankCard) available to the bulk of the population as a competitor to the less readily available Visa and MasterCard products. A process of bank branch closures began, reflecting the ability of banks to now compete via prices rather than excessive branching, as well as the opportunity to deliver financial services via technological innovations – although it was not until the mid 1990s that internet banking (in a relatively primitive form) began to emerge.

During the 1970s, the surge in inflation made constraints on interest rate levels problematic and increased the distortionary effect of portfolio restrictions on banks and insurance companies.

## The Deregulation Phase (1979-1990)

Deregulation took hold in the latter part of the 1970s. The Campbell Inquiry (appointed by the Liberal-National Party, Fraser, government in 1979 reflected the government's free market philosophy, and recommended significant deregulation in its Final Report issued in 1981. It took as fundamental that: competitive neutrality should apply; social and sectoral objectives should be tackled through fiscal measures; some risk free, deposit type, asset should be available. Even the election of a Labor government, which had nationalization of banks in its party platform until the late 1970s, did not reduce the impetus to deregulation which had begun during the life of the Campbell Inquiry. The Martin Report, appointed by the Hawke government to review the Campell Inquiry findings endorsed the broad deregulatory thrust in its report in 1984. Among the changes were removal of interest rate ceilings on banks, Government bond market structure changes (including new issue tenders), adoption of a flexible interest rate policy and removal of compulsory portfolio holdings requirements. Banks were allowed to compete in expanded range of deposit and loan markets, portfolio restrictions were abolished. The exchange rate was floated in 1983, and limited foreign bank entry permitted in 1985, and by 1986 most of the deregulatory phase was completed. During this period mergers with competitors led to the four major bank structure common today, the first new domestic bank was approved[5], and a process of mergers between building societies

[5] The Australian Bank, which was acquired by the SBV in early 1989.

and credit unions began. Several building societies demutualized (as did major Life Insurance offices) and became banks (such as Challenge Bank and Advance Bank), many of which were later acquired by the major and other regional banks.

The consequences were dramatic including a rapid expansion of bank lending – much of which turned out to be imprudent, leading to a financial "crisis" in 1989-91. There were large loan losses for banks, including the "failure" of two State government owned banks, and the "near failure" of several major banks and a large building society failed. There were significant business failures (particularly of the "entrepreneurs" who took advantage of lax lending by banks) and a property market collapse. There were a number of managed fund (unit trust) failures (including freezing of withdrawals). Investors, concerned about declining asset values, attempted to withdraw funds from illiquid open ended property and mortgage funds, leading to liquidity crises for those funds.

With hindsight the cause of the problems were obvious. Deregulation was not accompanied by improved bank governance, improved market discipline or adequate prudential regulation. Banks were given freedom to compete, and that led to a race to the bottom in terms of credit quality as banks chased loans. Inadequate accounting and disclosure requirements for corporate clients also contributed as did inadequate risk management systems in banks.

## The 1990's

Following the problems of the financial crisis, much greater attention was paid to prudential regulation, including the introduction of the Basel Accord (Basel I) capital requirements. The Accord had been agreed in July 1988 for introduction by 1992 by G10 members (too late to prevent the imprudent lending of the 1980s). A process of coordination of financial and corporate regulation by State governments and transfer of some responsibilities to the Federal government began[6], culminating in a range of changes in the late 1990s following the Wallis Inquiry and a Major Review of Corporations Law. The regulatory restructure (often referred to as the "twin peaks" model) occurred in 1998 with the creation of a separate prudential regulator (APRA) and the securities markets/ companies (conduct) regulator (ASIC). The former was given responsibility for prudential regulation of ADIs (banks), insurance, and

[6] These involved creation in 1991 of the Australian Securities Commission (to later become ASIC in 1998) and AFIC (Australian Financial Institutions Commission) – which operated until 1998 - to oversee state regulation of building societies and credit unions.

superannuation, while the latter also took over responsibility for financial consumer protection from the ACCC. The RBA remained responsible for monetary policy, financial stability and payments policy.

The start of the massive growth of superannuation followed the incorporation of employer superannuation payments into industrial relations agreements by the Hawke Government's Wage Accord in the 1980s and introduction of compulsory employer superannuation (pension) contributions in 1991. The SIS legislation in 1993 introduced the regulatory framework for supervision of superannuation funds. The major review of corporations law, known as CLERP (Corporate Law Economic Reform Program) culminated in legislation in 1998 and 1999 including the Financial Sector Reform (Consequential Amendments) Act, the Company Law Review Act, and the Managed Investments Act. Company law reforms related to such matters as: fundraising, directors duties, financial reporting, takeovers, while the Managed Investment Act introduced the notion of Responsible Entities for managed funds.

## The early 21st Century

The regulatory changes of the 1990s led to a regulatory approach involving a strong distinction between the prudentially regulated sector (banks/ADIs, insurance, institutional superannuation funds) and the non-prudentially regulated sector. ADIs and insurers faced capital requirements and APRA supervision, but there was no explicit government protection. The non-prudentially regulated financial sector, included non-bank financial institutions such as finance companies, managed investments schemes, direct investments in shares and bonds etc. Providers of financial services and products (but not credit) were required to hold an Australian Financial Services Licence (AFSL) following its introduction in 2001. For the non-prudentially regulated sector, wholesale investors were assumed to be able to identify and manage risks, while retail customers were precluded from wholesale markets. The approach to financial consumer protection was based on the triumvirate of "Education, Advice, Disclosure" and *"Caveat emptor" (buyer beware).* Securitisation boomed, and there was a proliferation of structured financial products.

While there were some financial sector "hiccups" at the start of decade, such as the (international) tech stock boom and bust, and the failure of the major insurance company

HIH in Australia[7], the initial years of the decade were relatively calm. Indeed it was labelled as the "Great Moderation", a period of low volatility, an asset price inflation build-up, increasing leverage, low pricing of risk, and significant financial innovation. Despite sectoral and international imbalances, it was a time of low inflation and sustained economic growth. There were minor developments in the regulatory arena with eventual agreement on Basel 2 in 2006. Concerns about financial system and economic stability began to emerge, but not in any way predictive of the Global Financial Crisis (GfC) which was to emerge in 2007-2009.

## The GFC

The Australian banking sector emerged relatively unscathed from the GFC, although there was strong government fiscal and monetary policy support which made that possible. Several smaller banks, with weakened financial positions, were taken over by the major banks. The Government introduced a deposit guarantee scheme in Oct 2008[8] and provided the option for banks to purchase guarantees over new wholesale borrowings. It also provided support for the securitization sector. There were significant failures of finance/investment companies which were part of the non-prudentially regulated sector, meaning that there were no credible arguments for government compensation for customer losses. But the experience exposed the deficiencies in the education, advice, disclosure (EAD) approach and many financial consumers suffered substantial losses.

## Post GFC

The GFC led to a re-regulatory phase, most notably the introduction of Basel 3 regulatory changes involving enhanced prudential regulation of banks, with those changes not being "finalized" until the early 2020's. The policy response to the GFC ushered in a period of low interest rates which was further reinforced by the policy response to the Covid Crisis in the early 2020's.

[7] The Australian Government introduced a large government funded compensation scheme for policy holders, which called into question the oft-touted claim that there was no implicit government protection of financial institutions.

[8] Known as the Financial Claims Scheme, the initially unlimited, then $1 million guarantee cap, eventually was adjusted back to the $250,000 cap which currently applies.

There was an increased regulatory focus on financial consumer outcomes (and the demise of EAD) following the GFC experiences. This led in April 2010 to Government legislation directed at the reform of the financial advice industry, and introduction of Responsible Lending Obligation (RLO) requirements associated with the introduction of Australian Credit Licences (ACLs). But, despite that, the Australian banks and other financial institutions continued to engage in behavior which had adverse consequences for financial consumers, ultimately leading to the establishment of the Hayne Royal Commission which reported in early 2019. This exposed the extent of such misconduct and misbehavior and led to a large number of recommendations for reforms to governance, accountability and remuneration arrangements in the financial services sector.

That need for improved regulatory arrangements had been noted earlier by the (Murray) Australian Financial System Inquiry (AFSI)which recommended in its 2014 report that ASIC should be given extended powers through introduction of Product Intervention Powers (PIPs) enabling temporary banning of unsuitable financial products and services, and Design and Distribution Obligations (DDOs) upon financial product producers and distributors. These became operational in the early 2020's.

The Murray AFSI also noted the impact of the rapid growth of "fintech" on the financial sector, and made a number of recommendations in that area. It should not be underestimated how many of the financial products and services currently available are only available because of advances in technology, and could not have been possible twenty years or so ago. Regulation is always struggling to keep up with the effects of those technological changes. Since then the pace of development of fintech appears to have increased, including the growth of financial services and products and information provided by way of internet platforms, innovations in payments arrangements, and emergence of crypto-currency. One consequence has been the need to focus on the consequences for financial sector competition (which was investigated in a major Productivity Commission Report (2019), and legislate to promote social benefits such as those expected from providing consumers with data ownership rights via Open Banking legislation.

As explained at the start of this brief history, the financial sector is not static. Change will continue. In 2021, for example, the Liberal-NP Government has been digesting the 2020 Retirement Incomes Review and is in the process of making changes to the regulation of superannuation. It has also attempted to roll back some of the financial consumer protection

regulation (such as RLOs) reflecting its underlying free market ideology (if not practice) and pressure from vested interests in the industry who claim that there are significant adverse consequences for lending.

Because financial regulation is shaped by historical forces and new developments (such as technological change), and is a major influence on future financial sector development, understanding how such changes have occurred and led to the current *status quo* is important for understanding likely consequences of ongoing change.

## 3.3 Drivers of Change

The preceding section briefly examined how the Australian financial sector has changed since WW2. Implicit in that story were a number of possible causes of change, and it is useful to consider each of those possible causes in a more general context to assist in thinking about possible future changes in the financial sector. We start with a discussion around theories of innovation.

### Theories of Financial Innovation

There are two general requirements for a viable financial innovation. It must either make markets more *operationally efficient* or it must involve *market completion*. The two requirements are interrelated. The latter relates to providing risk-reward opportunities which were not previously available either to any party or to some sub-group (such as enabling individuals the opportunity to invest in a market portfolio of shares through an ETF). Improved operational efficiency refers to developments which remove market distortions, reduce costs, and also make it feasible to provide new products and services which complete markets.

Consistent with Kane's perspective outlined earlier, one stimulus for innovation is the existence of binding constraints limiting firm profitability (such as regulation). These provide an incentive to find ways to loosen the constraints and as the impact of a constraints increases, incentive to expend resources to loosen that constraint increases. Changes in technology and increased financial competition can also contribute by, respectively, reducing the cost of making innovations and increasing the cost of not innovating (and losing market share to competitors who do innovate).

It is also relevant to look at the demand side. Economic conditions, such as high inflation or volatility of financial prices can create a demand for innovations which ameliorate adverse effects.

Differential taxation of different sources or uses of income is also important. Where taxes distort returns, innovation to take advantage of those distortions can be expected. Such arbitrage need not wipe out the originating profit opportunities, thus providing a continuing stimulus to the innovation.

The role of financial institutions in financial markets and the agency problems thereby created are also relevant. Innovations can emerge to solve moral hazard problems, even though they appear to offer little new in the way of completion of markets.

## Electronic Technology and "Fintech"

Over recent decades, technological change has altered fundamentally a number of features of the financial system. Bank payments services are a good example. Payments services have evolved from predominant reliance on cash and cheques, through paper based credit card facilities, direct credit of payrolls, and debit cards to popular acceptance of EFTPOS and ATM facilities. More recently the development of trade and payments via the internet, provision of web-based banking services, and mobile phone "apps" are accelerating the pace of change. Central Banks are investigating the implications of possible introduction of central bank digital currencies (CBDCs).

Such changes have had significant effects on bank cost structures, and the ability for customers to access payments and other banking services without interacting with bank staff has had an effect of "de-personalising" banking. Staffing numbers have fallen as technology has provide alternative ways of performing front-office and back-office functions. Customers are increasingly able to obtain information about, and purchase alternative services and products via the internet.[9] Given the growing competitive significance of customer loyalty (discussed below), this de-personalisation creates some major challenges for strategists in financial institutions.

Doing business over the Internet involves problems and opportunities which are familiar to financiers. Payment can be effected immediately at a keystroke, but delivery of merchandise takes time. Standard trade finance issues assume importance, providing financiers with

[9] The growth of *comparison sites* where financial consumers can compare (and purchase) alternative offerings of loans, investments, insurance etc., create new regulatory problems for financial consumer protection.

business opportunities from facilitating trade on the Internet (where PayPal and AliPay have prospered). Delivery of financial services can be divorced from physical location of the supplier relative to the consumer. Competition becomes increasingly global – unless national regulators create barriers which prevent such developments

Regulators and Governments face significant problems from such developments. Consumer protection becomes more complicated – as customers can access (via the internet) suppliers of services who operate outside of their physical jurisdiction. Traditional measures of market competition and power start to look less robust, as markets become more contestable by physically far distant competitors. Prudential regulators face problems of dealing with financial institutions whose activities increasingly cross national boundaries as physical presence becomes less of an impediment to service provision.

These developments also raise numerous issues for national governments in the area of competition policy associated with the operation of payments technology.

## Customer Focus and Customer Loyalty

Once, customers of financial institutions typically remained loyal for life to the financial institution they first embraced. The long-standing provision and subsidization of school banking accounts (analysed in this 2020 ASIC report), such as the "Dollarmite" scheme operated by CBA reflected this. This raised concerns about competitive equality for institutions not able to negotiate operation of such programs with school authorities, as well as about the benefits to children participating in the scheme. The CBA scheme became mired in controversy in 2018 when remuneration incentives for staff, linked to new accounts created, led some to set up thousands of "phoenix" accounts. The Victorian government was one which subsequently prohibited such schemes in public schools from 2021

Independently of the school banking schemes, now, like that other great social institution of marriage, lifetime commitment is no more, and financial institutions must continually woo their existing customers.

Here financial institutions walk a tightrope. They appear to profit most from long term customers. A prime objective is thus to entice customers away from competitors into a long term relationship creating fierce competition in the area of "special deals" for new customers. The risk is that unless one's own long term customers are looked after they will be poached by others pursuing similar strategies. If long term customers are not to be lost, financial institutions need to ensure that they share with customers some of the cost savings that a

long term relationship brings, and avoid excessive exploitation of customer immobility resulting from account transfer costs.

There is plenty of evidence that Australian banks have exploited the "stickiness" of their customers. One tactic was via the use of "break" or "exit fees" whereby, for example, a borrower wishing to pay out a home loan early to switch to another provider would be charged an explicit fee. This practice was prohibited by legislation in 2010 (although fees for fixed rate loans and for reasonable costs resulting for the lender were still allowed, as described in more detail in ASIC Regulatory Guide 220).

More recently the differential between the rates on variable rate mortgages offered to new borrowers versus those charged to existing borrowers has become an issue of contention. The higher rates charged to existing borrowers have been described by some as a "loyalty tax". The RBA found in 2020 (using data from its securitization data base) that the gap was in the order of 40 basis points p.a. (on a $500,000 loan that amounts to around $2,000 extra interest per year).

The ongoing challenge for financial institutions is thus to develop pricing structures for services which achieve three goals. First, they must provide incentives for new customers to switch business. Second, they must provide incentives for long term customers to remain with them, and/or increase the costs of leaving. Third, the overall pricing structure must deliver adequate profits. It will be necessary to pass on to long term customers some part, but not all, of the benefits of lower costs of long term accounts, and cross subsidise new customers in the hope of recouping those subsidies as a long term relationship develops.

As with any situation where cross subsidisation is involved, this is fraught with dangers. Longer term customers may leave if their share of cost savings is felt inadequate, although by doing so they destroy the asset (a long term relationship) which creates their potential benefit. New customers may be enticed away by competitors, so that initial subsidies are never recouped. For pricing strategies to work, they must be carefully designed and continually adapting to changes by competitors.

For long term relationships to evolve, financial institutions need to examine how to best respond to the technological de-personalisation of the financial services industry. At the business/institutional level, strategies which are relevant include:

- greater emphasis on the roles of account relationship managers to create personal links;
- provision of specialised advice and services upon which the customer becomes reliant;
- inducing customers to "lock in" to software etc. which interfaces with the financial institution's systems (and is costly to change from).

At the retail level, the importance of the financial advice and planning industry indicates an area in which financial institutions can expand services in a way which encourages customer loyalty. But this involves a different skill base and career path for employees to that traditionally seen, and has proved fraught with operational risk dangers. Following the revelations of the Hayne Royal Commission (although already in progress prior to that) the banks have moved away from providing financial advice and sold those businesses to others.

## Pricing and Fees for Service

In a competitive market where there are few regulatory constraints on prices which can be charged, it is important to have good information about the costs of providing various services and products. If competitors link prices to the cost of production, a bank which doesn't will quickly suffer losses. It will attract business for products where it is undercharging and lose business where it is overcharging.

Large financial institutions have in-depth knowledge on the cost of particular services (although allocating many costs, such as those of head-office, is somewhat problematic). In some cases they will use activity based costing to build up the total cost of a product or service from the component activities (staff time, physical inputs, etc) involved in production. Estimates of profitability by lines of business are important for internal resource allocation.

Increasingly, adequate profitability of individual lines of business is being required. The stock market emphasises the need for a return on equity capital adequate for the risks involved, and penalises the share price of financial institutions not delivering. The regulatory approach to supervision of financial institutions, based on risk weighted capital requirements, has further focused management's attention on the cost of equity capital. Those external pressures find internal reflection in the need for business units to return an appropriate risk related return on capital employed, and to do so by appropriate pricing of individual products to recover both explicit costs and required return on equity capital.

The need to return an adequate return on individual products arises because given the mobility of customers, or more particularly their money and business, it is not generally feasible to cross subsidise the provision of some products at prices below cost by excessive charges on other products. Customers, naturally, use intensively the products which are subsidised and shun the expensive products, so that no excess profits are made to support the cross subsidisation.

That does not mean that some cross subsidisation is not feasible across products where customers consume them as a "package". A retail transactions account, for example, involves a payments services facility (itself incorporating many individual services) as well as a deposit facility. Some forms of cross subsidisation across these services are feasible if they limit the extent to which customers can exploit the cross subsidisation, and this is reflected in the variety of systems of account fees and charges used by financial institutions.

## Industry Structure and Competition

The composition of the financial industry is continually changing, under the influence of number of factors. First, there is international competition. National barriers to entry into domestic financial markets have generally fallen over recent decades. Standardisation of prudential regulation via common capital requirements based on international proposals also levels the international playing field. Combined with modern electronic technology, which reduces the significance of geographical location, commonality of prudential supervision may enable far distant institutions to compete with locals for some parts of the financial services market, even in retail markets. Absent restrictive entry legislation, competition for business in the era of modern technology is increasingly global rather than national.

A second factor affecting the structure of the financial services industry is the impact of modern technology on the cost structures of institutions of different sizes. Numerous statistical studies have provided mixed evidence on whether "bigger is better" from a cost perspective. Average costs do not appear to decline as size increases above some mid-size level, but very large entities do appear to capture some economies. Of course, with the changes in technology currently being experienced, that historical evidence based on old data may be outdated. Certainly, managements of financial institutions appear to believe that bigger is better. That phenomenon may also reflect their personal prestige arising from running a larger organisation, or the fact that greater market power may arise from larger size, or that certain attractive activities can only be conducted by large scale institutions.

Blurring of the boundaries between banking and other financial service providers is a continuing phenomenon. Banks have expanded into "non-banking" areas, as evidenced by the growth of "bankassurance", the combining together of traditional banking and life insurance / funds management activities as well as "wealth management" involving financial advice. But the absence of financial benefits from economies of scope, and control problems in large complex institutions, have seen most Australian banks reverse that trend.

All types of institutions are continually facing new competitors. Mortgage Brokers (such as Aussie Home Loans) have made their presence felt in Australia, facilitating the securitisation industry and initially provided a new source of competition to the housing loan business of banks. Financial planners and advisors have usurped the traditional role of the bank manager and life insurance agents as a source of advice, and increasingly influence the direction of savings funds of their advisees. Large companies have sophisticated in-house treasury functions which enable them to undertake activities previously provided to them by banks. The funds management industry has boomed, with an explosion of mutual funds (unit trusts) available to investor / savers. Combined with growth of superannuation savings this has led to an increasing proportion of savings bypassing the traditional banking industry or the role of whole of life and endowment policies as forms of long term savings.

A fourth factor influencing change relates back to customer relationship issues. Recent years have seen the development of branded credit cards and credit point schemes enabling receipt of benefits from particular businesses associated with credit card schemes. The objectives of such schemes are to encourage customer demand and "lock in" continued business, ie to promote customer relationships. This can be expected to continue, and liaisons between banks, life offices, and large businesses further developed.

## Organisational Structure

Over recent years, financial institutions have changed dramatically their internal structures and organisational arrangements in the face of an evolving financial services industry. Organisational charts have been, virtually continuously, rearranged, the security of employment reduced, and relevance of traditional career paths reduced.

These changes seem likely to continue. As financial institutions adapt and the range of activities undertaken expands, it is unlikely that organisational structures will remain unchanged. Institutions have to grapple with the task of assimilating quite differing cultures (and salary arrangements) as that occurs. The bottom line, though, is that traditional services

and the careers based on those services are unlikely to be growth areas. Experience will remain important, but a greater emphasis on computer literacy and financial education and knowledge will be required to cope with the modern financial system and provide service to customers.

## APPENDIX: Major Government Reports/ Inquiries

Independent Inquiries commissioned by the Government (or Industry Associations) are relevant not just because of the recommendations made, but also because of the wealth of information provided in the reports and submissions made to the Inquiries. The Table below lists most of the major ones relevant to banks and the financial sector. There are also many reports produced by Parliamentary Committees (and information about those up till 2013 can be found here). Treasury also undertakes many consultations which can be found on its web page, while ASIC and APRA also undertake consultations and produce relevant reports.

**TABLE 1: MAJOR FINANCIAL SYSTEM RELATED INQUIRIES**

| Year of Report | Title | Chair | Focus |
|---|---|---|---|
| 1981 | Australian Financial System Inquiry: | Sir Keith Campbell | Deregulation |
| 1984 | Martin Report: Appointed by Hawke government to review Campell findings; endorsed broad deregulatory thrust in report in 1984 | Mr Vic Martin | |
| 1991 | A Pocketful of Change: Banking and Deregulation | Senator Stephen Martin | |
| | Industry Commission (Availability of Capital) Report 1991 | | |
| 1997 | Australian Financial System Inquiry Report | Mr Stan Wallis | Stocktake of effects of deregulation and |

| | | | |
|---|---|---|---|
| | | | recommendations for regulatory change |
| 1998 | Managed Investments Act Review | Treasury | |
| 2004 | Study of Financial System Guarantees | Prof Kevin Davis | |
| 2010 | Australia as a Financial Centre | Mr Mark Johnson | |
| 2010 | Super System Review | Mr Jeremy Cooper | |
| 2014 | Australian Financial System Inquiry | Mr David Murray | |
| 2016 | Inquiry into Small Business Loans | Ms Cate Carnell | |
| 2017 | Retail Banking Remuneration Review | Mr Stephen Sedgwick | |
| 2017 | Independent Review of the Code of Banking Practice | Mr Phil Khoury | |
| 2017 | Review into External Dispute Resolution and Complaints Framework | Prof Ian Ramsay | |
| 2018 | Review into Open Banking in Australia | Mr Scott Farrell | |
| 2018 | Competition in the Australian Financial System | Productivity Commission | |
| 2019 | Superannuation | Productivity Commission | |
| 2019 | Royal Commission into Misconduct in the Banking, Superannuation and Financial Services | The Hon Kenneth Hayne | |

| | | | |
|---|---|---|---|
| 2020 | Retirement Incomes Review | Mr Mike Callaghan | |
| 2020 | Review of the Australian Payments System | Mr Scott Farrell | |

# 4. The Basics of Banking

## Contents

## 4.1 Introduction

Banks are traditionally depicted as financial institutions which take at-call and term deposits (of up to several years) and make loans of a longer duration. They also provide various services to customers such as payments services and loan commitments (which allow the customer to borrow funds at some future date(s)). To manage the risks associated with these activities they hold cash and marketable securities (to be able to meet *liquidity risk* of net cash outflows from customer decisions) and have equity funds provided by shareholders (to absorb *credit risk* of losses such as from loan defaults, and other losses).

Larger banks also provide services to other smaller banks and financial institutions and to foreign banks. In some countries, at some times, banks have been precluded from undertaking investment

bank activities such as underwriting issues of securities by corporate entities. The Glass-Steagall Act in the USA (which was repealed in in 1999) enforced this from the 1930s. In Australia, as in European countries, "Universal banking" (allowing both commercial and investment banking activities in the one organisation) has been the norm

Some smaller banks may not have direct access to the payments network and will (for a fee) obtain access via a larger bank's systems. (There are also specialist organisations, such as CUSCAL which have ESAs, are linked into the payments system, and provide access for Credit Unions). Non-bank financial institutions (NBFIs) which do not have accounts at the Central Bank (Exchange Settlement Accounts at the RBA) will have deposit accounts at banks which act as their liquid reserves and into which they transfer funds received from customers, and draw upon to pay customers.

There is an important consequence arising from this use of bank deposits as liquid assets by NBFIs. If a customer decides to withdraw funds from a bank to place it with a non-bank financial intermediary (perhaps in response to an offer of a better interest rate), the banking system will not have a reduction in total deposits. Ownership of bank deposits will change and, if the NBFI banks with a different bank to the customer originating the transaction, one bank will lose and the other gain deposits (with settlement between the two banks occurring by way of credits and debits to their ESA accounts.

Services are also provided to foreign banks via *correspondent banking* services. US banks will, for example, have an AUD deposit account at an Australian bank. If a customer of the US bank receives (or needs to make) a payment in AUD, the US bank will credit (or debit) the customer's USD bank account (with the USD amount based on the prevailing exchange rate). In turn, it will deposit the AUD funds received from (or withdraw the AUD funds required by) the customer as transactions on its AUD account with the Australian correspondent bank. (The precise details of how this is done obviously depend on the way the payments occur – such as by way of cheque or wire transfer etc., as discussed in Chapter 14).

While much of the focus on banks involves their funding by way of deposits, they will often also use debt funding by issuing bonds (debentures, notes) to investors.

"Debenture" is a legal term for debt instruments which may alternatively be called "bonds" or "notes". (More information is at MoneySmart and in ASIC's Regulatory Guide 69). Their key characteristic is that they are a promise to repay the capital invested plus a specified interest on certain dates. They may be secured against particular assets of the issuer, or unsecured. The issuer is required to issue a prospectus to make an issue of debentures of (up to) some specified amount over some specified time. The investor (generally) has no right to claim early repayment unless an act of default has occurred, but can sell the debenture to other investors in the secondary market (if there is one).

In contrast, bank deposits do not require issue of a prospectus (and are available to investors "on tap"), must be unsecured, may be redeemed by the investor on demand (for at-call deposits), may allow for the bank to change the interest rate on offer at future dates, and cannot (except for negotiable certificates of deposit) be sold to other investors. In general, banks are not allowed to raise money by issue of secured debentures (the exceptions being via issue of covered bonds or repurchase agreements). "Basic banking products" (ie deposits) also escape the legislation on requirements for financial advice applicable to debentures and other financial products.

Should a bank become insolvent, the priority in recovery of funds of its debenture holders and depositors will depend upon the laws of the country, and generally deposits of up to some specified value will be guaranteed by a government run deposit insurance scheme. In Australia, deposits of up to $250,000 per depositor are guaranteed under the Financial Claims Scheme and deposits that are uninsured have priority over debentures in claim on the bank's remaining assets (if any). In some jurisdictions, deposits and debentures have equal standing.

One feature of debenture issues by non-bank companies is that they will generally involve the use of "covenants" aimed at protecting the investors. These may require the company to either do certain things (such as maintaining a debt/equity or interest coverage ratio below some specified number) or not do certain things (such as issuing higher ranking debentures). Due to the nature of banking, such covenants would unreasonably restrict the normal business of banking, and thus there are generally few covenants attached to bank debenture issues.

Modern banks do much more than take deposits and make loans, but it is useful to start with a simplified model of a bank before moving on to consider the additional complexities created by other activities. In such a model, there are two main components. One is the balance sheet position, reflecting the various financial claims held by the bank (as well as other assets such as physical premises) and claims (of depositors, creditors, shareholders etc) on it. (There are also typically significant Off-Balance-Sheet (OBS) items, described in notes to the accounts, reflecting other contracts with customers involving rights and obligations about future possible transactions between the parties or positions in derivatives). Table 1 provides a highly simplified example (to be expanded upon later).

**TABLE 1: A SIMPLIFIED BANK BALANCE SHEET**

| Assets (A) | Liabilities (L) |
|---|---|

| | | | |
|---|---|---|---|
| Cash | C | D | Deposits |
| Securities | S | B | Debt |
| Loans | L | E | Equity |

The balance sheet is a stock (point in time) depiction of the bank and focuses upon the bank as a portfolio of assets and liabilities – and prompts analyses from that perspective.

The other component is the income statement showing sources of income and expenses and the profit/loss arising over a specified period. Table 2 provides a simplified example, together with definitions of some commonly used metrics. (Note that in the financial accounts for Australian banks, the information is generally presented in one column showing first income, then expenditure, then profit). This is a flow (per period) depiction of the bank as an operational entity – and prompts analyses from that perspective.

**TABLE 2: SIMPLIFIED BANK INCOME EXPENDITURE STATEMENT**

| Income | | Expenditure | |
|---|---|---|---|
| Interest Income | II | Interest Expense | IE |
| Non-Interest Income | NonII | Operating Costs | OC |
| (fees, trading income) | | (wages, rent, inputs, depreciation) | |
| | | Credit Impairment Charge | CIC |
| | | Income Tax Expense | T |
| Profit after tax | π | | |

Net Interest Income (NII) = Interest Income (II) – Interest Expense (IE)

Return on Assets (ROA) = (Profit after tax)/Total Assets

Return on Equity (ROE) = (Profit after tax)/Equity

Cost/Income Ratio = OC/(NII + NonII)

The two components are interrelated such that neither is sufficient for a full understanding of banking activities, performance, and resulting risks. And, of course, the real world is more complicated than depicted in these simple examples. One complication arises from the legal structures of banks to which we now turn. Another arises from the internal organisational structures involving a number of business units whose activities are aggregated together to derive the overall bank balance sheet and income statement. This is considered subsequently.

## 4.2 Bank Legal Structures

An important distinction to be aware of is that between branches and subsidiaries. Banks can operate in many different geographical locations (including in other jurisdictions). A branch is generally thought of as a physical premise in some location, but it has no separate legal identity from the bank itself. A customer may operate a deposit or be granted a loan through a particular branch – but the legal contracts and obligations are with the bank, not the branch. The branch is simply part of the way in which the bank organises itself to best interact with customers. Internally the bank may operate a set of management accounts for all branches to track their performance, but they are purely an internal management tool. Larger banks will also structure their activities by dividing them across particular business units – such as retail, business, corporate, and institutional, and will include information on the performance of those business units in their financial reporting. Physical branches, which deal mainly with retail and small business customers, are likely to come under the responsibility of the retail business unit. Branches in offshore locations sometimes may involve not much more than a name-plate on a building and minimal staff (but in other cases are heavily engaged in international financial markets), and will generally come under responsibility of a wholesale or institutional business unit.

A subsidiary is a separate legal entity. The parent holds all (or a controlling share) of the equity of the subsidiary and thus exerts control over the subsidiary's activities by appointing directors and management. The subsidiary will be required by law to produce its own set of accounts, and customer transactions are legally with the subsidiary, rather than the parent (although the latter my guarantee some such transactions). The amount of equity invested by the parent in a subsidiary may be quite small, but not always. Customers of a subsidiary may look at its equity capitalisation (equivalently the excess of its assets over liabilities to customers) to assess the risk of dealing with it – knowing that the parent could simply "walk away" from a failing business and let it be liquidated. More significantly, if the subsidiary is a bank operating in another jurisdiction, it is likely that the host regulator will demand maintenance of some minimum level of equity capitalisation to protect depositors with that bank. The New Zealand regulator (RBNZ) has required that the Australian banks operate their main New Zealand activities by way of separately capitalised subsidiaries such that there is a dedicated equity buffer to absorb losses and protect New Zealand depositors against a bank failure.

It is also important to note that a "bank" will often itself be part of a corporate group. It might be owned by a holding company (common in the USA), which is often a non-operating holding company (NOHC). There has been an ongoing shift in the USA towards bank holding companies (BHC) having an important range of non-bank subsidiaries, such that focusing on BHC's does not necessarily provide good insights into "traditional banking" activities – but does reflect the increasing financial complexity

of financial conglomerates. In the UK and the EU that increasing complexity has been accompanied by recommendations (the Vickers Report in the UK (implemented in 2019) and the Liikanen Report in EU) for "ring-fencing" of retail banking from other activities. In the USA, the Volcker rule (part of the Dodd-Frank Act) aims to achieve a similar purpose of reducing risk spill-overs from what some have called "casino" (investment) banking to "utility" (commercial) banking by prohibiting banks from proprietary trading and restricting their investments in hedge funds and private equity. Correa et al examine whether there have been changes in the risk profiles of large US BHCs as a result and find that while organisational complexity has reduced somewhat, some types of risk have increased relative to years prior to the GFC.

"Ring Fencing" requires banks to adopt a form of holding company structure in which payments services, and retail lending and deposit taking are conducted in a subsidiary which is not allowed to engage in "excluded activities" such as investment and international banking. These must be conducted in different subsidiaries. Limits on transactions between the subsidiaries are required to limit spillover of risks.

Proprietary Trading is where a bank has a dedicated trading desk which enters transactions in forex, interest rate, commodities markets etc with the intention of making profits for the bank from such trading. A problem in clearly identifying "prop" trading is where a bank may acquire a large exposure position (such as in forex) from providing a hedge to a client, and then wishes to remove that exposure by dealing with other banks in the market.

A stylised illustration of a typical US Bank Holding Company (BHC) structure is shown in the figure below taken from an article by Avraham et al, which also explains the historical evolution of that model.[1] Following the Gramm-Leach-Bliley Act in 1999, many BHCs registered as Financial Holding Companies which enables a broader range of financial activities – although strict limits still exist on investments in non-financial companies. While the Federal Reserve has supervisory responsibility for holding companies, bank regulation and that of non-bank financial activities may be undertaken by a range of other entities. Stackhouse provides a discussion of reasons, such as restrictions on types of equity issues following the Dodd-Frank Act, why a holding company structure has become less desirable for some mid-sized US organisations, although there still remain benefits.

[1] The items in brackets in the figure refer to the financial reports required by regulators). See also the short article by N Cetorelli and S Stern for more information on historical evolution of BHCs.

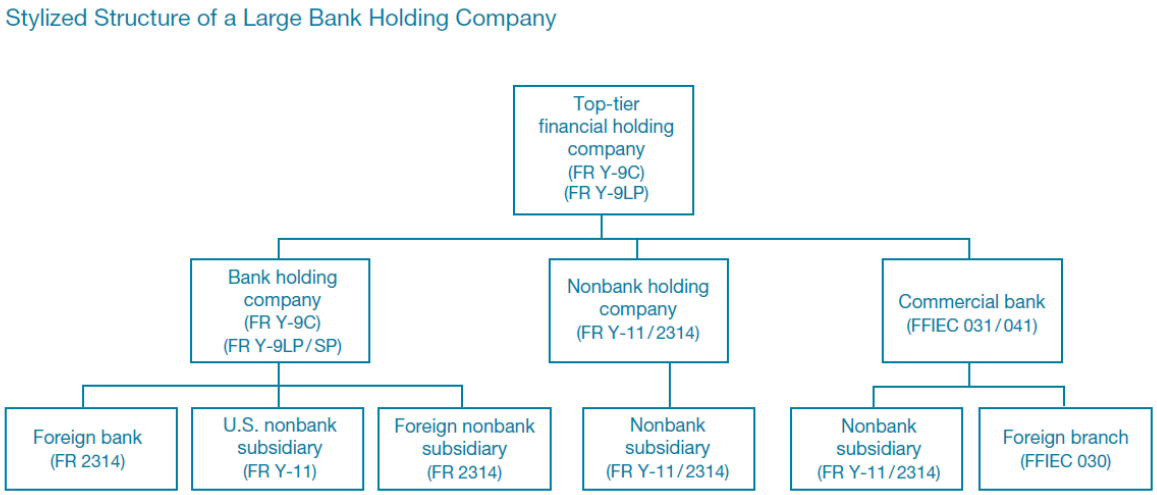



**FIGURE 1: ILLUSTRATIVE US BANK HOLDING COMPANY STRUCTURE**

## 4.3 Australian Bank Structures

An alternative structure is that the bank is the parent company of the group (typical in Australia) with a range of subsidiaries undertaking other types of financial business or undertaking banking business in other jurisdictions (although that can also be done via branches).

This leads to a distinction between "Level 1" (the Australian bank business plus overseas branch activities), "Level 2" (also including banking subsidiaries) and "Level 3" (including other subsidiaries' activities) definitions of a bank for regulatory purposes, as shown in Figure 2 for CBA. (Note that since the date of that figure, CBA (and other major banks) have undergone programs of divestments of entities shown).

NOHC structures are found in Australia for Macquarie (see Figure 3), Suncorp and AMP – each of which has other significant non-banking financial activities. Whereas equity capital is issued by the parent bank in other cases (and some of it disallowed by APRA in the calculation for regulatory purposes as being invested in other non-level 2 activities) the NOHC's issue equity capital and allocate some of it to the bank subsidiary. They may also issue debt and on-lend it to the bank subsidiary, or the latter could borrow in its own name.[2]

Macquarie converted its structure to a NOHC structure in November 2007. In the explanatory memorandum it noted that under the previous structure, where the parent company was a bank, many of the APRA regulations applicable to banks constrained its freedom to engage in some non-banking activities. The NOHC (MGL, which is the entity listed on the ASX) would still be subject to some

[2] In mid 2019, APRA raised a problem requiring rectification for the NOHCs operating in Australia in that the loans provided to the bank subsidiaries had conditions attached providing for recall with less than 30 days notice which meant those loans could not be counted as stable funding for the purposes of meeting the Liquidity Coverage Ratio.

APRA regulation (such as capital requirements), but by locating non-banking activities in a separate subsidiary to the bank (MBL), these would not be subject to APRA's banking prudential standards. Many services (Treasury, HR, IT, Risk Management etc) are provided at the group level via an operating company subsidiary of the NOHC. While some amounts of non-banking activities (funds management, real estate, commodities) were retained as subsidiaries of the bank (MBL) these were not included for APRA regulatory purposes at the level 2 bank definition and similar activities are also undertaken within the non-banking subsidiary.

Foreign banks can enter the Australian market in either branch or subsidiary form. However if they operate as a branch they are essentially excluded from operating as retail deposit takers. This is because legislation requires that depositors must make an initial deposit of at least $250,000. This does not preclude them from engaging in retail lending activities such as home mortgage lending.
At the start of 2021, Foreign subsidiary banks were: Arab Bank Australia Limited; Bank of China (Australia) Limited; Bank of Sydney Ltd; Citigroup Pty Limited; SBC Bank Australia Limited; ING Bank (Australia) Limited (trading as ING); Rabobank Australia Limited

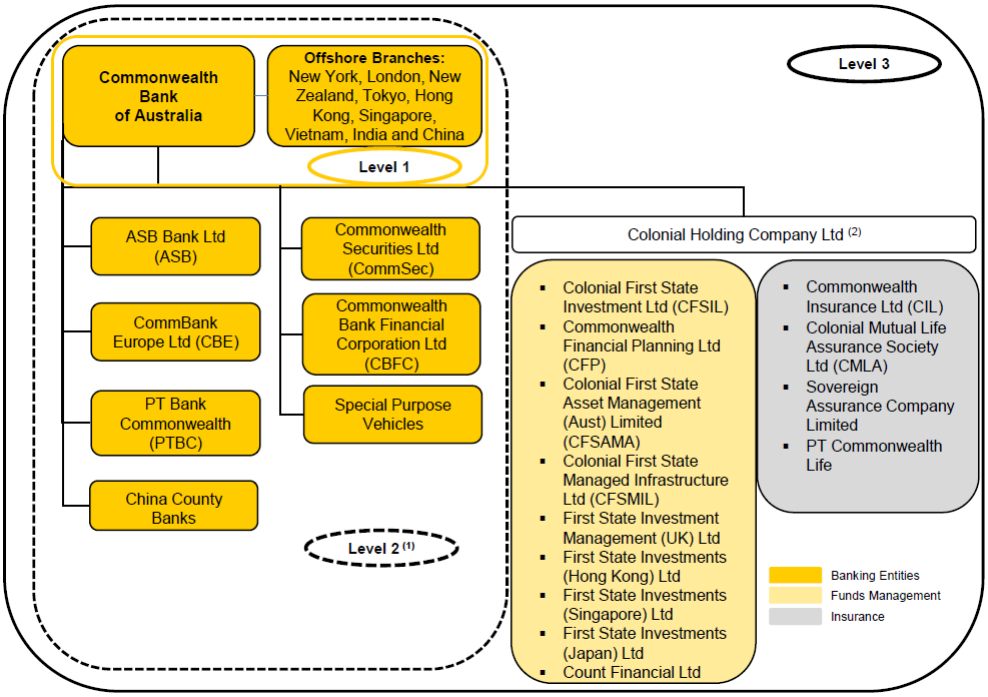



FIGURE 2: CBA GROUP STRUCTURE

SOURCE, PILLAR 3 REGULATORY DISCLOSURE AT JUNE 2016

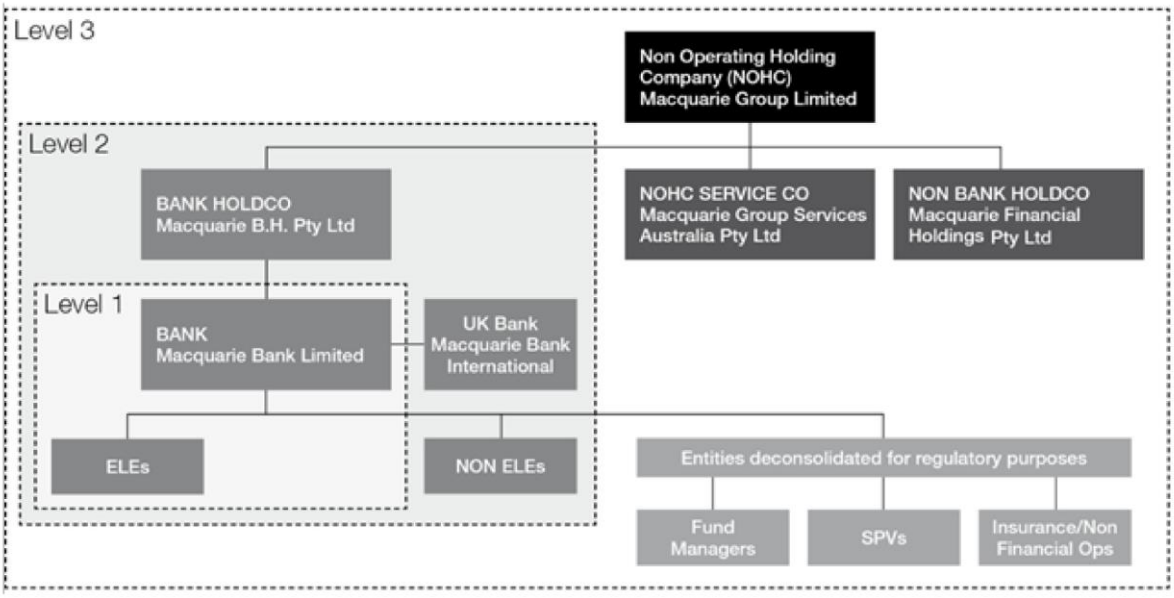



**FIGURE 3:MACQUARIE GROUP STRUCTURE: SEPTEMBER 2016:**

**SOURCE - BASEL 3 REGULATORY DISCLOSURE**

## Bank Structure & Account Consolidation – Which figures?

Because banks undertake non-banking activities via (generally fully-owned) subsidiaries, an obvious question arises of which set of accounts should be looked at? Australian banks will present financial statements for the "Consolidated Group", which corresponds to the "Level 3" framework outlined above and thus incorporates some non-banking activities. Some will also present financial statements for the "Bank" (CBA) or "Parent" (WBC) or "Company" (NAB) which corresponds to the "Level 1" framework, incorporating Australian (and overseas branch) banking operations. (Those that don't present that information in their audited financial statements will, however, provide information on the performance of the banking businesses in the notes to the accounts and other disclosures). Operations of overseas subsidiaries (such as in New Zealand) will be included in the Group, but not the "Bank" figures. The "Group" figures thus involve the consolidation of accounts for the "Bank" and its subsidiaries (and the practice of accounting consolidation is not necessarily a simple one!)

Banking analysts with a focus on the bank share price will tend to focus on the consolidated accounts for the group – since this reflects all the activities of the bank and its subsidiaries which contribute to the profit of the listed entity. At the same time, figures presented for the "Bank" (level 1) are also of interest, giving some information on the banking activities – although some banking activities are conducted in subsidiaries which are part of the "level 2" grouping. Moreover, since bank regulatory requirements are based primarily on the "level 2" grouping, these also need to be considered.

So, level 1 financial statement data will correspond to "The Bank" financial statements in the annual accounts (including transactions between the bank and subsidiaries). Thus, "The Bank" financial statement data will incorporate such things as customer deposits and loans at the offshore branches. The Consolidated financial statements will incorporate all Level 3 entities – where control applies,[3] and it is this Level 3 data which is relevant for determination of the banking group share price on the ASX.

Unfortunately, the Level 1 balance sheet data, because it includes offshore branch positions, does not provide information about an important aspect of the bank's financial condition. Under the Banking Act (Section 13A, (4)), Australian incorporated banks (including subsidiaries of overseas banks operating in Australia) are required to maintain domestic assets greater than domestic deposit liabilities (ie items "booked" in Australia with either residents or foreigners). These correspond to the figures shown in APRA's *Monthly Authorised Deposit-taking Institution Statistics* (MADIS)– but only a subset of information is provided there. (Aggregated data is provided in *Quarterly authorised deposit-taking institution performance statistics* (QADIS)). In theory, a bank (Level 1) could have assets greater than liabilities, but not meet the domestic assets/liabilities requirement if, for example, the foreign branches had made many more loans than deposits they had raised. (The reason it matters is that the contracts of the foreign branch with its customers would be dealt with under the legal system of the foreign jurisdiction if the bank failed, complicating resolution of the bank and availability of the bank's remaining assets to repay domestic depositors). Unfortunately, the regulator (APRA) is unwilling to provide full disclosure of bank financial statements provided to it monthly as part of its data collection.

In terms of regulation, APRA (and supervisors elsewhere) apply capital and other requirements at all of the level 1, 2, and 3 frameworks. The capital adequacy standard (APS110) applies at both a level 1 and level 2 basis, and banks generally report the level 2 figure (which corresponds to total banking activities whether by branch or subsidiary) in their briefings and disclosures. At the level 3, conglomerate level, APRA applies certain prudential standards regarding governance and risk management to eight groups (the four majors, Macquarie, Suncorp, AMP, and Challenger). APRA has not implemented specific conglomerate capital requirements as at early 2021 (although having signalled several years prior that it was looking at this issue). For the four majors, designation as a Domestically Systemically Important Bank (D-SIB) with additional capital charges can, to some extent, be regarded as an alternative.

[3] It is important in using international databases such as Moody's (Bureau van Dyke) BankFocus (previously known as BankScope prior to 2017) to be careful as to whether consolidated data for the group or bank-level data is being used.

It is worth noting that many (but not all) of the misconduct problems for the banks exposed by the Hayne Royal Commission related to activities conducted by entities outside of the level 2 framework (but part of level 3). These include financial advice, insurance, wealth management.

## Australian Bank Business Unit Structures

A further dimension of the complexity of bank operations lies in the ways in which they structure themselves into separate business units. Table 3 shows the structures of the five largest Australian banking groups as shown in their 2018 Annual Reports. Over the years the banks have experimented with a variety of structures (influenced by various consulting firms) involving different groupings by way of products, customers, geography. Within each business unit there will be risk officers responsible for risks emanating from that unit's activities, in addition to risk officers at higher levels in the organisation overseeing overall specific types of risks arising from the various divisions. An important component of overall bank management is the way in which delegation of pricing and risk management responsibilities occurs to business unit managers, as well as performance evaluation of the business units (and their sub-units and by products). Internal funds management transfer pricing practices and divisional capital allocation and risk assessment are crucial in this regard.

Putting Macquarie to one side (because of its NOHC structure and relative importance of non-banking business), all have retail/consumer business units and New Zealand operations, but vary slightly in terms of how they separate corporate, institutional and business banking and wealth management and international (non-NZ) activities. For ANZ, for example, an "Australian" business unit combines retail, corporate and commercial activities whereas Westpac has separate "Consumer" and "Business" units (but in March 2021 announced that it was combining them). Typically, the Head Office/Corporate Functions is a cost centre, relying on charges made to other business units (although treasury trading income is also relevant in some cases). Mortgages provide the largest contribution to profits for the four majors, with some part of that activity located in business banking – in addition to personal/retail banking.

Each of the banks will present financial statement information for each of its business units in annual reporting and presentations to analysts. The way in which these figures are derived depend upon managerial accounting methods such as funds transfer pricing, activity based costing, and economic capital allocation which are considered later.

TABLE 3:AUSTRALIAN BANK BUSINESS UNIT STRUCTURES

| | CBA | NAB | WBC | Macquarie |
|---|---|---|---|---|
| ***Head Office/ Corporate Functions*** | | | | |
| Corporate Centre, Digital Banking, Group Operations & Services, Technology | Group Strategy, Marketing, Corporate Affairs, Treasury | Technology & Operations, Risk, People, Customer products & services, People, Finance | Treasury, Technology, Core Support | Corporate |
| *Business Units responsible for Mortgage Portfolio* | | | | |
| Australia (Retail, Corporate and Commercial) | Retail Banking Services Bankwest Business & Private banking | Consumer Banking and Wealth Business and Private Banking | Consumer Business | Banking & Financial Services (Personal Banking) |
| *Other Business Units* | | | | |
| Institutional | Institutional Banking and Markets | Corporate and Institutional Banking | Institutional | Corporate and Asset Finance |
| New Zealand | Wealth Management | NZ Banking | BT Financial | Macquarie Asset Management |
| Wealth Australia | New Zealand | | New Zealand | Commodities and Global Markets |
| Asia Retail & Pacific | IFS (International) | | | Macquarie Capital |

## Australian Bank Reports and Presentations

There are three main sources of information about individual bank positions and performance. One is the Annual Report and Financial Statements. A second is the various presentations made by senior bank staff to analysts and investors (which can be found on bank web sites or announcements to the ASX). The third is the required Basel 3 regulatory disclosures (also found on bank websites). The risk disclosures are quarterly, but the full and half year ones provide the more comprehensive information. Capital disclosures are updated as banks issue (or retire) funding instruments which count as regulatory capital.

Unfortunately, APRA does not provide much useful public information about individual banks. While it collects a lot of relevant data (such as through regular D2A (Direct to APRA) reports filed by banks),

it is bound by confidentiality clauses in legislation (and available resources) which reduce its willingness to make this data available. This is quite different to, for example, the USA where the bank Call Reports are publicly available and very detailed. However, APRA is in the process of considering how much more of the data collected about individual banks can be made publicly available.

## 4.4 Bank Balance Sheet Fundamentals

Understanding the balance sheet of a bank is a crucial part of analysing banks. The balance sheet shows the collection of assets and liabilities arising from their activities, and can provide important information about the financial products provided and the risk position of a bank. Being a point in time (stock) measure, the balance sheet can only show so much, however, and is often only available to the public and analysts at infrequent intervals. It does not, for example, provide information on the processes by which those assets and liabilities are created or acquired and whether delivery and distribution mechanisms used are efficient or keeping up with technological changes. Nor does it provide information on a bank's commitment to, and strategies in, the increasingly important area of ESG (Environmental, Social, and Governance) matters. For this type of information it is necessary to look to other parts of bank disclosures.

### A simplified bank balance sheet

Putting to one side the complexities associated with bank organisational structures, in its simplest form a bank balance sheet can be represented as shown in Table 4.

**TABLE 4: SIMPLIFIED BALANCE SHEET**

| Assets (A) | | Liabilities (L) | |
|---|---|---|---|
| Cash | C | D | Deposits |
| Securities | S | B | Debt |
| Loans | L | E | Equity |

Typical features of such a balance sheet include:

1. High leverage[4] (E/A quite small, e.g. 0.05)
2. Average maturity of loans (L) much greater than that of deposits (D), some of which will be available to depositors "at call"
3. Cash holdings (C), including deposits at the Central Bank, are a relatively small fraction of total assets

[4] Note that the "leverage ratio" capital requirement introduced as part of Basel 3 and defined as "equity/exposures" is the inverse of standard corporate measures (assets/equity or debt/equity) and includes off-balance sheet credit exposures in its calculation of the denominator, and disallows some part of equity in the calculation of the numerator.

4. Debt finance (B) is generally small relative to deposits (D), and may include "hybrid" instruments (which have some equity-like features)

Each of these characteristics may be subject to regulatory restrictions such as capital adequacy, stable funding, or liquid asset holdings, requirements – which are all features of the international prudential regulation standards (currently) known as Basel 3 introduced in 2011.

Such a balance sheet presentation prompts a number of questions:

1. How are assets and liabilities valued? The balance sheet is an accounting document and thus the items are valued according to prevailing accounting standards. Historical cost accounting is used for the majority of items, but some (such as tradeable securities held) will involve "mark to market" valuation.
2. If full repayment of loans made is in doubt, how is that reflected in the balance sheet? For example, a borrower's circumstances may have changed such that a loan previously made for $100 is now unlikely to be repaid in full – and only $80 expected. The bank will make a "loan loss provision" of $20, and deduct this from the "gross loan" amount of $100 to give a "net loan" amount of $80 which is the figure now shown on the balance sheet. This raises the following fundamental question.
3. If the value of assets falls, what adjusts to ensure the balance sheet balances? The answer is that the value of equity recorded on the balance sheet must fall (by $20 in the example above) to ensure that the balance sheet balances! Equity is a residual item in the balance sheet equal to the difference between the value of assets and the value of liabilities.

This last point highlights the need for good bank accounting practices, so that the equity figure shown in the balance sheet is a good reflection of the bank's solvency. A bank with a number of bad loans which it has failed to disclose might appear solvent when, in fact, it is not.

It is also important to emphasise that bank equity (ie bank capital) is an item on the liability side of its balance sheet. It is thus not something "held" by the bank – despite the widespread use of this term by bankers and regulators. The bank "holds" assets and it is the excess of these over liabilities which determines the amount of recorded equity capital. (A far better expression would be to say that the bank "maintains" or is required to maintain a certain level of equity (or capital) in its funding of assets.

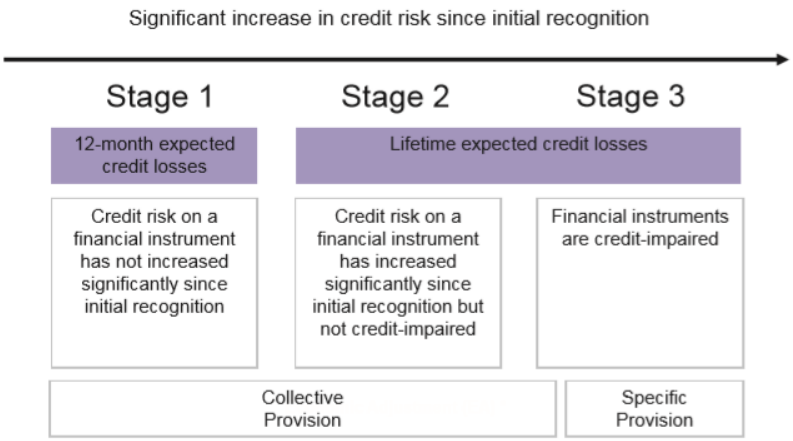
Another way to think of the role of equity is that it is one of the sources of funds (along with deposits and debts) available for holding assets. If for example a regulator requires a bank to raise more equity that means the bank has more funds available to purchase additional assets (make loans). An increase in required equity does not mean (as some wrongly suggest) that the bank will be less able to finance loans.

## Bank Accounting

In July 2014 the IASB (International Accounting Standards Board) introduced the revised standard *Financial Instruments IFRS 9* for introduction by January 1, 2018. The Australian implementation is AASB9. The new standard has three main elements relevant for bank accounting.

First, it is possible to value an instrument either as "fair value through profit or loss" (implying that changes in market value, even if unrealised, are reflected in the balance sheet and affect current period profits). This is applicable to trading portfolios (books). It is also possible to value an instrument at amortised cost, but only if (a) the asset is planned to be held to maturity and thus not available for sale and (b) the future contractual cash flows are principal and interest amount receivable on specified dates. This applies to most of the "banking book". A further option is measurement at fair value through other comprehensive income if the intention is to hold the asset but where it is also available for sale, which would be applicable to portfolios where there is less frequent trading than in the trading book.

Second, impairment of assets is now based on expected credit losses (rather than incurred losses). The loss amount can be calculated as either (a) expected lifetime losses on the asset from possible default events in the next 12 months or (b) expected lifetime losses from future default events at any time over the life of the asset. If an asset is impaired, then the recognition of interest income due from




the asset is appropriately adjusted. Earlier recognition of credit losses is a consequence as is smoother provisioning over the cycle.

**FIGURE 4: AASB9 PROVISIONING (SOURCE: NAB)**

The third element of AASB9 relates to disclosures.

A short summary of IFRS9 implications for banks is provided by the Financial Stability Institute

NAB implemented IFRS9 in 2014, ahead of the required start date and provided an analyst/investor presentation on the consequences in March 2015. This states that there was an increase in collective provisions offset by reduced GRCL (no P&L impact) and had a negative effect of 13 bp on the CET1 ratio. ANZ 2018 Annual Financial Statements notes that AASB9 applies with the Sept 2019 accounts and reduced net assets by $813mill and reduced the CET1 ratio at Level 1 by 12 basis points.

## 4.4 Capital Measurement Problems

Equity Capital is the "buffer" to absorb losses and protect depositors/creditors. Regulators pay particular attention to the size of such a buffer – including how to measure it in such a way that it appropriately shows the quantum of net assets available for the buffer/loss-absorbing role.

In practice, bank failures have often involved sudden recognition of long standing, but previously unrecorded, losses. These could be due to loans which have been recorded in the accounts at the amount owed, even though the prospect of recovery is slim. Another reason is the discovery of long standing fraudulent practices leading to overstatement of the value of assets or understatement of liabilities.[5]

Once recognized these require a write down of asset values (or writing up of liabilities)[6] to their "true" value. Since the balance sheet must balance, this implies a corresponding write down of equity capital.

In calculating the value of equity capital which is available to serve as a loss absorbing buffer, regulators make a number of adjustments. For some assets (not shown on the simplified balance sheet above), balance sheet measures are estimates of what might be realized only if the asset was sold while the bank was a viable, going concern. These include such things as goodwill, investments in subsidiaries, and deferred tax assets. Their value is likely to decline just when it matters most! Hence they are commonly deducted in calculating eligible regulatory capital.

Capital Measurement Problems: US Examples

The experience of the US FDIC provides some good examples of how reported accounts may not provide a timely indication of the true state of a bank. Information can be found on the immediate pre-failure balance sheets reported to the regulator, and how much the deposit insurance fund lost as a result of the failure.

One such example is the Alabama Trust Bank (ATB) which closed on May 18, 2012. At March 31, 2012, six weeks earlier, it had reported approximately $51.6 million in total assets and $45.1 million in total deposits, and (after other liabilities) a positive equity value. The FDIC entered into a purchase and assumption agreement with Southern States Bank, Anniston, Alabama. This, essentially, involved that bank taking on (assuming) the deposit (and some other) liabilities of ATB, and obtaining the good assets (loans) with the shortfall of assets relative to deposits made up by a payment from the FDIC. It was estimated at the time that the cost to the Deposit Insurance Fund (DIF) would be $8.9 million.

### Capital Measurement: Alternative Perspectives

Capital is a balance sheet "residual", which is the difference between assets and other (non-equity) liabilities. There are alternative approaches to measuring assets and liabilities which lead to different

[5] This FDIC paper states that "material insider abuse and internal fraud were present in approximately 457 (37 percent) of the 1,237 U.S. failed commercial and mutual savings banks (hereafter, banks) between 1989 and 2015".

[6] Understatement of a liability might arise if, for example, the terms of the contract require, as a result of some event, a higher payment to the creditor than is recorded in the accounts.

measurements of "capital". Measurement also needs to reflect the value of contingent assets and liabilities.

There are, at least, three different perspectives which can be considered.

### The Owner's Perspective

Capital is a measure of the wealth of a group of stakeholders (owners), and from their perspective is wealth tied up in the organisation. Their equity holding provides entitlement to the residual income stream of the bank, and also control rights. The appropriate measurement of capital from their perspective is on an opportunity cost basis – what could the equity be sold for. This is reflected in the share market value for banks listed on the stock exchange – and could be quite different to the equity value recorded in the bank's accounts.

The owners expect (require) a rate of return on their capital sufficient to compensate for the risks involved. The return is measured by the stock market return (dividends and capital gains), and the rate of return is measured against a base of the stock market value of the shares. This may be only loosely related to the accounting value of equity and the accounting rate of return on equity.

***The Market Value of Mutuals and Cooperatives***

Obviously for mutual or cooperative banks, there is no stock market value, but it is in principle possible to determine what a stock market value would be if they were demutualized, with tradeable shares issued to members and/or other investors in such an IPO. The hypothetical market value should be equal to the accumulated retained earnings plus "franchise value" reflecting the present value of the expected abnormal future profit stream (ie in excess of the required return of investors) if operated as a joint stock firm. (See

APPENDIX 1: The Residual Income Model, for an explanation of the link between book and market value).

The accumulation of significant stocks of retained earnings gives incentives for "carpetbaggers" to lobby for demutualization and the conversion of that communal wealth into private wealth. While many would argue that the history of substantial demutualisations in the finance sector reflects conversions to a more efficient organizational form, others see it as more a result of attempts to expropriate communal wealth built up by the mutual over generations to underpin the provision of financial services to future generations. (See, for example, Davis (MF, 2005))

### The Manager's Perspective

Equity (book) capital consists of the funds initially provided to operate the business from share issues adjusted for retention of subsequent earnings or losses made by the business. Those funds, unlike deposits or debt raisings, do not require contractual payment of interest, but management will be judged at least in part on the rate of return on equity capital. Of course, in an ongoing entity, the balance sheet identity means that book equity is a residual given by the difference between the value of assets and the value of liabilities. The accounting standards which are used to value assets and liabilities are thus important in the calculation of the amount of "book" equity.

The quantum of such funds is not equivalent to the stock market value of equity which will reflect both financial (book value) capital, "knowledge capital" (franchise value) and "growth opportunities". Likewise, the accounting and stock market measures of rate of return differ. The accounting return on equity (ROE) relates accounting profit to book value of equity. The stock market rate of return (capital gains and dividends relative to market value of equity) may differ substantially from this. One complication this creates is that of translating the equity investor's required rate of return (derived from the CAPM or alternative approaches and applying to the market value of equity) into a target rate of return for an accounting ROE to be used by bank management in pricing and performance evaluation.

### Customer and Regulator Perspective

For depositors/creditors and regulators, the key role of equity is to act as a buffer to absorb risk. The providers of capital rank below liabilities to customers, and regulators are particularly focused on the buffer available to protect depositors. Thus, from their perspective the buffer could consist of equity or alternative subordinated debt or credible guarantees over deposits from third parties. Naturally any providers of such guarantees will also be interested in the extent of equity and subordinated debt available to absorb loss and avoid a call on their guarantees. Thus the cost to the bank of such guarantees could be expected to depend upon its capital ratio (somehow measured), or guarantors might require maintenance of some minimum capital ratio. Regulators are also concerned with systemic stability and with having the ability to resolve (close down, sell to a third party, restructure) a troubled institution quickly and without significant financial sector disruption. A recent trend has

been to augment more traditional measures of capital with requirements that systemically important banks have sufficient TLAC (Total Loss Absorbing Capacity)[7] through the issue of subordinated debt (or perhaps preference shares) securities which can be converted into equity or written down to prevent a troubled bank needing to be liquidated.

## Alternative Capital Measurement Approaches

Roughly corresponding to these alternative perspectives the value of bank capital can be estimated in at least three ways based on different perspectives/uses/ relevance. But it must always be remembered that capital is the difference between some measurement of assets and liabilities.

*Book value (historical cost)* involves measuring assets and liabilities at their original cost, written down for repayments, recognised (or expected) losses, and (for real assets) depreciation. Book value could include some figure for goodwill, where assets (including takeovers of other firms) have been purchased for more than their net asset value. Accounting treatment of R&D expenditures (as either expenditure to be written off or capital items to be depreciated) can also differ between banks and hinder comparisons.[8]

*"Mark to market / mark to model"* involves valuing assets and liabilities at their current market value. For example a $1 mill 5% govt security will have a market value of less than $1 mill if the current market rate of interest is above 5%. If market prices are not available, an alternative is to use estimates of inputs to model valuation. For example the value of an option could be estimated by inputting a volatility estimate etc into a generally accepted formula.

*Market value* is simply the stock market value of equity. In theory it reflects the present value (PV) of the expected future income stream discounted at a suitable risk adjusted discount rate. That could, if one wished, be written as PV(Equity) = PV(Assets) – PV(Liabilities) retaining the relationship of equity being the difference between assets and liabilities. In doing so, the present values would involve discounting future cash inflows and outflows of assets and liabilities respectively, and where those cash flows incorporated the bank's operating costs as well as interest and principal cash flows.

In practice, the accounts for banks are prepared using a mix of historical value and mark to market/model. For assets and liabilities which are held in the "banking book" and not for sale,

7 An overview can be found in this RBA Bulletin Article and the FSB published a review of global implementation in July 2019. In the EU, a minimum requirement for own funds and eligible liabilities (MREL) applicable to all banks on an institution specific basis has been in force since 2014. EU G-SIBs are thus subject to both requirements

8 This RBA Bulletin article illustrates how a requirement to book goodwill resulting from the merger of Bendigo and Adelaide Banks caused a significant increase in book equity of the combined entity and contributed to lowering its ROE.

historical value is used. For "trading book" or "available for sale" assets (and contingent, off balance sheet, items) mark to market/model is used.

## 4.5 Bank Equity: Book Values v Market Values

There can be quite a gap between the book value and the market value of a bank (or other company). Figure 5 illustrates for the major Australian banks, and shows that (a) the ratios have generally been well in excess of unity (b) a major fall occurred at the time of the GFC, with a recovery until around 2013 (c) a general downward trend since 2013 and (d) a sharp decline in 2020. These changes reflect primarily changes in the market price of bank shares, with a small effect from new issues of shares.[9] For example, the share price of NAB fell by almost 40 per cent between September 2007 and September 2008 and by a similar margin between September 2019 and September 2020.

Unlike the majors, the smaller banks have generally had a market to book ratio below unity.[10]

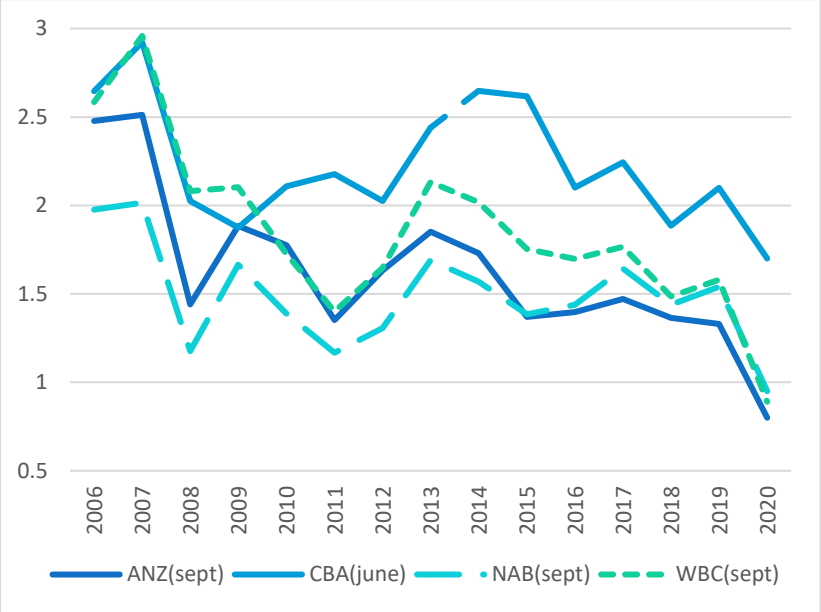



Figure 5: Australian Major Bank Market/Book Ratios

(*Source: Bank Annual Reports and author calculations)*

[9] If shares are issued at the current market price, the equal increase in both the numerator and denominator will cause a small reduction in the ratio if the M/B ratio is above unity, while if issued at a discount to market price the effect will be greater.

[10] Of course, for mutual banks a M/B ratio cannot be calculated since there is no share market price for their equity. But it could be expected to be low because of their low ROEs.

Financial accounting academics have developed a relatively simple framework (known as the residual income model) within which to study this type of issue. It posits that the aggregate market value (MV) and book value (BV) of equity of a firm at any date t are related as:

$MV_t = BV_t$ + Present value of expected future abnormal earnings,

or, in symbols,.

$$MV_0 = BV_0 + \sum \frac{e_t - rBV_{t-1}}{(1+r)^t} = BV_0 + \sum \frac{(roe_t - r)BV_{t-1}}{(1+r)^t}$$

Denoting earnings in period t as $e_t$ which equals $roe_t.BV_{t-1}$, abnormal earnings at any future date τ are given by $(roe_\tau - r_\tau)BV_{\tau-1}$, where roe is the accounting rate of return achieved and r is the required rate of return of shareholders, both applied to the book value at the start of that period. The formula includes the expected value of such abnormal earnings into the distant future, and these need to be discounted to a present value to allow for the delay and risks.

The intuition is straightforward (even if the maths is not – see Appendix 1)! If investors think that managers will be able to use the financial resources (book value of capital) available to them to generate a return (roe) greater than that required (r), they will be willing to bid up the share price (market value) above its book value. In an efficient market, the share price (market value) will settle at a level which investors believe is consistent with their receiving just their required rate of return.[11]

This provides some insights into why such a decline in M/B ratios has occurred. Essentially, investors must have downgraded their expectations of the banks' abilities to generate an accounting return on equity in excess of the rate of return required by investors, or expect that growth will be lower. Relevant factors include: reduced confidence in bank profit-making ability due to economic conditions (resulting from the GFC and Covid crisis and risk of loan defaults) or increased competition from other intermediaries or a low interest rate environment (when bank profits are typically less); higher capital requirements reducing the benefits to equity holders from leverage.[12]

## 4.6 Loan Impairment, Provisioning and Bank Capital

Credit losses on loans made are a major source of risk for banks and historically one of the major causes of bank failures. In Australia, the early 1990s was a period in which a number of banks suffered major such losses due to previously lax business lending standards and a down turn in commercial property values (reducing the value of loan security). Rodgers (2016) estimates losses of around 8.5

[11] As a simplistic example, suppose that a company could earn $20 p.a. in perpetuity on a capital base (book value) of $100 (ie a roe of 20 per cent p.a.), but investors only required a 10 per cent rate of return. Investors would bid the share price (market value) up to $200, such that their return is 10 per cent p.a.

[12] With a given ROA, a lower leverage will imply a lower ROE.

per cent of average bank lending between September 1989 and September 1994 (compared to 2.5 per cent at the time of the GFC). The proportion of non-performing loans to business peaked at around 13 per cent in 1992 and credit losses were the major source of a marked decline in ROE (to below zero) in 1991. Two State government owned banks (SBV and SBSA) effectively failed while ANZ and Westpac faced troubled times. (See Appendix 4.2 of the Study of Financial System Guarantees, and this FirstLinks (formerly CuffeLinks) article).

Banks deal with the potential for credit losses in three main ways. One is via pricing of loans to allow for expected losses, such that on average the expected return on loans (allowing for defaults) is at the required level. A second is via having equity capital which (among other roles) acts as a buffer to absorb unexpected losses in excess of those expected. A third is by making provisions – in effect redesignating part of the equity capital as the amount which is be expected to be depleted by credit losses. There are two main types of provisions. *Individual (specific) provisions* are where a specific loan is recognised as having the potential for default and incomplete recovery of the amount owed. Banks typically will make such a provision when a loan is 90 days past due (where scheduled repayments have not been met for 90 days). *Collective (general) provisions* are made for particular types of portfolios of similar loans, such as credit card receivables. The bank will recognise that there will be some proportion of loans made which will default, even though it is not sure which specific loans those will be. Hence a general provision equal to some proportion of the total loans is made. Banks will transfer identified troubled loans from the collective to the individual provision, and should recovery be deemed not possible, write-off of the loan will occur. To the extent that a troubled loan has been fully provisioned (with past credit impairment charges for the loan reducing profits in prior periods), the write off will have no impact on current period profits, instead showing up as a reduction in individual provisions. Sometimes, the bank may also make a *direct write off* where a loan which had not been subject to provisioning is suddenly recognised as valueless.

Accounting standards and bank practices for dealing with potential credit losses have recently undergone significant changes, as discussed earlier.

Previously, accounting standards were "backward looking" meaning that banks could not make estimates of expected loss and provision against those. One reason was that these were thought to be subjective in nature and provided potential for discretionary income smoothing through adjustment of provisions. For banking regulators, the concern was that such an approach meant that cyclical downturns and risk of loan losses could lead to large increases in provisions, reducing bank capital and thus inhibiting further lending and aggravating the downturn. Moreover, without having previously anticipated and provisioned against such possible losses, bank capital may be insufficient to absorb such losses leading to bank failure.

That has changed since the GFC with pressure for forward looking provisioning from banking regulators leading to a change in accounting standards. IFRS9 (AASB9), which was mandatory from July 2018 and allows for provisions based on expected value.

## Impairment, Provisioning, and "Non-monetary defaults"

When full recovery of a loan is no longer expected, a bank must classify the loan as impaired. A common trigger is when the loan is 90 days past due, but it may be that the bank has sufficient security that even in that case of a non-performing loan there is no expectation of loss. In some cases, borrowers meeting repayments may find their loan classified as impaired if the bank is of the view that ultimate recovery is in doubt. A good example would be a small business loan where the viability of the business is questionable and the value of underlying security (eg buildings) has fallen sufficiently to be inadequate to ensure repayment if sold or breaching covenants imposed on the loan.

In some such cases, banks may invoke "non-monetary default" clauses to call in the loan, such as happened in the highly publicised case of CBA treatment of BankWest borrowers. (See, for example the PJCCFS 2016 report on Impairment of Consumer Loans, but also Royal Commission discussion (p3046-7) of this matter, tending to support CBA's actions (if not its communications with borrowers)). Controversy over this has led the Australian Bankers Association to revise its Banking Code of Practice to clarify when and how such actions may occur.

Once a loan has been identified as impaired, a bank must make an accounting provision for the expected loss (APRA Prudential Standard APS 220). This effectively involves an accounting reduction in shareholders equity (retained earnings) equal to the "provisions" amount. The Australian approach is to show "net loans" (post-provision) as an asset and disclose the amount of provisions in the notes to the accounts. There are two relevant consequences of making provisions, one for the income statement and one for the balance sheet. First, the making of the provision (denoted as a credit impairment charge (CIC)) implies an equivalent reduction in the bank's income for that period. Second, the amount of shareholder's equity is reduced on the balance sheet by the stock of provisions, (denoted as either Allowance for Loan Losses (ALL) or Loan Loss Provisions LLP)) with consequences for regulatory capital requirements.

Under APRA's prudential standards, (explained here, and analysed in this KPMG article) both the numerator and denominator of the bank's risk-weighted capital ratio are affected by the stock of provisions. The amount of Tier 1 capital is reduced (the numerator) while the loan exposure (risk weighted) is also reduced (the denominator). The net effect is (generally) to reduce the bank's capital ratio.

## 4.7 Bank Balance Sheet Structures

A more detailed (but still incomplete) balance sheet depiction, focusing purely on financial assets and liabilities is shown in Figure 6. In practice, there will also be holdings of real assets (bank premises) or lease obligations, goodwill, amounts due or owed on derivatives transactions, etc.

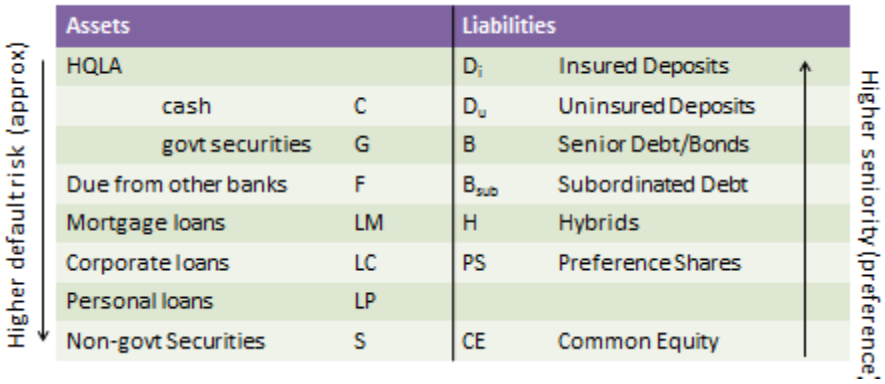



FIGURE 6: MORE DETAILED BANK BALANCE SHEET

Figure 6 shows major classes of assets in approximate order of default risk, although personal (non-mortgage) loan and corporate loan default risk depends on the nature of the counterparty and thus cannot really be ranked as shown. And poor lending practices (such as the "NINJA" (No Income, No Jobs or Assets) loans made in the US Sub-prime crisis) mean that mortgage loans can be highly risky,

Figure 7 provides a more detailed depiction of liability priority, reflecting an assumption of depositor preference over unsecured creditors (as in Australia, but not found universally), and the special position of a number of bank collateralised financing positions.

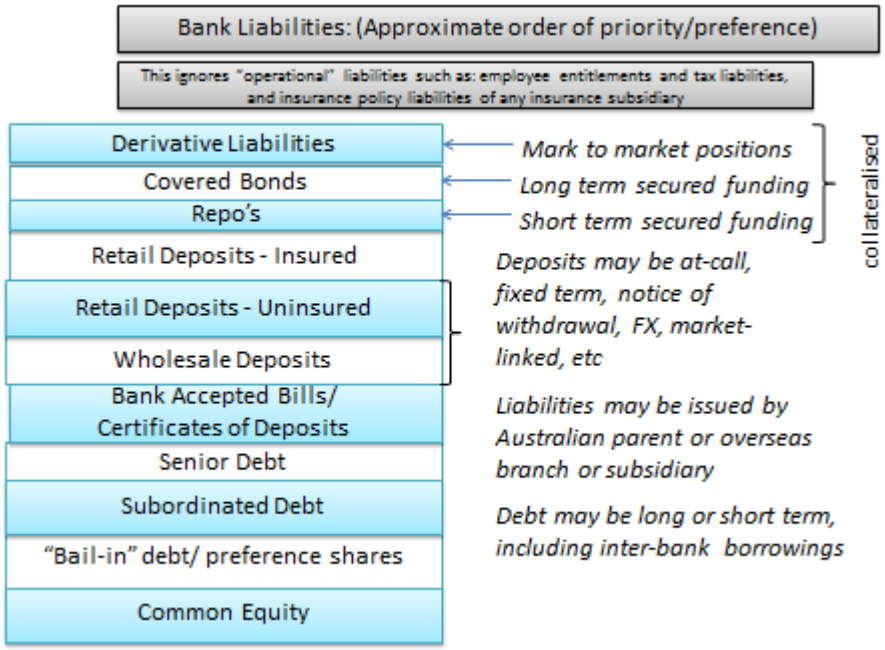



FIGURE 7: BANK LIABILITY PRIORITY

## 4.7 Off Balance Sheet (OBS) Items

Banks undertake a range of activities which lead to future expected revenues or costs and exposures to risk. These are wide-ranging, but the categorisation of types of OBS positions given in the original Basel 1 Capital Requirements, and still applicable in the Standardised Approach for Basel 3, is a useful framework. That categorisation was focused on credit (non-market related) risk and market risk arising from those positions. For the former group, the Basel 1 standards required converting the positions into an "on-balance-sheet" equivalent using a "credit conversion factor". These are shown in brackets. (The Basel 1 approach then converted this into a risk weighted assets (RWA) amount by applying the risk weight applicable to the counterparty).

### Non-Market Related OBS exposures

- Direct Credit substitutes, Assets sold with recourse (1)
  - An example of a direct credit substitute would be a guarantee given by the bank over a loan made by a third party to a bank customer. If the customer defaulted on the loan, the bank would be required to compensate the third party for the loss involved. The bank thus has an exposure to credit risk loss equivalent to that which would have occurred if it had instead lent directly to the customer. (The bank obviously would charge the customer a fee for providing such a guarantee).

  - If the bank sold a loan made to a customer to a third party, where the third party had recourse to the bank for any resulting losses, the bank's credit risk exposure is the same as if it had retained the loan on its books.

- Repos, Forward Asset Purchases (1)
  - A Repo (Repurchase Agreement) is equivalent to making a loan to a third party which is secured by the bank taking ownership of some collateral of equal or greater value provided by the third party. The loan is expunged by the third party repurchasing the collateral back from the bank at a price previously agreed upon. (Because the loan is secured, and margining generally applied, the credit risk and the risk weight applied to the on-balance-sheet equivalent amount (which is the repo amount) will generally be quite low).
  - A forward asset purchase could expose the bank to the obligation to pay out an agreed amount for the asset (such as a company issued bond) which is above its worth due to a decline in the credit rating of the issuing company.
- Performance related Contingent items (0.5)
  - A bank may have provided a commitment to provide a loan to a company bidding for a tender if its bid is successful. Another example would be a commitment by a bank to pay a foreign exporter of goods to one of its customers should the customer not make payment upon satisfactory delivery of the goods.
- Note Issuance and Revolving Underwriting Facilities (0.5)
  - If the bank has an agreement with a customer to underwrite its issuance of, say, commercial paper and the market is unwilling to accept that commercial paper, the bank will be obliged to buy that paper and thus be exposed to resulting credit risk.
- S-T self-liquidating trade-related contingencies (0.2)
  - A bank may make a short-term trade-finance loan to a customer exporting goods where the contract requires that sales proceeds accrue directly to the bank to meet repayment of the loan with the residual credited to the customer's account. There has been considerable disquiet in the banking industry that the capital requirements resulting from the credit conversion factor inhibit such trade finance arrangements.
- Long term revokable commitments (0)
  - If the bank has the option to withdraw a commitment to provide loan funds to a customer on request over some future period, then it will not be locked into providing such funds to a customer whose credit rating has fallen since the agreement was entered into.

### Market Related

Banks deal in a range of derivatives markets such as: Futures, Forwards, Swaps, Options. These positions leave them exposed to gain or loss from future movements in the value of the underlying items, such as interest rates, FX, commodities. In general, the current market value of such positions

will be "marked to market" such that gains or losses accrued to date will be recorded on the balance sheet as the "fair value" of such positions. But even if the fair value is zero, such as when a swap contract is entered into, there is a risk that future movements in the underlying prices could lead to the positions causing "market related" losses to the bank. Regulatory capital requirements (related in some way to the scale of the position and volatility of the underlying asset price) are imposed on banks to reflect this possibility.

More recently, following the GFC, OBS risks related to implicit guarantees given to SIVs and Conduits established by banks have become recognised as important. Reputational concerns may for example lead to a bank supporting a SIV by repurchasing assets at a loss, or injecting funds to prevent a liquidity crisis, even if not legally required. The regulatory response has been to try and prevent such OBS risks.

### Valuation Adjustments

A relatively recent development in bank accounting and management has been the growth of various "valuation adjustments" (some mandated for regulatory calculations) for assets and liabilities, sometimes referred to as XVAs. These are particularly relevant for derivative positions with a Credit Valuation adjustment (CVA) being the most well known. The CVA adjusts the model-based value of a derivative (eg using a Black-Scholes formula) for the possibility of a default by the counterparty, such that the amount owed on an in-the-money position may not be received. Large banks will have a CVA desk (and other XVA desks) focused on the cost of hedging and managing those counterparty exposures, and allocating the costs across internal divisions. A Funding Valuation Adjustment (FVA) incorporates differences between the bank's actual funding costs and the risk-free rate which is assumed in theoretical valuation models. A Capital Valuation Adjustment (CVA) allows for requirements that bank regulatory capital positions are affected by derivative positions.

## 4.8 The Trading Book and the Banking Book

Table 5 provides an alternative depiction of a bank balance sheet, useful when discussing regulatory arrangements (and internal bank structures). It shows a separate category of assets – securities held for trading. When these are combined with positions held by the bank's trading desk in market related off balance sheet (OBS) items (such as swaps, futures options etc), we obtain the "trading book" of the bank which is distinguished from its "banking book" of assets and liabilities generally held until their maturity.

**TABLE 5: TRADING AND BANKING BOOK**

| Assets | | Liabilities | |
|---|---|---|---|
| HQLA | | $D_i$ | Insured Deposits |
| cash | C | $D_u$ | Uninsured Deposits |

| govt securities | G | B | Senior Debt/Bonds |
|---|---|---|---|
| Due from other banks | F | $B_{sub}$ | Subordinated Debt |
| Mortgage loans | LM | H | Hybrids |
| Corporate loans | LC | PS | Preference Shares |
| Personal loans | LP | | |
| Securities held for trading | S | CE | Common Equity |

Thus, in the notation used above:

Trading Book = S + Market-related OBS

For the trading book, mark to market (mtm) accounting is required (every day) in accordance with AASB 13 (Fair Value Measurement). The mtm values (as explained previously) could be either current market prices or (where not available) derived from theoretical models or management estimates.

The risk characteristics of the two books are quite different with the trading book (reflecting the activities of the bank's trading desks) involving taking on market risk in search of profit. In contrast, the banking book positions involve primarily exposures to credit risk on loans and interest rate and liquidity risk arising from the way in which those positions are funded. Of course, operational risk is pervasive, and some of the largest losses of banks worldwide have arisen in the trading book from activities of "rogue" traders.

The distinction between the books is not always clear-cut. For example, government (or other) securities held in the banking book as liquid assets which generate interest income could be shifted to the trading book if opportunities arose to make a quick profit from their sale. Regulators have put in place constraints on shifting positions between the two books to prevent "arbitraging" of different types of capital requirement regulations applying in the two books.

## Loss Absorbing Capacity (LAC)

Another feature of the balance sheet structure which is worth noting is that of how much "loss absorbing capacity" (LAC) it provides. This has become a major focus of regulators since the GFC, and is focused upon the protection afforded to depositors arising from other sources of bank funding having lower ranking claims. Thus Loss absorbing capacity (LAC) is liability items which protect deposits (& possibly some senior creditors) from loss by absorbing credit, trading, or other losses.

It is common to identify two types of LAC. One is "going-concern" LAC which corresponds to common equity (CE) which acts as the buffer absorbing losses (and profits) when the bank is solvent. The other is "gone-concern" (liquidation) LAC (or GLAC) calculated as the amount of losses which can be absorbed by claimants with lower-ranking claims to depositors before depositors (or governments)

start to bear losses in insolvency. In terms of the notation above, in principle, GLAC = CE+PS+H+Bsub+B.

In practice matters are more complicated. First, if governments/taxpayers "bail out" non-depositor creditors when a bank gets into difficulty GLAC is less relevant and essentially much less. Second, the Basel 3 introduction of "bail-in" requirements has meant that some hybrid securities which are eligible as regulatory capital, convert mandatorily into equity if specified "point of non-viability" trigger points are hit. If such conversions enable the bank to continue operation (although there is no evidence that "bail-in" would not adversely affect confidence in the bank and lead to its failure), this would increase going-concern LAC above the current level of CE.

## 4.9 Bank Balance Sheets and Bank Funding

The liability side of the bank's balance sheet shows its sources of funds (deposits, debt, equity). Figure 8, from the RBA Chart Pack, illustrates trends in the composition of bank funding since the early 2000's. In looking at that figure, however, two points should be noted.

First, a figure for "Securitisation" is included. "Traditional" securitisations generally won't show up on the balance sheet, since the process involves the bank selling loans it has made to a Special Purpose Vehicle (SPV) in return for cash which can be used to make further loans. So while the amount of securitisation it has undertaken won't be recorded on the balance sheet, this can be thought of as a form of funding for the bank. (Some forms of securitisation such as covered bonds will show up as liabilities on the bank balance sheet, and be matched by recording of the loans involved in the securitisation as assets on the balance sheet. "Self-securitisations", where the bank creates asset backed securities which it holds itself involve more complicated accounting which is explained in Chapter 11). The marked decline in securitisation after the GFC is apparent.

A second point worth noting is the introduction in 2020 of the Term Funding Facility, introduced as part of Covid response measures, which involves the RBA providing banks with access to a specified amount of cheap funding.

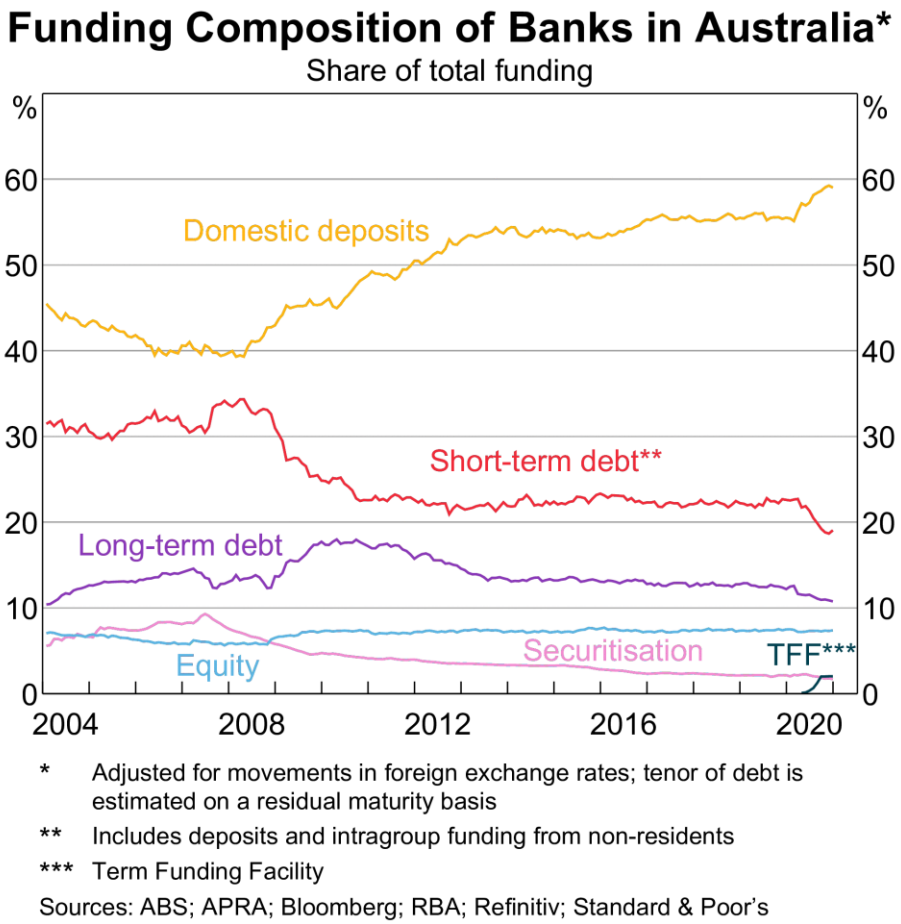



FIGURE 8:BANK FUNDING COMPOSITION AND TRENDS (SOURCE: RBA CHARTPACK)

The stand-out trend in the figure is the post GFC substitution of domestic deposits for short-term and (to a lesser extent) long-term debt as sources of bank funding. The GFC demonstrated the liquidity risk associated with wholesale debt funding when capital markets are in crisis and rolling over maturing debts is problematic and/or expensive. The Australian banks have become more "prudent" in the funding mix, relying more on deposits which tend to be "sticky", and this change has been reinforced by liquidity regulations introduced after the GFC. But also relevant is the relative cost of funding sources. Wholesale debt cost incorporates a risk premium (which increased markedly at the time of the GFC, but has since fallen back to more usual values). In contrast, it can be argued that there is no or little risk premium incorporated into the interest rate cost of many bank deposits. This is particularly the case for deposits of less than $250,000 which, following the introduction of the Financial Claims Scheme in October 2008, are guaranteed by the Australian government.[13]

Figure 9 (from the RBA Chart Book) shows the composition of deposit funding of the major banks. Household deposits account for just under half of total deposits, and a significant increase in at-call deposits has seen them increase to around 70 per cent of the total compared to around 30 per cent

[13] The initial level of coverage when the scheme was introduced was $1 million and reverted to $250,000 in 2011.

for term deposits. Some part of that increase in at-call deposits may reflect increasing use of housing loan offset accounts.

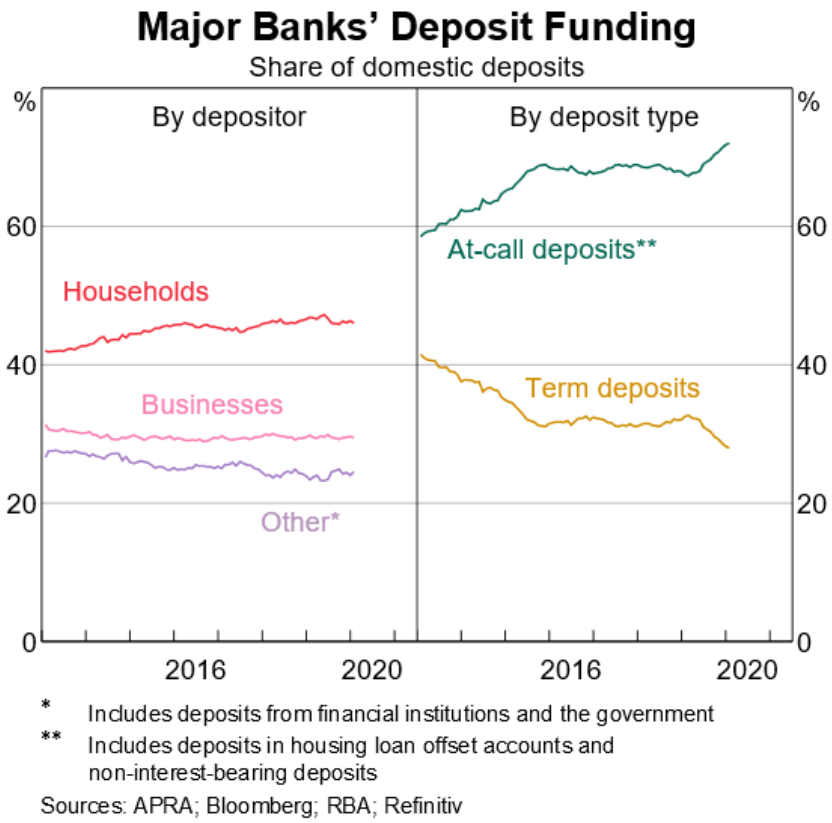



FIGURE 9: DEPOSIT FUNDING TRENDS (SOURCE: RBA)

Another trend which is less noticeable, is the increase in the equity share of bank funding after the GFC. The relative constancy of the share since about 2010 at around 8 per cent may appear surprising, given the increase in regulatory capital ratio requirements and "headline" figures of a much higher percentage. The explanation can be found in the fact that regulatory capital ratios are calculated on a "risk-weighted" basis. One cause of higher bank capital ratios has been an increased allocation of funds to assets with lower risk weights (such as housing), reducing the denominator of the capital ratio calculation.

## 4.10 Bank Assets

The asset side of bank balance sheets is more complex than depicted in the simple balance sheet examples given earlier, although loans, liquid investments (eg cash) and securities held (either in the banking or trading book) account for the bulk of assets. To illustrate, at September 2020, the ANZ accounts (for the consolidated, level 3, group) showed the following composition of total assets

| Asset Category | Percentage of Total |
|---|---|
| Net loans and advances | 59.21% |
| Derivative financial instruments | 12.98% |
| Cash and cash equivalents | 10.35% |
| Investment securities | 8.96% |
| Trading securities | 4.88% |

All other assets listed were each under 1.5 per cent of the total. These included; goodwill; Physical assets (branch and investment properties, equipment); deferred tax assets; settlement balances owed from other banks; collateral paid.

For a smaller (mutual) bank such as BankVic, which does not engage in trading activities, Loans and Advances were 74.8% of total assets and Cash and Deposits with other financial institutions were 24.6%.

More detail about the components of the various items (including types of loans) , and complications in examining the banking activities separate from those of the consolidated entity is available in other chapters.

## 4.11 Bank Finances: Income and Expenditure

Most analysis of bank profitability and efficiency starts with the Income Statement which shows sources of income, costs incurred, and profit as the difference between income and costs. A simplified example is shown in Table 1 which also outlines the calculation of some commonly used financial ratios. The Income Statement is for a specified period, such as a year, and is part of the link between the bank balance sheets for the start and end of the period. In the absence of any external equity raisings, that link can be expressed as:

$S_t - S_{t-1} = \pi_t - d_t$

where $S_t$, $S_{t-1}$ are shareholder's funds (equity) shown in the balance sheet at the end of year t and t-1 respectively, $\pi_t$ is profit after tax in year t shown in the income statement, and $d_t$ is dividends paid in year t (so that $\pi_t - d_t$ is retained earnings).

In practice, the relationship is complicated by:

- External equity raisings (including reinvestment of dividends by shareholders) by the bank which if denoted by $X_t$ would change the relationship to $S_t - S_{t-1} = \pi_t - d_t + X_t$

Repurchases of shares by the bank, which reduce bank equity, would involve a negative figure for X.

- Lags in the actual payment of dividends, such that $d_t$ is dividends declared for that year, even though the actual dividend payment (cash flow) may not occur until after the end of the year. For example, the three major banks that have a financial year ending on 30 September (ANZ, NAB, Westpac) will generally declare an interim dividend in April/May, to be paid in July, and announce their final dividend for the financial year just ended in October/November when the annual results are announced, to be paid in December or January.

**TABLE 6: A SIMPLE BANK INCOME-EXPENDITURE STATEMENT**

| Income | | Expenditure | |
|---|---|---|---|
| Interest Income | II | Interest Expense | IE |
| Non-Interest Income | NonII | Operating Costs | OC |
| (fees, trading income) | | (wages, rent, inputs, depreciation) | |
| | | Credit Impairment Charge | CIC |
| | | Income Tax Expense | T |
| Profit after tax | π | | |

Net Interest Income (NII) = Interest Income (II) – Interest Expense (IE)

Return on Assets (ROA) = (Profit after tax)/Total Assets

Return on Equity (ROE) = (Profit after tax)/Equity

Cost/Income Ratio = OC/(NII + NonII)

Bank Analysts (and management) pay a lot of attention to various financial ratios as a way of identifying trends in bank profit performance and for making comparisons between banks. The most commonly used ratios are those shown in Table 1. The major banks, in particular, provide a substantial amount of additional information in their Annual and semi-annual financial statements, their Basel 3 disclosures, and in analyst presentation materials accompanying release of financial statements or other major events (including capital raisings). These are available on the bank websites – generally under the "investor relations" or similar section. While there is much information presented, differences in presentation, terminology, and selectivity of topics and content, all combine to making it often difficult to digest and interpret.

This is not aided, for the non-accountant, by the complexity of accounting conventions and changes occurring in those – such as the switch from AASB 139 to AASB9 introduced in 2014 and required for accounting periods commencing in 2018. To give one illustration consider the ANZ accounts for 2019 and 2018. Comparing the 2018 and 2019 Annual Reports, the bank would appear to have increased in size by about 17 per cent in one year. But based on the different (compared to the 2018 Report) 2018 figure presented in the 2019 report the increase was a more realistic 4.25 per cent. Looking more closely at the accounts, it is possible to identify that the difference in the two figures for 2018 is primarily due to an increase in the "loans and advances" item recorded in the balance sheet, roughly matched on the liabilities side by an increase in deposits. There is no easily found disclosure in the reports of why this reporting change has been made!

| | 2019 Annual Report | | 2018 Annual Report |
|---|---|---|---|
| Year | 2019 | 2018 | 2018 |
| Assets ($ bill) | 981,137 | 943,182 | 840,747 |

Another accounting change has been the introduction of AASB 15 which has led to line fees being reclassified from net fee income to net interest income.

Also complicating matters is the presentation of financial accounts for both the bank (or holding company) and consolidated accounts. NAB presents accounts for both the "Company" and "Group" where Group incorporates subsidiaries; CBA for the "Group" and "Bank" where the Group incorporates subsidiaries; Westpac for the "Parent Entity" and "Consolidated"; whereas ANZ now only presents results for the "Group" which incorporates controlled entities.

## 4.12 Commonly Used Performance Indicators

Among the main ratios which get considered are the following – in Australia generally only available every 6 months following release of annual and semi-annual results statements.

- Net Interest Income (NII) = Interest Income (II) – Interest Expense (IE)
- Return on Assets (ROA) = (Profit after tax)/Total Assets
- Return on Equity (ROE) = (Profit after tax)/Equity = ROA x (TA/E)
- Cost/Income Ratio (CTI) = OC/(NII + NonII)
- Net Interest Margin (NIM) = NII/Average Interest Earning Assets = NII/AIEA

They are calculated primarily from information provided in the bank's Income Statement, and Table 7 provides an illustration using ANZ's accounts for the year ending September 2020. In looking at those figures a number of prior explanations are needed. First, these are the figures calculated by ANZ for

its "continuing operations" – taking out the amounts for "operations discontinued" during the year in order to present a more informative picture of how the bank might perform in future years. (In this case, including discontinued operations would have had relatively little effect and would have led to an roe figure of 6.0 rather than 6.2. In some cases, such as when there are sales of substantial businesses, the effect can be significant). Second, by removing discontinued operations, the profit figures are what the banks refer to as "cash" profits rather than "statutory" profits based on official accounting standards. Again, the reason the banks prefer to refer to "cash" profits is because it is claimed they give a better idea of ongoing profitability. Third, an item not shown in the table is "comprehensive income" which adds to the profit figure those valuation changes not currently (perhaps never) classified to P&L (incl losses/gains on hedging instruments). The change in shareholders funds recorded in the balance sheet is linked to comprehensive income.

**TABLE 7: ANZ INCOME STATEMENT (AND OTHER) INFORMATION, 2020)**

| | Year ending September 2020, $M |
|---|---|
| Net interest income (NII) | 14,049 |
| Other operating income (NONII) | 3,703 |
| Operating income (OI = NII +NON) | 17,752 |
| Operating expenses (OE) | (9,383) |
| Profit before credit impairment and income tax | 8,369 |
| Credit impairment charge (CIC) | (2,738) |
| Profit before income tax (PBT) | 5,631 |
| Income tax expense (T) | (1,872) |
| Non-controlling interests | (1) |
| **Cash Profit (π)** | 3,758 |
| Average interest earning assets (AIEA) | 862,882 |
| Average deposits and other borrowings (L) | 679,336 |
| Funds under management (FUM) | 36,714 |
| Earnings per share (basic) (eps) | 132.7 |
| Ordinary share dividend payout ratio (D/π) | 45.3% |
| **Profitability Ratios** | |
| Return on average ordinary shareholders' equity (roe) | 6.2% |
| Return on average assets (roa) | 0.36% |
| Net interest margin NIM) | 1.63% |
| Net interest income to average credit RWAs | 3.81% |
| **Efficiency Ratios** | |
| Operating expenses to operating income (CI) | 52.9% |
| Operating expenses to average assets (OE/A) | 0.89% |
| **Full Time Employees** | 37,506 |

*Source:* ANZ

There are several immediate points to note, which are relatively common across commercial banks.

1. Net Interest Income (NII) is the main source of income (and doesn't include the credit impairment charge – which reflects actual/expected losses on loans)

2. The NIM =NII/(AIEA) is used as a measure of the interest "spread" being earned by the bank from its intermediation activities. Note that the denominator is average interest earning assets for the year – which is typically in the order of 90 per cent of total assets.
3. Non-Interest Income (NONII) – fees, trading profits etc., is also important. Some part of this will reflect income from off-balance-sheet (OBS) items such as fees for guarantees or provision of loan facilities.
4. Australian banks like to use a "cash" income concept (rather than the official accounting measure of statutory profit) to enable comparisons of performance across periods. The difference is normally relatively small when considering performance measures such as ROE.
5. The Credit Impairment Charge (CIC) is the amount by which annual profit is reduced by allocations to loan loss provisions to cover future loan losses (or direct write-offs of unexpected loan losses not covered by provisions). In general, when a loan defaults this will be charged against loan loss provisions, and thus not affect current period profitability (except to the extent that a decision is made to make a CIC against current income to restore provisions to a desired level).
6. Comprehensive income incorporates the effects of some transactions not passed through P&L but directly affecting the balance sheet –comprehensive income is used in calculating changes in shareholder equity.
7. ROA (based on average assets for the period) in the vicinity of 1 % p.a. has been a typical result for Australian banks in normal times – but 2020 was a bad year for Australian banks with much lower ROAs being recorded.
8. Use of "Return on Risk Weighted Assets" (RoRWA) has become more used as a performance measure since the introduction of RWA as part of Basel capital requirements. RWA is calculated by applying "risk weights" to each asset category (and off-balance sheet items). For a commercial bank, a figure of RWA/Assets of around 0.5 is not uncommon. In a very general (approximate) sense this standardises return measures so as to reflect differences in risk-taking by the bank.
9. ROE has generally been in the order of 10-15 times ROA due to the high leverage of banks.

Figure 10 provides a way of breaking down ROA and ROE into the various items ("drivers") which determine their values. It shows approximate typical values for Australian major banks during normal years over the recent past – although note that from around 2016, the ROE's have fallen from the mid-teens to around ten.

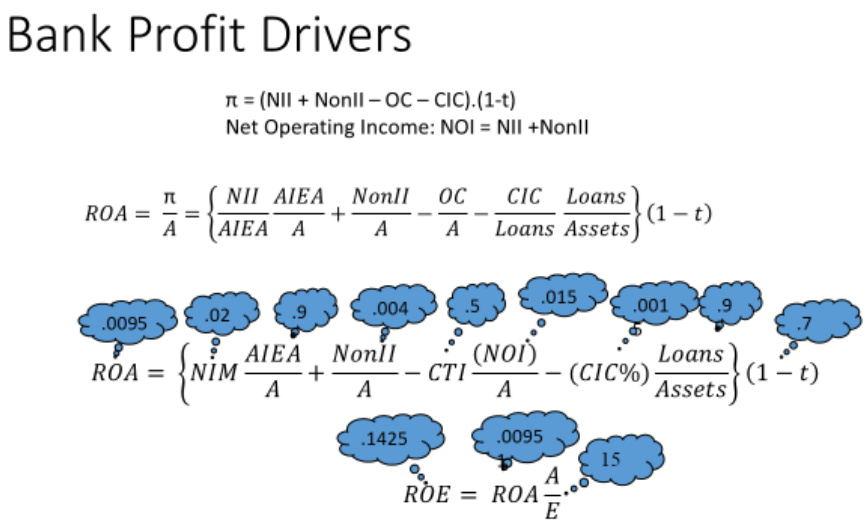



FIGURE 10: BANK PROFIT DRIVERS

## 4.13 Net Interest Margin Behaviour

The NIM is a major driver of bank profit performance. Over the past two decades the NIMs of the major Australian Banks have fallen markedly by over 100 basis points (as Figure 1 illustrates for the period since 2000). Why has this fall occurred? Various explanations can be hypothesised:

- A transition to a lower interest rate environment – since some proportion of bank deposits pay zero interest, lower interest rates on assets will automatically reduce NIM (assuming other deposit/debt funding rates fall equivalently). Hack and Nicholls (RBA, 2021) examine the international evidence on the effects of low interest rates on bank profitability, including studies which examine the consequences of negative interest rates being paid on deposits. They conclude "In the short run, most studies find at most a modest negative effect of lower interest rates on bank profits in aggregate, but larger effects for smaller banks." When interest rates are low for longer periods of time, there is stronger evidence of a decline in profits.
- Increased competition in some loan markets – particularly the housing market as a result of the growth of securitisation and non-bank lenders since the mid 1990s (although the GFC interrupted this growth for several years after 2008). This is discussed by Kirkwood (ER, 2010) and (Liu & Skully (ISBAF, 2008) find evidence of a negative relationship between securitisation market share and major bank loan spreads (relative to securitisers) for Australia over 1994-2003.
- A shift into less risky lending – with lower interest rates (offset by lower expected losses, ie provisions). Illustrative of this is the case of ANZ which had a ratio of RWA/Assets of 70% in 2007 and a significantly reduced ratio of 46% in 2019. Note, however that there have been

substantive changes in the calculation method for RWA over that time, and the risk weights are not necessarily the ideal measure of risk. Nevertheless, the shift is dramatic.

- Increased use of deposit funding relative to wholesale market borrowing – lower interest rates but higher operating costs. Domestic deposits of the major banks have increased as a share of their total funding from around 45 per cent at the time of the GFC to nearly 60 per cent in 2021.
- Higher capital ratios – more equity and less interest-paying funding of interest earning assets. (NIM = $(r_A.A - r_D.D)/A = r_A - r_D.(D/A)$, so an increase in D/A reduces NIM *cet par*. However, note that banks will incorporate a cost of equity into loan pricing, which will work in the opposite direction – if banks have some market power in loan pricing - since the cost of equity will be higher than the cost of deposits). Again using ANZ as an illustration, the Tier 1 capital ratio was 7.9% in 1999 (which incorporated some non common equity amounts meaning that the CET1 ratio was slightly lower), while the CET1 ratio in 2020 was 11.3%.
- Different pricing structures – higher loan fees offset by lower loan interest rates and/or higher fees for deposit services accompanied by higher deposit interest rates.

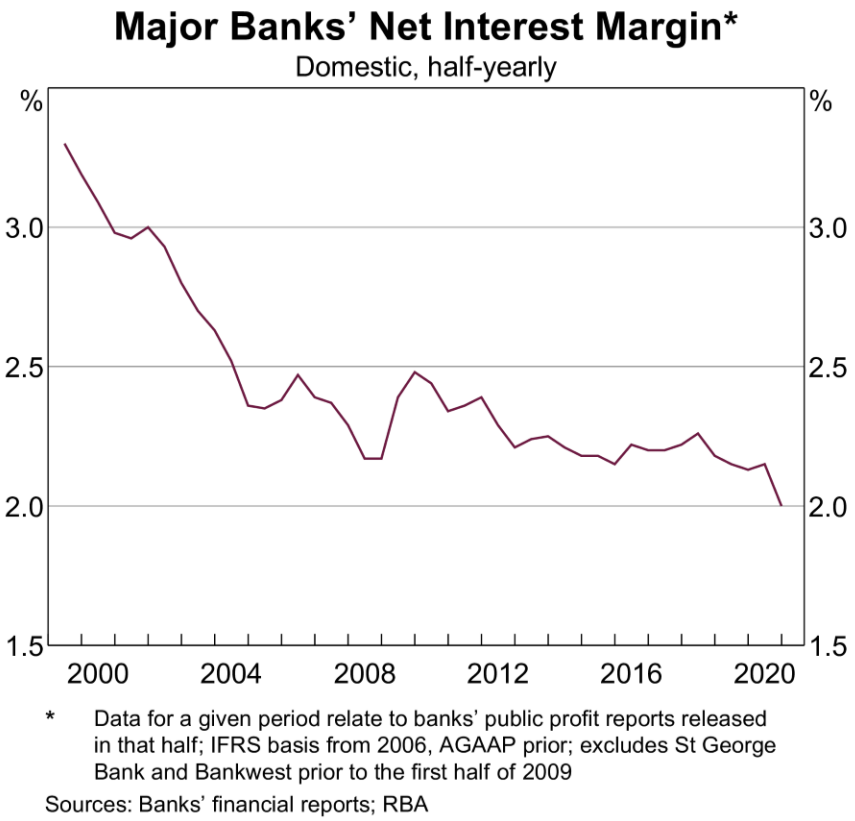



**FIGURE 11: NIM TRENDS FOR MAJOR AUSTRALIAN BANKS (SOURCE: RBA CHART BOOK)**

One factor affecting the declines in NIMs in the very recent past has been the growth of "switching" by mortgage borrowers. Historically, the "back book" has been an important source of income for the

banks, with existing customers not taking advantage of opportunities to switch banks and take advantage of special rates lower than the standard variable rate on offer to new borrowers. Also relevant has been a shift of borrower composition from higher rate loans (interest only and investor) to principal and interest and owner-occupier. Whether banks have attempted to push up NIMs by not passing on (fully) RBA cuts in the cash rate to mortgage rates is contentious, although the relationship between the cash rate and the banks' cost of funding (interest expense) is complex and variable.

ANZ and NAB generally have had substantially lower NIMs than CBA and WBC and over the three years 2018-20 the latter two had NIMs of around 2.1 compared to around 1.8 for ANZ and NAB.

## Some Theory and Empirics

While the marked decline in Australian bank NIMs indicates that there are a variety of factors influencing their behaviour over time, one question addressed by a range of theoretical and empirical studies has been: what determines the level of the NIM (or the "spread" between loan and deposit rates?)[14] The Ho and Saunders (JFQA, 1981) model based on dealer spreads has been influential and the basis for many empirical studies examining this question, although a more easily understood version, more applicable to Australia is McShane and Sharpe (JBF, 1985). The models are based on earlier models of a "market-maker" who maintains an inventory of stock so as to be able to meet buy and sell orders of customers and make a profit from the buy-sell spread – but facing the risk that price movements could lead to gains or losses on the inventory position. The models are of a single bank which is able to set its loan and deposit interest rates with the effect of market competition occurring via the elasticity of loan demand and deposit supply.

The model is summarised in Figure 12, where it is assumed that there is only deposit and equity funding and loans and money market cash holdings/borrowings. Loans and Deposits have the same maturity. Banks set their offering interest rates on loans and deposits (at date 0), where it is assumed that they have some market power in setting loan and deposit rates. They choose margins above and below the risk free rate for loan and deposit rates respectively. Deposit supply and loan demand are then seen (date 1) and the bank will either need to invest surplus funds or raise additional funds in the cash market at an uncertain interest rate. In setting the interest rate margins at date 0, the bank (knowing the uncertainty of the net cash flow from deposit inflows and loan outflows) will aim to maximise the expected utility of its wealth at the loan and deposit maturity date (date 2). The bank is assumed to be risk averse such that the expected wealth and its variance are relevant to its decision making. Solving the maximisation problem the optimal spread between loan and deposit rates is found to depend on the bank's market power (the sensitivity of loan and deposit flows to the rates set), the

[14] NIM is NII over AIEA, whereas the spread is simply $r_L - r_D$.

size of the potential mismatch between loan demand and deposit supply, and the volatility of the market interest rate. This provides a framework for empirical studies regressing the interest rate spread on variables such as market power (concentration ratios), interest rate volatility, loan and demand variability, and others (often using the "kitchen sink" approach). However, various theoretical extensions to the model include credit risk, operating costs, asset diversification, duration mismatch, etc. can motivate inclusion of alternative explanatory variables.

Most empirical studies of spreads cite Ho & Saunders, and are generally of the form:

- Dependent variable: $Margin_{it}$ for bank i at time t; some papers (eg Entrop et al, JBF 2015) examine spreads of the individual rates to market benchmarks jointly by incorporating longer term interest rate uncertainty into the model via assuming longer maturity for loans than deposits. (They find that this is more relevant for the loan spread than the deposit spread).
- Explanators: Concentration ratio (market power); Operating costs; interest rate volatility; excess capital; other risk variables; implicit interest; cash reserve costs; macroeconomic variables; etc.

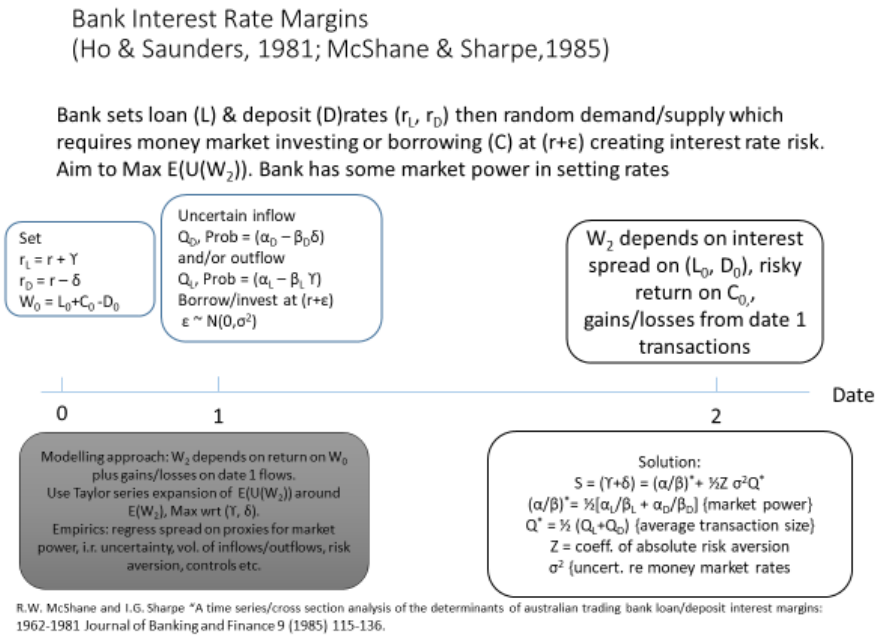



FIGURE 12: MODELLING THE DETERMINANTS OF BANK INTEREST RATE MARGINS

One study adopting the Ho-Saunders approach for Australia is by Williams (FMII, 2007). His results are shown in Figure 13. He does not find a role for market power – but this may be explained by the massive size differences between the banks in his study and the inclusion of dummies for the major banks.

## Australian bank NIMs

| Theory (ex sign) | Proxy (ex sign) | result | Comment |
|---|---|---|---|
| Market power(+) | Assets/Fin sector total (+) | - X | massive size diff (& dummies) |
| Operating costs (+) | OC/TA (+) | + *** | cf Implied Interest (coeffs sum ≈ 1) |
| Manag. risk aversion (+) | Capital ratio(s) (+) | + *** | less deposits & debt |
| Interest rate vol (+) | BBR90 hist vol (+) | + *** | |
| Credit risk (+) | Provisions/loans (+) | - * | |
| Credit & market risk | Interaction term | no | |
| Bank Size (+) | #branches / loans (+) | no | ? (to capture product mix) |
| Implied interest (+) | (OC-NonII)/TA (+) | + *** | implied by profit decomposition? |
| Reserves cost (+) | (Reg reserves)/Liabs (+) | no | not relevant for much of period |
| Management quality (+) | Cost/Income (-) | - *** | implied by profit decomposition? |
| Liquidity risk (+) | Liq Assets/Liabs (-) | no | more of lower earning assets |
| Big4 & Foreign Bank dummies | | + (big4) – (for) | |
| Year dummies | | Increasing (-ve) NIM trend (securitisation, 89-92 crisis | |

Period 1989-2001: 43 banks but significant exits (foreign, state); interest rate level changes; How to rule out other theories?

FIGURE 13: DETERMINANTS OF AUSTRALIAN BANK NIMS

## 4.14 The NII – NONII mix

The relative importance of Net Interest Income (NII) and Non-Interest Income (NONII) in determining bank profitability varies between banks and has varied substantially over time. Understanding the impact on profitability and risk of the different activities which generate these different income streams is important for bank managers. It is also an important consideration for regulators concerned with understanding bank risk.

### Academic studies – diversification and NONII

This issue is linked in the academic literature to that of diversification in banking, prompted partly by a paper by Stiroh (JMCB, 2004). He noted a significant increase in the relative importance of NONII in US banking over recent decades, involving activities which generate trading income, fiduciary income (from administration/management of assets for clients), service charges (like account keeping fees/payments charges), and fee income (loan application fees etc), rather than interest income. Within those categories, the largest banks had more focus on trading income than smaller banks. Stiroh asked whether this diversification away from "traditional" intermediation was beneficial in terms of reduced bank risk and improved risk-adjusted profits? His answer, based on US data from the late 1970s to 2001, was in the negative. Among the reasons were: greater volatility of NONII than NII; the level and growth of correlation between NONII and NII; a worse risk-return tradeoff for NONII activities than for NII.

Williams and Prather (IJMF 2010) examined the effect of diversification into NONII activities of Australian banks. They found that fee-based income was riskier, but that diversification improved risk-adjusted bank performance. Subsequently Williams (JBF 2016) examined how bank revenue composition and bank risk were related using quarterly bank data (confidentially provided by APRA) for 2002 – 2014 for 26 banks (of which 11 were ASX listed). A range of risk measures (accounting and market based) were used as a dependent variable in regression on the composition of bank revenue (using three alternatives of NONII/Total revenue, a HHI index of revenue concentration and weights of revenue share of different activities) and additional control variables. He finds that there appears to be no portfolio diversification benefit (risk reduction) from combining NII and NONII activities, and that the latter income stream is riskier. The results suggest that trading and investment activities have some portfolio diversification benefits.

## Australian data

The RBA conducts an annual survey of bank fee income (see eg Crews and Lewis (2020)). This does not incorporate trading income, but focuses on fees charged to household and business customers. Deposit fee income has declined steadily as a ratio to deposits since 2000 when it was around 60 bp to below 10 bp in 2019. Likewise lending fee income as a ratio to assets has declined from over 30 bp to just over 15 bp, and other non-deposit fee income as a ratio to assets has fallen from near 30 bp to below 15 bp. The household share of the total fee income charged is around one-third.

Fee income from households (credit cards, housing loans, and deposit related fees contributing 43, 28, and 19 per cent respectively of the total in 2019) has declined in total over recent years whereas that from businesses has continued to grow. Changes in ATM charging and use have contributed to a decline in deposit related fees. “Exception” fees (for dishonoured or unauthorised transactions) have fallen in recent years. Some of the fees charged by banks to consumers (such as late payment fees) have been controversial, as indicated in this article by consumer group Choice.

Fees charged to business include *et al* loan and deposit related fees (around 40 and 7 per cent of the total), together with merchant service fees (associated with providing payments services) which contribute around 40 per cent of the total.

There is little public information available on the relative importance of trading and investment activities of Australian banks, although individual bank disclosures do provide some guidance. For example, for ANZ the RWA calculated for market risk and IRRBB for 2019 was around 3-4 per cent of total RWA. In terms of income, trading and investing activities are undertaken by the markets group within the Institutional division. In 2019, the Institutional division contributed $5.3 bill of the bank’s total revenue of $19.0 bill ($14.3 bill of NII and $4.7 bill of NONII). Of that $4.7 bill NONII, the markets

group generated operating income of $1.3 bill (around 25 per cent). Public figures for the share of the markets group in total bank expenses are not available, but the Institutional division had expenses of $2.7 bill which is around 30 per cent of total bank expenses. The institutional division contribution to overall bank Cash Profit of $6,772 bill was $1,852 bill. Assuming the markets group accounts for 25 per cent of the institutional group expenses and profits, its contribution to total profit would be less than $500 million or around 7 per cent of the total. These are ball-park figures but serve to indicate that trading and investing activities are a relatively small (but not insignificant) part of overall bank income for Australian banks. Another indicator supporting the conclusion of relatively modest reliance on trading and investing activities is from the bank's 2019 G-SIB disclosure which reported "trading and available-for-sale securities" equal to a little over 4 per cent of the bank's total exposures.

## 4.15 Bank Efficiency

Analysts typically refer to the banks cost-to income (CI) ratio when examining bank efficiency. That ratio defined as operating costs/(NII+NONII) is interpreted as indicating the efficiency with which inputs are transformed into outputs, and is suggestive of adherence to the production rather than the intermediation view of bank activities. A lower CI ratio is interpreted as increased efficiency.

The RBA noted in its September 2014 Financial Stability Review that the CI ratio for the major banks in 2013 of 44 per cent was down 20 percentage points from the mid 1990s. That was a massive decline, which put the Australian banks near the bottom of CI ratios internationally. The RBA pointed to the following factors contributing to that fall: adoption of new technologies; closures of branches; and restructuring. The RBA also noted that commercial banks with a focus on retail activities tend to have lower CI ratios than universal banks with more emphasis on non-interest sources of income. The Australian banks' focus on residential mortgage lending was also suggested as an explanation for lower CI ratios than commercial banks elsewhere. The RBA also suggested that economies of scale might help explain why the CI ratio for smaller regional banks was substantially higher at 57 percent than the 44 per cent of the majors.

Since that time there has been something of an increase in the majors' CI ratios to an average in 2019 of 49.7 per cent, with much of the increase occurring in 2019. The need to invest in new technologies and significant compliance costs are relevant here. Also important is a substantive amount of customer remediation costs for poor customer outcomes (in some cases this might be recorded as a reversal of non-interest income and in others as an operating cost) and penalties for regulatory non-compliance.

## Empirical Studies

There are essentially two types of studies examining efficiency in banking. One type is studies attempting to discern whether there are economies of scale or scope in banking. The second type is studies which, in essence, examine "X-efficiency" – the extent to which banks are operating inside the efficient production frontier.

## Economies of Scale and Scope

For many years the conventional wisdom was that there were economies of scale in banking up to the size of, for example, a mid-sized bank. The evidence, based on regressions of bank total costs on measures of size and input prices (with a functional form derived from a Cobb-Douglas production function or using a translog specification[15]), using data from around the 1980s supported such a view. Amel et al (JBF, 2004) survey this literature. Economies of scale seemed to disappear for larger banks, with the shape of the average cost curve flattening out after some level.

Since that time, the evidence has tended to point in the opposite direction – that economies of scale persist, even for very large banks. Changes in the technology of banking could be one reason for that, but a number of studies re-examining the earlier data have suggested that empirical specifications used earlier studies ignored important factors. Hughes and Mester (JFI, 2013) provide an overview of the reasons, the main ones being a neglect of risk and product difference considerations, while also acknowledging that changes in technology and regulation are relevant for the results using later data. They argue that bank management decisions incorporate risk considerations which are not considered in the standard production function approach, and that the bank's cost will depend on its risk exposure.

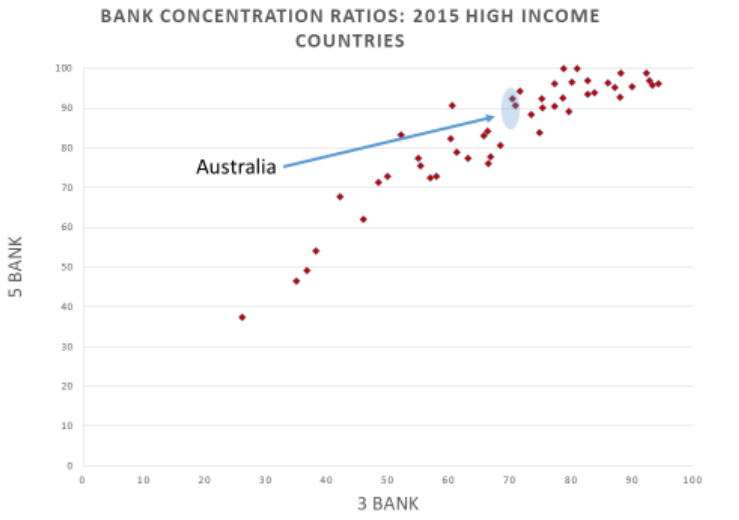
The essence of the argument of Hughes and Mester is that larger banks will have a superior risk-expected return frontier available to it than smaller banks because of increased diversification which also enables lower resource costs in achieving a specific level of risk. If a larger bank takes advantage of that difference by adopting a strategy with higher expected returns and lower risk, then average costs will tend to be lower for larger size (the economies of scale effect). But their optimal strategy could be to target a higher level of risk consistent with a higher expected return, but implying higher costs associated with management of that risk. This would lead a simple comparison of costs and output to lead to a conclusion of diseconomies of scale which is incorrect because the higher costs of the larger bank reflect a higher expected return. It is thus necessary to incorporate managerial preferences regarding risk-taking into the analysis, and incorporate determinants of risk - including capital structure choices.

[15] This involves regressing log of total cost on a function of log of output and log of input prices

Hughes and Mester identify significant differences in relevant characteristics between banks in different size categories (for US banks using 2007 data). They show that incorporating differences in equity capital ratios, by itself, into a standard cost function does not negate the traditional view of no economies of scale for larger banks. But when cost functions which incorporate differences in the risk-expected return trade-offs are allowed for, substantial economies of scale are found for large and very large banks.

The economies of scale issue is an important one in considering whether concentration in the banking sector is a natural outcome of cost differentials. That in turn has significant policy considerations of two sorts. One is the effect on the level of competition in banking and potential for excess profits for larger banks and the sub-optimal resource allocation associated with imperfect competition. (On the other hand, the benefits from lower production costs may outweigh the distorting effects). The second is the impact on financial stability – and there is a large, but inconclusive, literature examining whether more concentrated banking systems exhibit more or less financial stability.

Banking sector concentration is a world-wide phenomenon as shown in Figure 14.




Source: World Bank Global Financial Database (Series GFDD.OI.O1, GFD.OI.O6)

http://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database

**FIGURE 14: WORLDWIDE BANKING SECTOR CONCENTRATION**

Inchauspe & Cronje (ER, 2020) is a recent study of concentration in Australian banking. They estimate a system of demand and adjusted marginal cost conditions which incorporates a parameter allowing inferences to be made regarding use of market power. For the period 2004-2017 they suggest that there is a fairly competitive environment, and that the BankWest acquisition by CBA had a minor negative effect on competition.

## X-Efficiency in Banking

The term "X-efficiency" was introduced into the economics literature by Leibenstein (AER, 1966) and refers to the extent to which organisations operate at less than maximum efficiency. It has led to a plethora of studies attempting to determine the extent to which that happens and, if so, why.

In the area of banking there have been two main types of studies. (They differ from economies of scale and scope studies which tend to implicitly assume efficient, cost-minimising, production). One uses "frontier regressions". The other uses a technique known as "Data Envelopment Analysis (DEA)".

The frontier regression approach estimates, for example, a standard cost function relationship but with the constraint that observations must lie on or above some efficient (albeit, *a prior* unobservable) frontier. By making specific assumptions about the regression error term such a constraint can be incorporated (although other random effects can be allowed for which permit some observations to lie below the frontier).

The DEA approach has its origin in linear programming and is suited to situations in which the entities (Decision Making Units (DMUs) is a common term) being studied produce a range of outputs with a range of inputs. Using observations from a number of entities, the approach determines (via an optimisation method) the frontier of maximum output combinations that can be achieved using a least cost combination of inputs. If a particular entity was on the frontier, it would have an efficiency score of unity, while those within the frontier would have a score reflecting distance from the frontier. Figure 15 illustrates for the simple case where banks (each represented by the stars) produce varying combinations of outputs X and Y per unit of the one input used in production. The output combinations of banks A, B, C and D define the "efficient frontier" (such that those banks have an efficiency score of 1. The efficiency scores of other banks, such as E and F, are determined by how far inside the frontier they lie (on the ray from the origin through their output combination to the frontier).

A range of different DEA approaches can be adopted, and the approach allows for multiple inputs and outputs. This immediately leads to the question (relevant for the stochastic frontier regression approach also) of what are the inputs and what are the outputs of a bank. Most studies use the *intermediation approach*. There is a plethora of studies, including of Australian banking and ADIs. Among the best known are Sathye (JBF, 2001), Avkiran (JBF, 1999). A more recent example is Moradi-Motlagh (EM 2015) who argue that efficiency declined after the GFC. They also argue that their results indicate that small banks operate in an increasing returns to scale region, but that this is not so for large banks.

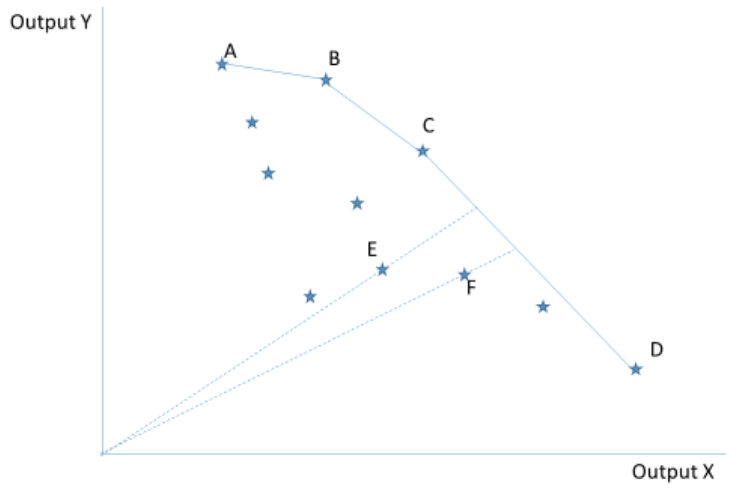



FIGURE 15: MEASURING EFFICIENCY

## Bank Profitability

The profitability of Australia's major banks has occasioned much debate over recent decades. As the figure shows, the accounting return on equity (ROE) was in the mid to high teens for much of the first half of the decade commencing in 2010. But has since fallen to around 10 per cent and lower in 2020 reflecting lower interest rate levels and the Covid-19 crisis. Whether these levels reflect "monopoly profits" at a time when interest rate levels have moved to near zero is a matter of some debate. A CAPM analysis of required returns for such entities with systematic risk betas of around unity, and a market risk premium of, say, six per cent would suggest that expected returns should be substantially below 10 per cent. However it should be noted that the figures above are accounting rates of return based on book value of equity. Given market to book ratios for bank equity still significantly above unity (although less than in earlier years), such that scaling by the M/B ratio is relevant, the difference may be somewhat exaggerated.


FIGURE 16: MAJOR BANK PROFITABILITY (SOURCE: KPMG 2019)

One recent study of Australian bank performance (an earlier study is Kirkwood and Nahm (ER, 2006)) is by Hoang et al (ER, 2020),. They examine 73 ADIs over 2000-15, considering NIM, ROE, Tobin's Q

ratio (Q) and an economic value-added ratio (EVAR) as measures of performance. They regress the measures of performance on its lagged value, measures of market structure (concentration), market power (Lerner index), measures of bank efficiency and control variables for bank, industry and macroeconomic characteristics. Their results suggest diseconomies of scale for the four major banks, perhaps supporting the Four Pillars policy and "the conclusion that 'the banking sector is competitive, albeit concentrated' drawn by the 2014 financial system inquiry may be supported by the empirical evidence of this study."

# APPENDIX 1: The Residual Income Model

This short appendix demonstrates the mathematical equivalence of the Residual Income Model to the more familiar Dividend Discount Model (DDM) for share market valuation. Starting with the DDM, it uses the fact that the book value (BV) of shareholder equity will increase by the excess of earnings (e) over dividends (d) paid out in that period. (There are specific assumptions about the accounting principles involved, generally referred to as "clean surplus" accounting, whereby all profits and losses are assumed to be recorded in the income statement and directly affect shareholders funds (book value). In practice, some valuation adjustments can be added, or subtracted from, shareholders funds, without being recognised in the income statement). The algebra simply involves using the second equation to substitute for $d_t$ in the first equation, and then writing out the summation in full and manipulating that.

$$MV_0 = \sum \frac{d_t}{(1+r)^t}$$

$$BV_t = BV_{t-1} + e_t - d_t.$$

$$MV_0 = \sum [\frac{e_t}{(1+r)^t} + \frac{BV_{t-1} - BV_t}{(1+r)^t}]$$

$$MV_0 = \sum \frac{e_t}{(1+r)^t} + \frac{BV_0}{(1+r)} - \frac{BV_1}{(1+r)} + \frac{BV_1}{(1+r)^2} - \frac{BV_2}{(1+r)^2} + ....$$

$$MV_0 = \sum \frac{e_t}{(1+r)^t} + BV_0 - \frac{rBV_0}{(1+r)} + \frac{BV_1 - (1+r)BV_1}{(1+r)^2} + ...$$

$$MV_0 = \sum \frac{e_t}{(1+r)^t} + BV_0 - \sum \frac{rBV_{t-1}}{(1+r)^t}$$

$$MV_0 = BV_0 + \sum \frac{e_t - rBV_{t-1}}{(1+r)^t}$$

# APPENDIX 2: Bank Deposits as an Option

A useful way of thinking about some key features of banking is to draw on option pricing theory (although this also disregards many important features of banking).

Consider a one period scenario in which depositors provide a bank with funds D = $90 in return for a promised repayment $D(1+r_D)$ at the end of the year, where $r_D$ is the promised rate of interest. The bank uses deposits and own equity funds E =$10 to invest in assets (loans) costing A = D+E =$100 which promise an interest return of $r_A$ and thus a total repayment of $A(1+r_A)$ at the end of the year. It's accounting balance sheet is shown below.

| **Assets** | | **Liabilities** | |
|---|---|---|---|
| **Loans** | 100 | Deposits | 90 |
| | | Equity | 10 |

The current "mark to market value" (ie present value) of the loans (A) may differ from their cost (D+E) reflecting market power of the bank. The assets are risky – repayment may not happen, or only be partial. Assume that the loans and deposits have a one year maturity (ie ignore maturity transformation by the bank and thus liquidity risk issues), and ignore bank operating costs. Assume the promised interest rate on deposits is $r_D = 0.05$, such that amount promised to depositors is 94.5, and the contractual loan interest rate is $r_A = 0.10$. For simplicity we ignore the bank's operating costs.

The promised loan repayment = 110, but allowing for the probability of full or partial default, assume the expected loan repayment is 109. Reflecting the risk involved in the loan we assume the bank requires an expected rate of return on the loan of 7% (0.07) for the loan to have a zero NPV. Given the contractual loan rate and expected repayment, the loan has a positive NPV to the bank – the mark to market value ($A_{MV}$) is $A_{MV}$ = 109/1.07=101.9, for an NPV of 1.9.

We can identify two possible end of year outcomes. If loan value (repayment) is: (a) >94.5, depositors get promised repayment of 94.5; (b) <94.5, bank is liquidated, shareholders get nothing and depositors get the value of loan. These outcomes are shown in Figure 17.

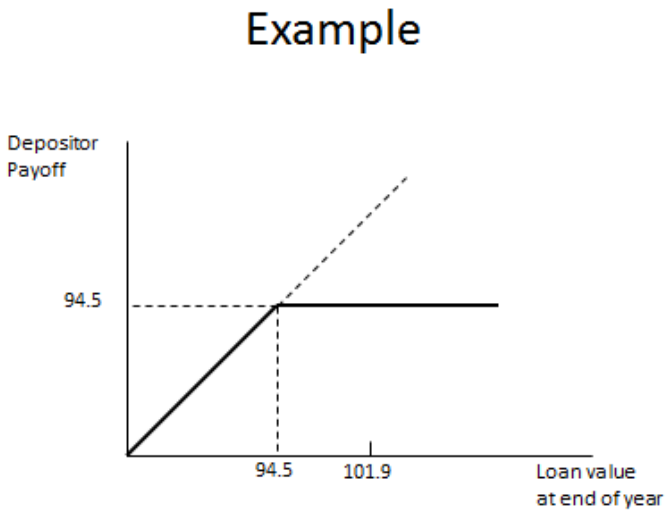



FIGURE 17

As the figure makes apparent, we can think of deposits as equivalent to depositors having made a risk free investment of 94.5 but also having written a put option over the bank's assets. The put option gives the bank owner's the right to put the assets of the bank to the depositors at a price of $94.5. At the end of the year, if A> $D(1+r_D)$, the "strike price", the put option is not exercised by the bank and depositors receive $D(1+r_D)$ = $94.5. But if A < $D(1+r_D)$ depositors receive A (the bank is in liquidation and, effectively, the assets are put to the depositors in exchange for bank not paying the amount owed ( $D(1+r_D)$ which is the strike price). These outcomes can be expressed as:

Depositor Payoff = Min [A, $D(1+r_D)$] = (as shown below) = $D(1+r_D)$ – Max [$D(1+r_D)$ - A, 0]

Min [A, $D(1+r_D)$] = Min [A - $D(1+r_D)$ ,$D(1+r_D)$ - $D(1+r_D)$ ] + $D(1+r_D)$ = Min [A - $D(1+r_D)$ ,0 ] +$D(1+r_D)$

= - Max [ $D(1+r_D)$ – A, 0 ] + $D(1+r_D)$ = $D(1+r_D)$ - Max [ $D(1+r_D)$ – A, 0 ]

This is equivalent to making a risk free investment promising $D(1+r_D)$ and a written put option over assets of the bank with a strike price D(1+rD) as shown in Figure 18.

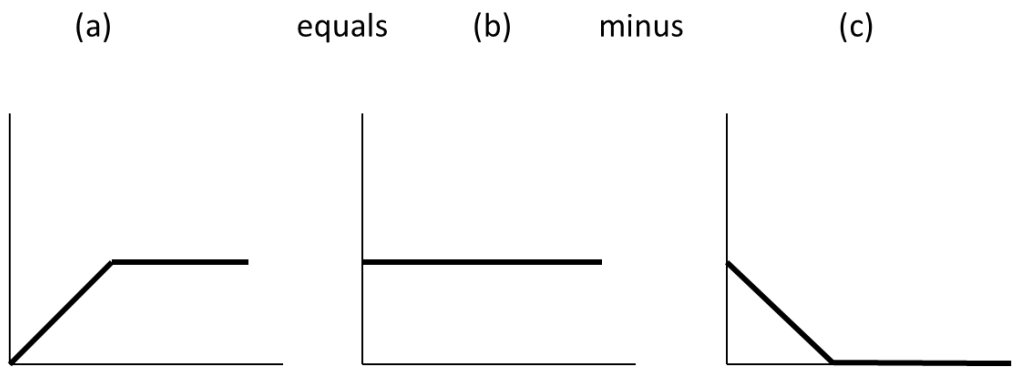



FIGURE 18

From the Bank shareholder (owner) perspective (drawing on put-call parity), owners have a portfolio comprising: (i) Assets (loans made); (ii) Liability: promise to pay $D(1+r_D)$ to depositors; (iii) Option to put assets to depositors at strike price of $D(1+r_D)$. Exercise of the option implies default on promise.

Equivalently, using Put –Call Parity, the owners' equity in the bank is equivalent to having a call option over the assets of the bank with a strike price equal to promised deposit repayment:

Long Call = Long Put + Long Asset – Short Risk free asset promising strike price

## Insights from the Option Perspective

Informed depositors, who recognise the risk, would adjust the interest rate demanded such that $D(1+r_D)/(1+r_F) - P = D$, ie they would adjust $r_D$ such that the present value of a risk free deposit promising $r_D$ minus the value of written put option (P) equals the amount deposited (D).

If depositors do not adjust $r_D$ to reflect risk, the bank receives cash amount of deposit D in return for a promise which has fair (present) value less than D.

Even if $r_D$ does reflect the perceived risk at the time the deposit is made, a moral hazard problem exists. The bank owners can, after the deposits are made, increase the value of the call option they possess in several ways. One is to invest in higher risk assets, and charging a correspondingly higher loan interest rate, than originally expected to be the case. They get the upside of a higher loan return when the loan does not default, whereas if the loan payoff is below the amount promised to depositors, their payoff remains at zero. A second method is to reduce the amount of their own equity invested in the bank and replacing it with further deposits (higher leverage).

Of course, if depositors have the right to withdraw deposits at call, and can observe the bank's subsequent actions, they can protect themselves from such wealth transfers by threat of withdrawal of deposits. In practice, they are unlikely to be able to observe such risk-increasing actions and regulation instead provides some form of protection by linking capital requirements to the riskiness of bank assets.

The option approach (modified to reflect more complicated situations, and drawing on option pricing theory) can be used to examine issues such as testing whether more risky banks pay higher interest rates on their deposits.

# 5. Bank Structure, Ownership and Governance Issues

## Contents



## 5.1 Introduction

Financial institutions can be organised in a variety of different forms, involving different methods of allocating risk and control rights. Because of imperfect information and the impossibility of complete contracting, these lead to different forms of agency problems and risks for stakeholders and society. The form chosen will reflect the perceived most efficient form given the objectives of the founders (or controllers) of the organisation and the various constraints they face. Taxation and regulation also

affect the viability or suitability of particular types of organisational structures. An historical perspective is important, since current institutional structures will reflect past social and economic circumstances relevant to their origins and evolution through time.

The structure of the organisation also gives rise to internal governance issues. Particularly in large organisations, delegation of decision-making authority becomes necessary and requires control mechanisms to ensure that decisions are consistent with the goals of the organization. Sticks and carrots are both needed. Accountability is required, limits on the scope of decision-making delegated are required, rewards for superior performance are warranted. Senior executives and Boards need to receive adequate information to enable them to assess overall performance against goals. As the Hayne Royal Commission showed, these have not always worked well in Australian Banks (nor those in foreign jurisdictions).

The following sections examine types of ownership arrangements, the role of banks as (part of) conglomerate structures, Australian banks and methods of delivery of banking services, governance and accountability in banks, and bank remuneration arrangements.

## 5.2 Bank Ownership

Organisational forms and ownership structures in the financial services industry vary widely and include unincorporated enterprises, partnership (including limited partnerships), unit trust/managed investment schemes (MIS) and mutual/cooperative structures and joint-stock companies. The last of these, where equity holders are the residual risk bearers, but with limited liability, and have control (voting) rights, is the most common nowadays, but history demonstrates a wide variety of alternative structures can exist. Since joint-stock companies (such as limited-liability companies listed on the stock exchange) are well known, they are not discussed in detail here.

### Some History regarding Bank Ownership Structures

A feature of banking before the 20th century in many countries, including Australia, was the existence of *unlimited liability or double liability* of bank owners.[1] With minimal regulation, this was a way of owners convincing depositors or holders of the bank's notes that they would have strong incentives to manage the bank in a way which avoided failure. Likewise, Lloyds of London insurance was historically characterised by unlimited liability of the individual members (high net-worth individuals referred to "names") providing insurance cover. That has changed in recent decades such that

[1] Until 1963 many of the Australian Trading Banks had uncalled shareholder funds which could be demanded from shareholders if needed. In the early post-WW2 years these were around a quarter of shareholders' funds. (Source: RBA, Occasional Paper 4B, Table 10)

members typically have a corporate form, or other structure, which limits liability, and no new individual memberships are allowed.

Partnerships also involve unlimited liability and were the only structure allowed in stockbroking in Australia prior to the mid 1980s. Most investment banks before the 1970s were partnerships, but in the 1970s and 1980s the large US investment banks converted to public firms. Morrison and Wilhelm (JF, 2008) explain this phenomenon by reference to the relevance of human versus physical capital in investment banking. Prior to the technological revolution of the 1970s onward, the partnership form was suited for ensuring mentoring within the partnership (to achieve the maintenance of "reputational capital") and development of, and retention of future partners with, "tacit" human capital skills. The partnership model allowed profit sharing and provided incentives for effort by those with such not easily codified or measured "soft" (as opposed to technical) skills. Once technology provided scope for new efficiencies requiring large investments in physical capital, the public firm model was a better organizational form. Not only was it better able to provide the required funds for large scale investments, but within larger organisations the free-rider problem becomes more relevant – to the detriment of the partnership model. It also increased the relevance of technical skills relative to "tacit" skills.

There are very few unlimited liability firms found in financial services today, although limited liability (or master limited) partnerships (LLPs) involve a general partner having unlimited liability and management responsibility, while limited partners (investors) enjoy limited liability. Many hedge funds adopt such a structure in other countries, but Australian tax laws have stifled growth of this form of organisation, by not allowing a "tax flow through" approach (except for some venture capital funds). (A flow-through approach means that if all realised income is distributed to investors, to be taxed in their hands, there is no tax paid at the LLP level).

Governments have also often been owners of banks, including historically promoting "trustee banks" run in the public interest by trustees appointed by the government. Tasmania had several Trustee banks (eventually privatised in the 1990s). The Victorian and South Australian governments each owned banks (SBV and SBSA), with a significant share of the local banking market, until the banking crisis of the early 1990s led to their demise and takeover by the private sector. SBV was sold to the Commonwealth Bank in 1991 and the SBSA was sold to Advance Bank in 1995. The NSW Government sold the State Bank of NSW to Colonial Mutual in 1994.The Australian government-owned Commonwealth Bank was privatised in the 1990s as was the WA government owned R&I (subsequently BankWest) bank. The Commonwealth sold the Housing Loans Insurance Corporation to the private sector in 1997

## Mutuals

In Australia, the mutual form once dominated the life insurance business, and mutual life offices have been common elsewhere. While customer/members are the legal owners (with one vote each), control generally lies in the hands of management due to limited member participation in voting. Credit Unions and (many) Building societies were established as mutuals in Australia and similar structures for deposit taking/lending institutions can be found in other countries such as the USA and UK. In Europe, cooperative banks have been particularly important. Many stock exchanges around the world were originally established as mutual entities with market participants (stockbrokers in Australia) being the owners, but demutualisation has been widespread.

The RBA provides some historical information on demutualisations in the Australian financial sector prior to 1980 here and Davis provides an analysis of credit union demutualization in Australia here and here, and internationally here.

What are the advantages and disadvantages of the mutual form relative to others such as joint-stock companies, and why has there been the observed decline of the mutual form in the financial sector? One explanation lies in the nature of agency problems associated with each ownership structure. Joint stock companies involve an agency problem between owners and creditors (including depositors in the case of banks) which can lead to excessive risk-taking (owners getting the upside benefits, with creditors incurring the downside costs of failure). Mutuals do not have that agency problem arising from separate groups of owners and depositors (or policy-holders etc). And while in mutual ADIs, borrower and depositor members have conflicting preferences over interest rates, traditional limits on membership to those sharing a common bond (location, religious affiliation, employment etc) tended to reduce the significance of that conflict.

But mutuals may face a more severe owner-manager agency problem because their one-member one-vote structure can lead to managerial entrenchment. Paradoxically, manager preferences for avoiding loss of perks of their office may lead them to be more risk-averse, increasing the safety of member deposits. More generally, capital market discipline, associated with having tradeable shares priced in the market, is missing for mutuals (although product market discipline has similar effects for financial mutuals).

Why have mutuals declined in importance? There are two main conflicting (but not incompatible) views. One is an *expropriation* hypothesis. As mutuals have accumulated communally owned financial reserves, incentives increase for some to convert that into private wealth via demutualization, even if the mutual is a more efficient ownership structure. The alternative is an *efficiency* hypothesis, which argues that the benefits of the mutual form may have diminished with changes in competition,

technology, regulation etc. Small mutual institutions may find the costs of regulatory compliance high, while growth may involve more heterogeneous membership with different, competing, preferences – less suitable for the mutual model. Government financial consumer protection schemes (such as deposit insurance) may reduce the perceived safety benefits for customers of the mutual form. Information and monitoring benefits of mutuals dealing with a limited, socially connected, group of members may have declined as membership widened. Growth ambitions of professional managers who are needed for a more complex financial environment may be thwarted by the inability of a mutual to raise external capital.

What does the evidence say on the expropriation versus efficiency hypotheses? Overall, it is somewhat mixed. A number of studies (reviewed in Davis) provide evidence supportive of increased efficiency following demutualisation, but this event typically involves other possible confounding changes such as shifts into different activities and risk-taking. Others point to the demise of demutualized institutions as stand-alone entities (via take-overs etc) as suggestive of conversion leading to loss of some benefits of mutuality. Arguably both expropriation and efficiency considerations are both relevant.

## The EEC and Cooperative Banks

In Europe, the creation of the European Economic Community has created many issues regarding banking structure and supervision. Whereas previously banks from another European country would have been classified as "foreign banks", there is no longer such a distinction. Since the GFC the EU has embarked on a banking union applying common laws and regulations across all EU states and creating a single market for financial services.

Europe is characterised by a range of ownership structures in banking. **Error! Reference source not found.** provides an overview of bank ownership structures in Europe.

**TABLE 1: BANK OWNERSHIP STRUCTURES IN EUROPE**

| | | |
|---|---|---|
| In Europe, government and cooperative banks are as significant as shareholder owned banks. | | |
| Schoenmaker et al[2] provide a useful list of significant Euro-area banks as at 2015, which is summarised (excluding branches and subsidiaries of banks from elsewhere) in the Table below. | | |
| Type, Size (Assets), Number | | |
| G-SIBs, >EUR 800bill, (8) | 6 – joint stock | Listed - dispersed ownership |
| | 2 - cooperative | 1 listed – controlled by mutuals<br>1 unlisted – owned by mutuals |
| E-SIBs, >EUR 150 bill, (22) | 8 - joint stock | Listed – dispersed ownership |
| | 4 – cooperative | 3 unlisted - owned by mutuals<br>1 listed – controlled by foundation |
| | 10 – government | 2 listed – nationalised<br>1 unlisted – nationalised |

| | | |
|---|---|---|
| | | 1 in resolution<br>4 local government owned<br>1 Post Office owned<br>1 Policy bank |
| Other significant institutions, >EUR 3bill,(70) | 27 – joint stock | 16 listed – dispersed ownership<br>4 unlisted – major owner<br>7 unlisted private owner |
| | 21 – cooperative | 10 unlisted – mutual or owned by mutuals<br>6 populares (listed, one vote per owner)<br>3 Unlisted – controlled by foundations<br>2 other |
| | 22 – government | 6 nationalised<br>7 policy banks<br>4 central government<br>3 local government<br>2 other |
| [1] Source: Schoenmaker et al (Bruegel.org, 2016) | | |

The cooperative banks in Europe generally have a structure along the lines of that shown in Figure 1 (although some may have only two tiers rather than the three shown in the figure). Members/customers own the local bank which in turn has an ownership stake in a regional bank, and which in turn is a part owner of the group's "central bank", which provides liquidity and other services and access to Central Bank facilities for the lower level banks. This is in distinct contrast to the multiple bank-holding company model seen in the USA where shareholders own the holding company which owns several bank subsidiaries and provides equity capital (and debt funds raised by the parent to them).

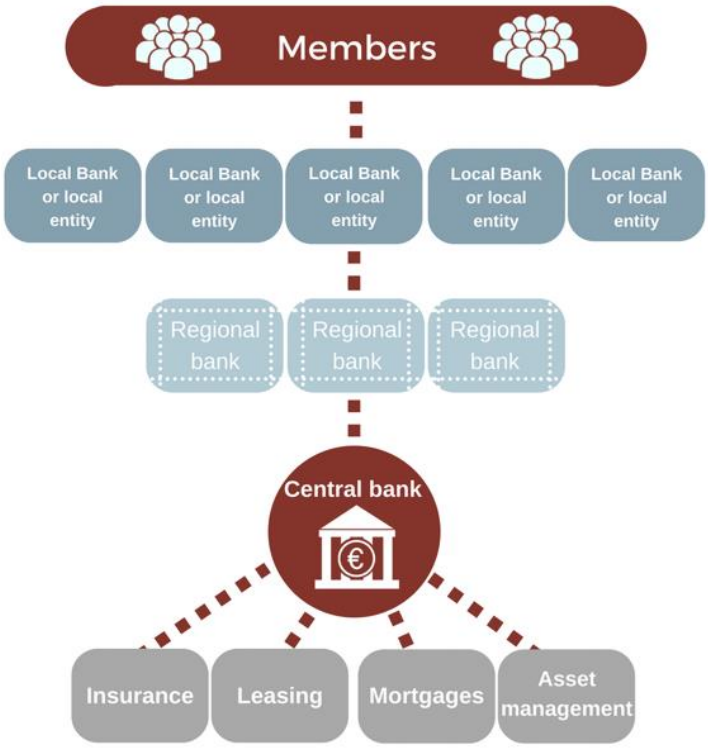



FIGURE 1: COOPERATIVE BANK STRUCTURE (SOURCE: GLOBALCUBE.NET, 2017))

## Bank Ownership and Non-Banking Activity Restrictions

The appropriate nature of relationships between banks and industry, as well as that of ownership and control of banks, has long been debated. Different regulatory arrangements and models have emerged globally, and changed over time, reflecting historical experiences, dominant political ideologies, and roles of special interest groups.

The ownership of banks has been a subject of considerable controversy and regulatory arrangements. At one level there is the question of the extent to which commercial companies should be allowed to own or control banks. At another level there are debates over government versus private ownership structures, choices between joint-stock, partnership, or mutual ownership forms, foreign ownership, limits on maximum ownership share, banks as parent companies or subsidiaries of some other holding (parent) company.

Regarding ownership of banks, Australia requires that there be a diversified ownership structure, reflecting concerns that concentrated ownership could lead to activities which benefit controlling shareholders at the expense of depositors and bank safety. That is reflected in the Financial Sector (Shareholdings) Act of 1988, which limits shareholding in a financial sector company (which includes banks) to no more than 20 per cent, unless otherwise approved by the Treasurer.

Regarding activities, in some jurisdictions, at some times, there have been severe limitations on the ability of banks to engage in "commerce", either directly or via significant equity investments in companies engaged in non-financial activities (manufacturing etc). There have also been restrictions on commercial banks engaging in certain types of financial activities, such as securities business, real estate, insurance, with the since repealed Glass-Steagall Act, involving separation of "commercial" and "investment" banking in the USA being the most well-known example. Where non-banking business is allowed, it may be permissible if conducted in a subsidiary of the bank, or in a separate part of a conglomerate structure of which the bank is a part.[3] Ford provides a recent review of the "banking/commerce separation doctrine" as it is known in the USA, and how it applies in a number of countries.

In Australia, there is no formal, legal, restriction on banks undertaking non-financial activities, but it has not been an area of major activity nor concern. Prudential regulation, which applies relatively high risk weights to equity investments can discourage such activity. While the Australian banks have recently retreated from a range of non-banking financial activities (insurance, wealth management, financial advice) the growth of fintech may operate to encourage more involvement in non-financial activities. Banks possess large amounts of data about their customers which is a valuable resource for the development of "apps" across a wide range of activities. With "Open Banking" allowing customers to approve sharing of that data with third parties, banks may have incentives to partner with fintechs to engage in non-financial activities using that data.

Such restrictions have reflected concerns, not necessarily supported by strong evidence, that mixing banking and commerce could aggravate financial instability, lead to concentrations of economic power, or allow self-interested bankers to direct financing inappropriately to associated parties for their own gain.

Understanding why different activity and ownership regulations on banks apply around the globe requires a deep understanding of the history of financial and economic development, and political pressures of the countries concerned. Often the differences are summarised as being whether a "universal banking" model (in which a full range of financial activities is allowed) applies or whether a segregated banking model applies. The USA during the period in which the Glass-Steagall Act applied was an example of the latter, while European banks tended more toward the former. In some countries, such as Japan and Korea, the integration of banking and commerce was even more pronounced with the Keiretsu and Chaebol conglomerates involving a "main bank" which serviced a plethora of associated industrial companies.

[3] For an overview of US history in this regard see Haubrich, Joseph G., and Joao AC Santos (FMII, 2003).

## 5.3 Australian Major Bank Business Structures

Large banks are complex organisations divided into a number of Business Units (BUs) each comprising various divisions or sub-units and undertaking a number of activities. The complexity extends across a range of business activities as well as geography – including in different jurisdictions. Managers of those BUs (and of divisions) have delegated authority for decision making - subject to limits imposed on such delegation, reporting requirements, performance targets, etc. Ensuring consistency of decision making with bank objectives across BUs and management of resulting risks for the bank are complex problems.

Within a large complex banking conglomerate or BHC, it is possible to categorise the possible range of activities into the following:

- Traditional Banking – deposit taking, lending, payments services etc
- Investment Banking/Dealing – securities activities
- Insurance – Life Assurance and General Insurance,
- Mutual Fund and Pension Fund provision and management
- Wealth Management, Financial Advice
- Trust & Custody Services – managing and holding assets on behalf of others
- Other financial – portfolio managers, broker dealers, other intermediaries
- Nonfinancial Management firms – real estate, housing, utilities, management,
- Other Non Financial – technology, accounting services, subsidiaries etc

Many of the non-financial subsidiaries may be providing services for the organisation and/or for external clients. For the US Goldberg and Meehl (FRBNY, 2020) show that the largest Bank Holding Companies controlled over 1,000 legal entities operating across most of these types of activities. There was some evidence of reduced complexity (in terms of number of legal entities) and less international dispersion of activities since the GFC, but less so in terms of range of business activities.

The four major banks in Australia all have group structures such as shown in Figure 2 in which the Australian banking activities and those of offshore branches are classified by regulators as “Level 1”. Those banking type activities operated outside the bank itself (in subsidiaries) are included in the “Level 2” classification, and other financial services activities are included in the “Level 3” classification. The Banking Group, the firm listed on the stock exchange, is the consolidation of all those activities, such that most of the level 2 and level 3 activities are conducted within subsidiaries or associates of the “Bank”. Banking prudential regulation focuses upon the safety (and financial stability implications) of the Level 1 and Level 2 activities, although exposures to the bank arising from Level 3 activities conducted by subsidiaries is also taken into account. Moreover, some of those Level

3 activities (such as insurance, provision of superannuation funds) will also come under the purview of the prudential regulator.

Macquarie Bank has a quite different structure (as do AMP and Suncorp) involving the bank being a subsidiary of a Non-Operating Holding Company which is the ASX-listed company. This reflects the relative importance of non-banking activities for those groups.

Information on the number of subsidiaries and affiliates of the major Australian banks is not readily available, although their annual reports do indicate major entities included in the consolidated group. Interests in some structured entities (such as SPVs used for securitisations) may be included, as well as insurance and funds management subsidiaries and overseas bank subsidiaries (such as in NZ).

FIGURE 2: MAJOR BANK STRUCTURES

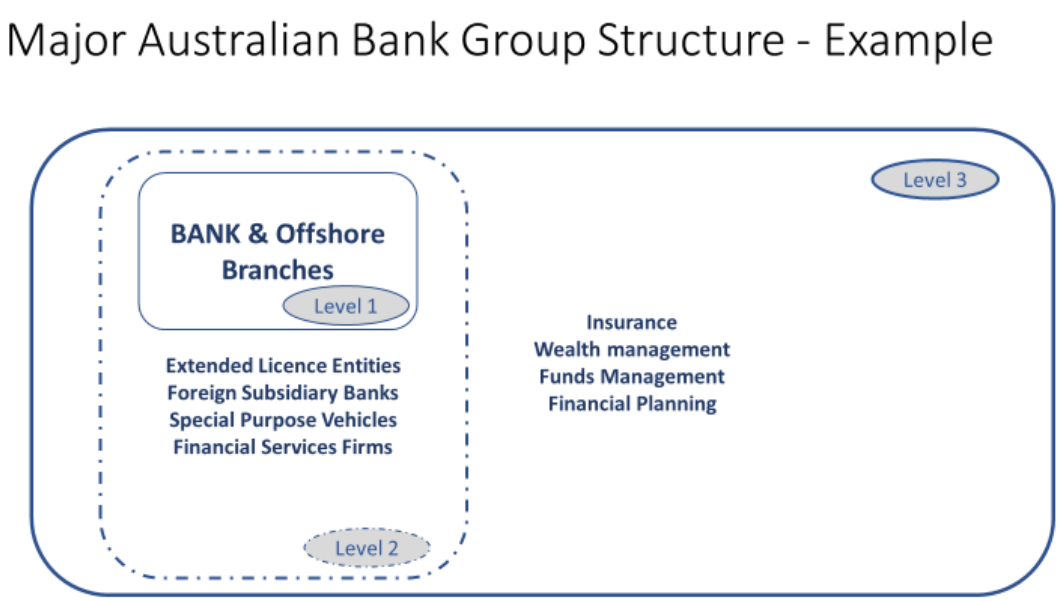



Figure 3 provides an overview of the business unit structures of the four major banks plus Macquarie Bank. Each of the customer facing units will have sub-units with responsibility for different types of financial products and services. An example of how various activities are arranged within particular business units for NAB can be found here.

Treasury which is depicted as being part of Head Office plays a major coordination role for the bank in dealing with consequences of BU activities. Net imbalances of funds received and provided to customers will be managed in that entity through raising or placing of funds in wholesale markets, and

from the equity funding of the bank. Some level of funds will be invested in a portfolio of liquid assets to meet regulatory requirements and manage liquidity risk. Interest rate risk arising from the different transactions undertaken by the customer facing units will be managed at this central level. That will generally involve the head office unit undertaking an internal hedging transaction with the "trading desk" which may be located organisationally within the Institutional Division, and which will separately determine what hedging position, on behalf of the bank, it will take via transactions with third parties.

To achieve this coordination role, involving management of funding, liquidity and interest rate risk, and to provide appropriate pricing signals to BUs consistent with market conditions and the bank's objectives, the *Funds Transfer Pricing* system (Chapter 15) plays a crucial role.

**FIGURE 3:MAJOR BANK BUSINESS UNIT STRUCTURES**

Major Bank Business Unit Structures (contribution to Profit 2017)

| | ANZ | CBA | NAB | WBC | MacQuarie[a] |
|---|---|---|---|---|---|
| Head Office | Corporate Centre, Digital Banking, Group Operations & Services, Technology (-1%) | Group Strategy, Marketing, Corporate Affairs, Treasury (-4%) | Technology & Operations, Risk, People, Customer products & services, People, Finance(-4%) | Treasury, Technology, Core Support (-2%) | Macquarie Group - Macquarie Banks |
| Customer Facing | Australia (Retail, Corporate and Commercial) (53%) | Retail Banking Services (50%) | Consumer Banking and Wealth (25%) | Consumer (39%) | Banking & Financial Services (Personal Banking) |
| | Institutional (26%) | Institutional Banking and Markets (13%) | Business and Private Banking (43%) | Business (26%) | Corporate and Asset Finance |
| | New Zealand (20%) | Wealth Management (6%) | Corporate and Institutional Banking (23%) | BT Financial (10%) | Macquarie Asset Management[a] |
| | Wealth Australia (3%) | New Zealand (10%) | NZ Banking(13%) | Institutional (16%) | Commodities and Global Markets[a] |
| | Asia Retail & Pacific (-2%) | Bankwest (7%)) | | New Zealand (11%) | |
| | | IFS (overseas retail /business banking) (1%) | | | |

Macquarie Bank is a subsidiary of the Non Operating Holding Company, Macquarie Group, with other financial activities undertaken by other subsidiaries. For the other banks the parent company is the bank, such that some types of activities undertaken in the non-bank part of Macquarie Group would be undertaken in the bank itself or its subsidiaries. (a) these business units and Macquarie Capital are primarily part of the non-banking group business.

As can be seen from Figure 3, the Head Offices of the banks generally run at a loss, even though many services provided by the head office may be charged to the customer facing divisions through the banks' costing systems. Within the customer facing divisions, two main points stand out. One is the heavy reliance of the banks on consumer business – particularly home-mortgage lending. The second is the significance of New Zealand operations (contributing in excess of 10 per cent of profits) and which are also heavily dependent on consumer business.

## 5.4 Banking Conglomerates

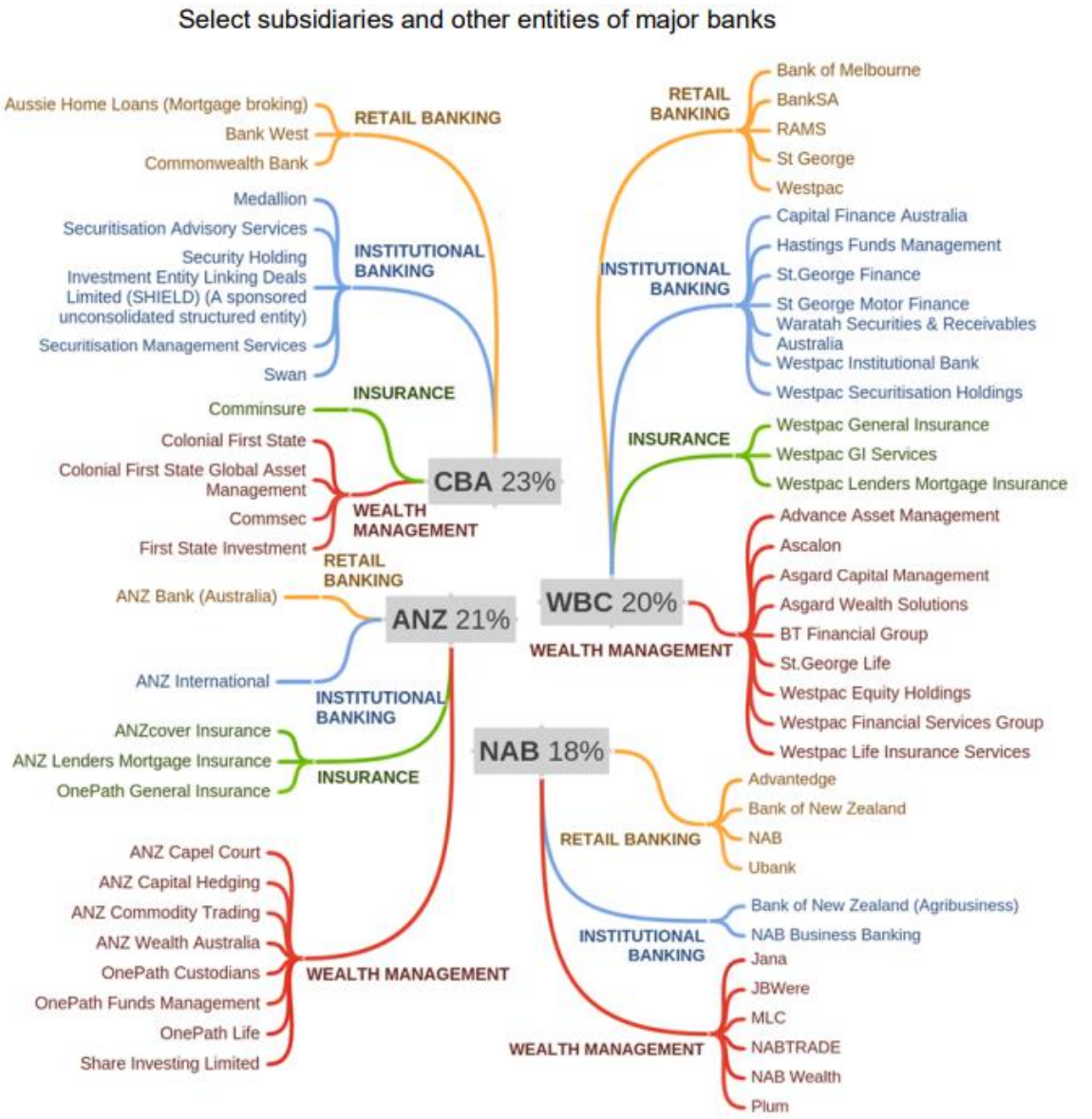
The major Australian banks diversified into a range of non-banking financial activities following the financial deregulation of the 1980s. To some extent this reflected a view that their large customer bases gave them the opportunity to efficiently cross-sell non-banking products to their customers as

part of a "whole of wallet" strategy. In recent years the trend has been in the opposite direction for reasons explained below.

One aspect of Australian bank diversification has been expansion (at least until recent years) into wealth management activities (see Golat, 2016) with the four major banks having around 20 per cent of total Assets Under Management (AUM) in 2016. Growth at the turn of the century partly reflected acquisitions of: Colonial Group by CBA; BT by Westpac; and MLC by NAB, which were generally operated as subsidiaries of the parent bank. These wealth management activities include financial advice, product distribution and funds management and (in some cases life insurance).

Partly prompted by opportunities arising from the growth of superannuation (as well as possibilities for cross-selling of products to their large customer bases), the banks' income growth from wealth management disappointed and this has been an area which has created reputational problems and remediation costs for the banks following the Hayne Royal Commission. Large complex, conglomerate, financial institutions create the potential for adverse outcomes in one part of the organisation to spill-over into other parts, while governance can be made more complex (as discussed by Golat, RBA 2016). APRA has a range of prudential standards which aim to deal with such issues.

The Productivity Commission in its Report on Competition in the Financial Sector provides an informative (if already dated due to bank exits from wealth and insurance) graphic showing the involvement of the four majors in various parts of the financial markets. It is reproduced below.




[a] Percentages are total assets of major bank group as % of total assets of all authorised deposit-taking institutions and Registered Financial Corporations. Banks include Australia and New Zealand Banking Group (ANZ), Commonwealth Bank Group (CBA), National Australia Bank Group (NAB), Westpac Banking Corporation (WBC). [b] Entities listed may fall within more than one category and may not reflect investment or divestment activity since annual reports were released. The listed entities do not comprise an exhaustive list, do not show exclusive contracts, and are generally entities incorporated in Australia.

**FIGURE 4: MAJOR BANK ACTIVITIES (SOURCE: PRODUCTIVITY COMMISSION)**

At the time of the Hayne Royal Commission and since, there have been (or commenced) substantial disinvestments of wealth management subsidiaries by the major banks as shown in Table 2.

**TABLE 2: AUSTRALIAN BANK DIVESTMENTS**

| Year | Bank | Divestment | Activity | Acquirer |
|---|---|---|---|---|
| 2018 | ANZ | OnePath Life (NZ) | Life Insurance | Cigna |
| 2019 | ANZ | PNG Retail, Commercial, SME Businesses | Prior sales of retail and wealth in Singapore, HK, China, Taiwan, Indonesia, Vietnam, joint venture stakes in Cambodia and Philippines | Kina Securities |
| 2020 | ANZ | OnePath (Aust) | Life Insurance | IOOF (initiated discussions 2017) |
| 2020 | ANZ | UDC (New Zealand | Asset based finance | Shinsei Bank |
| | ANZ | Merchant Acquiring Services | Provision of merchant terminals | (Joint venture with) Worldline |
| | ANZ | Offsite ATMs | ATMs | Armaguard |
| 2019 | CBA | Colonial First State GAM | Asset Management | Mitsubishi (MUTB) |
| | CBA | CommInsure Life | Life Insurance | AIA |
| | CBA | Count Financial | Financial Advice/Planning | CountPlus |
| | CBA | Colonial First State | Superannuation & Investment | KKR (55% stake) |
| | CBA | Commsec Adviser Services | Wholesale Broking Services | Nomura |
| 2021 | CBA | CommInsure General Insurance | General insurance | Hollard |
| 2016 | NAB | MLC Life | Life Insurance | Nippon Life |
| 2019 | NAB | Ausmaq | Managed Funds Services | ClearStream |
| 2020 | NAB | MLC (Wealth Business) | Financial Advice and Funds Management | IOOF |
| 2020 | NAB | PLAN Australia, Choice, Fast | Broker aggregation business | Loan Market Group |
| 2021 | NAB | BNZ Life | Life Insurance | Partners Life |
| 2019 | Westpac | BT (financial advice component) | Financial advice | Viridian Advisory |
| 2020 | Westpac | Pendal (formerly BT Investment Management) | Funds Management | Took control of the fund manager in 2002. IPO in 2007 Gradual sell off of holdings from 2015 |
| 2021 | Westpac | Vendor Finance (part of subsidiary Capital Finance Australia Ltd) CFAL | Funding small equipment loans | Angle Finance |
| 2018 | Westpac | Hastings Funds Management (100% owned from 2005) | Portfolio management of infrastructure debt and equity assets | Northill Capital acquired international activities, loss of mandate to manage Infrastructure |

| | | | | |
|---|---|---|---|---|
| | | | | Trust Australia in 2017 led to closure of domestic activities. |
| 2020 | Westpac | Westpac general insurance | General Insurance | Allianz |
| 2020 | Westpac | Westpac Fiji, Westpac Pacific PNG | Fiji and PNG businesses | Kina Securities |
| 2021 | Westpac | BT super fund management | Super fund management | In progress |
| 2021 | Westpac | Auto dealer financing and novated leasing | Auto dealer financing and novated leasing | Cerberus Capital |
| 2021 | Suncorp | Suncorp Portfolio Services Limited (SPSL), | Superannuation business | LGIAsuper |
| 2015 | Suncorp | Guardian Advice | Wealth Management/Advice | |
| 2015 | Suncorp | Suncorp Financial Planning | Wealth Management/advice | |
| | | | | |

## Conglomerates, Risk and Regulation

Correa and Goldberg (JBF,2021) examine the effects of greater bank complexity (geographic, number of business lines, organisational structure) on risk and performance, based on analysis of large US BHCs over the period 1996-2018). They find that "organizational complexity and geographic scope tend to provide diversification gains and reduce idiosyncratic and liquidity risks while also increasing BHCs' exposure to systematic and systemic risks."

Regulators world wide have been concerned since the GFC to reduce complexity in ways that enable dealing with distressed organisations. Requirements for "Living Wills" (documented plans for recovery and resolution arrangements, see Chapter 18) have been one component of that.

## Diversification and Performance

A long standing question in finance is the extent to which diversification improves the performance and/or valuation of a firm and that has also been a topic of research in banking. Diversification can reduce overall risk, but often it involves entry into higher risk activities than traditional intermediation. In general, there is no strong evidence that diversification of activities within a bank brings benefits, with most studies using a higher role for non-interest income as a proxy for diversification, and either stock market valuation or income metrics as performance measures. Geographical diversification has also been studied, such as involving entry into foreign markets, but there is little evidence of significant benefits (and the Australian experience points to that). Likewise diversification into non-banking financial activities such as insurance and wealth management has not proven value adding for Australian banks.

There is an enormous academic literature investigating the effects of different types of diversification in different countries and at different times. As well as considering effects on bank valuation and performance, some studies also focus on the implications for bank risk and regulation. The literature generates varying results, but does not appear to suggest that diversification has substantial benefits. And whether the results from any study focusing on a particular country, time period, or type of diversification are generalizable is very much open to question. Perhaps not surprisingly, the answer to whether diversification is worth pursuing is: it depends!

## 5.5 Branching, Franchising and Banking Service Delivery

Historically, the delivery of banking services relied upon physical "bricks and mortar" premises where customers could interact with bank staff to deposit and withdraw funds, obtain information, apply for loans etc. Proliferation of branches, by reducing travel and time costs incurred by customers in doing banking business, was an important form of competition.

However, over time, the need for physical branches (and associated staff and face-to-face interactions) has been reduced by the progress of technology. Phone banking and subsequently internet access to accounts, ATMs, EFTPOS, electronic wallets have all played a role in leading to the decline in number of bank branches.

But also important has been the "outsourcing" of parts of the "front office" activities of banking– such as the growth in the role of independent mortgage brokers. In 2020, around half of residential mortgage loan applications were originated by mortgage brokers – and even many of the direct applications to banks could be done largely on-line. Outsourcing of "middle and back office" processing activities, including use of third-party provided banking software and hardware systems, has been relatively common for many years. For smaller ADIs such as Credit Unions, banking platforms, payment services, and applications have been provided by several specialist providers such as Data Action, Indue, Cuscal, with some such companies owned by the credit unions themselves.

### Trends in Australian Bank Branching

The number of bank branches in Australia peaked in 1993 and has fallen significantly since that time. Between 1970 and 1993, total bank branches increased by around 15 percent, although much of this increase was a statistical artifact caused by the conversion of building societies to banks. (The branch networks of the four major banks changed little in number over that period). Between June 1993 and June 2001, the number of bank branches fell from 7064 to 4712 and the number of bank agencies fell from 6288 to 5043 (most of this fall occurring in the last year).[4] The number of credit unions declined

[4]These and the following numbers on credit unions and building societies were extracted from Reserve Bank of Australia documents and statistical tables.

from over 600 in 1981 to under 200 in 2002 (and is well below 100 in 2021). The number of building societies declined from 66 in 1985 to 17 in 2001, to low single digit numbers in 2021. Many of the credit unions and building societies had more than one branch or agency (and many now use the term "mutual banks").

Since that time, there has been a continued decline in "points of presence" of ADIs.[5] At June 2020, branch level service was available at 5173 locations and "other" (agency) type service at 4,193 locations. Partly offsetting this decline was a growth in ATMs and EFTPOS terminals. At June 2020 there were 9621 ATMs (albeit down by around 25 per cent from a peak in 2016) and 780861 EFTPOS terminals. There has thus been a massive growth in locations at which customers can access their bank/ADI accounts to withdraw or deposit (via ATM) cash and make payments, but a significant decline in availability of "face to face" customer service for information exchange. However on-line (phone/internet) banking has become ubiquitous.

Several factors can be identified which may have contributed to these trends. First, takeovers/mergers in the banking/ADI sector (of previously state-owned banks and regional banks – including former building societies) prompted some branch rationalisation. Second, deregulation of the banking sector led to more price competition and less "service" competition in the form of excessive branching. Third, advances in telecommunications have made the need for physical branch presence less relevant to the delivery of certain banking services such as access to payments services.

The decline in bank branches led to significant public concern about access to banking services, particularly in rural areas, reflected in the establishment in 2002 of a Parliamentary Inquiry into Banking & Financial Services in Rural Regional & Remote Areas of Australia. The Inquiry made a number of specific recommendations regarding, *inter alia*, bank treatment of customers when services were withdrawn from an area. The Inquiry noted the potential role of agency arrangements, including via Australia Post and Rural Transaction Centres[6], and also raised the issue of banking as an essential service and suggestion of Community Service Obligations (CSOs)[7] arising from the privilege of having a banking licence.

[5] Data from APRA. Earlier data from RBA

[6] Rural Transactions Centres, operated largely by volunteers, were established in the early 2000's in a number of small regional towns under a government program to enable access to basic government and private sector services.

[7] CSOs are a requirement for a provider of some essential service to make it available in all locations even if it is not profitable to do so in some areas.

## Community Banking[8]

The exit of the major banks from various communities, leaving them "unbanked", created an opportunity for another entrant with a business model able to capitalize on the willingness of those communities to contribute to establishing a local bank

Between June 1998 and December 2002, eighty-seven "Community Banks" were established in Australia under a franchising type arrangement promoted by Bendigo Bank. The number has since grown to 324 community banks in mid 2020. Four former credit unions also became community bank branches of Bendigo as members of an "Alliance Bank Group".

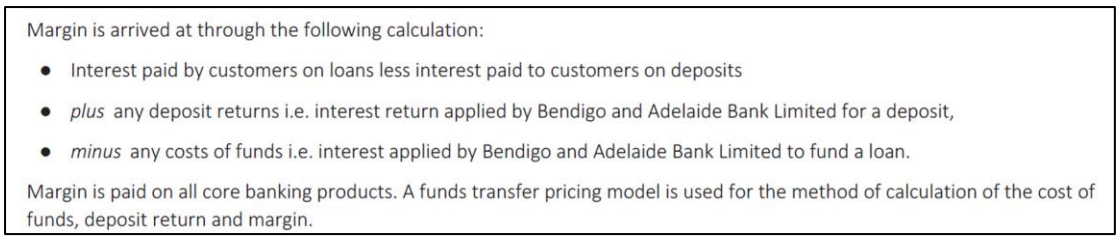
Although the community banks are linked to Bendigo Bank, their organisational structure involves some participation at the community level in the decision making process.

The Bendigo Community Bank model operates as follows. Community members are invited to subscribe "equity capital" to the organisation which is established as a company and operates under a franchise arrangement from Bendigo Bank. Typically $500,000 or more was required as equity capital. Some proportion (eg half) of any profits of the Community Bank would be used for community projects and the remainder available for distribution as dividends to shareholders.

Banking products provided by the community bank are those of Bendigo Bank, and provided at prices determined by Bendigo Bank under its Funds Transfer Pricing model. For regulatory purposes, the community bank is viewed as a branch of Bendigo Bank, such that separate regulatory reporting and supervision is not involved. This is a significant advantage, since regulatory compliance is quite costly for a small ADI. The Board of the community bank is responsible for operational decisions of the bank.

Bendigo Bank operates a Funds Transfer Pricing model with the Community Banks as described in Figure 5 from the 2019 Annual Report of Inverloch & District Financial Enterprises Limited. Deposits by customers of the Community Bank are transferred to Bendigo Bank's balance sheet, with the difference between the transfer pricing rate and the rate paid to the customer being a source of income for the community bank. Similarly the difference between loan rates charged to customers and the cost of funding those loans from Bendigo's Treasury is a source of income. The community bank's profit is derived by subtracting operating costs such as the cost of office rental and staff expenses etc.

[8] See also Thomson and Abbott (Agenda, 2000).



Margin is arrived at through the following calculation:

- Interest paid by customers on loans less interest paid to customers on deposits
- *plus* any deposit returns i.e. interest return applied by Bendigo and Adelaide Bank Limited for a deposit,
- *minus* any costs of funds i.e. interest applied by Bendigo and Adelaide Bank Limited to fund a loan.

Margin is paid on all core banking products. A funds transfer pricing model is used for the method of calculation of the cost of funds, deposit return and margin.

**FIGURE 5: COMMUNITY BANK FTP MARGIN (SOURCE: INVERLOCH & DISTRICT FINANCIAL ENTERPRISES LTD)**

Many of the earlier community banks established were listed on the Bendigo (now National) stock exchange, but a lack of trading of the shares has since seen most delist. Exempt markets are operated by the Community Banks matching interested buyers and sellers of shares in the bank. While some banks have proved financially successful, others have made losses, thus requiring some form of financial support from Bendigo.

## Outsourcing via Mortgage Brokers

Branching is one mode of product and service delivery to bank customers. But not all steps in the delivery system need to be provided by the bank using its own resources. Mortgage loan applications are a good example. Mortgage Brokers, independent from banks, originate around 50 per cent of mortgage loans – helping intending borrowers to complete applications, advising on most suitable loan products and providers, and submitting applications to the chosen bank.

Some mortgage brokers may be sole traders or members of a quite small group, but the majority are employees of a large firm such as Aussie Home Loans, Mortgage Choice, and Loan Market Group. These three firms had 970, 517 and 503 brokers respectively in 2020 and accounted for over 75 per cent of loans arranged by mortgage brokers in that year.

Mortgage brokers rely on the services of companies known as “aggregators” who provide platforms (systems and software) enabling brokers to obtain information about bank loan products from banks on their panel, create and send loan applications from customers to banks, and maintain ongoing liaison with borrowers. There are a large number of aggregators (the industry association MFAA provides a list on its website) and the industry is relatively concentrated. Despite this, but reflecting the role of the “direct channel” of intending borrowers dealing directly with banks, the ACCC did not oppose a planned merger announced in 2020 between the two largest aggregators, Australian Finance Group (AFC) and Connective, which had 39 per cent of the market. The ACCC report on the planned merger provides a large amount of information about the market and the activities of aggregators. A planned merger between Aussie Home Loans (owned by CBA) and Lendi was announced in December 2020 with CBA to own 45 per cent of the merged group.

Outsourcing via brokers may generate cost savings for the bank, and may increase the demand for its loans. However, it is not without risks, since mortgage brokers may operate in their own best interests and not in those of the bank nor the customer. This issue was one considered by the Hayne Royal Commission, which argued that the remuneration model for brokers – involving up-front and trailing commissions paid by banks to brokers on the loans they had originated – was not compatible with broker responsibility to act in the best interest of their client. As well as an incentive for brokers to direct clients to banks offering higher commissions and encourage clients to take out larger loans, there was also an incentive to "churn" (encouraging customers to switch from existing loans to a new loan with a different provider). The government rejected the RC recommendation to move away from this conflicted remuneration structure, opting instead for an upgraded "best interests" duty (with guidance on achieving that contained in ASIC Regulatory Guide 273 published in June 2020).

There is no definitive evidence that loans originated by mortgage brokers have different default rates than those originated by the banks directly. However, the RC heard evidence that broker originated loans were generally larger and more likely to be interest only, which together with concerns about the accuracy of information about applicant income incorporated into applications, indicates a potential for higher default risk (and/or non-compliance with responsible lending rules) from such loans.

Another possible concern is the ownership of a number of mortgage broker groups by some of the Australian banks. (CBA owns Aussie Home Loans, Westpac owns RAMS). The competitive concern is that smaller mortgage lenders may not get equal prominence on the loan platforms.

## Franchising

Another possibility for banking services delivery is via franchising, where an independent business owner (the franchisee) is given the right (for a fee, and with specific constraints on product/service quality) to deliver products and services branded with the franchiser's name. Many fast-food and convenience store chains operate on such a model. The franchiser may (depending on the specific model) avoid investment of its capital in the physical premises, and may generate better outcomes from the independent owner/manager of the franchise effecting better operating economies resulting from better incentives than an employee/manager model.

The Bank of Queensland advertises branch franchising opportunities and the "single site operators" are responsible for operational management decisions at that branch level. Final responsibility for loan approvals remains with the bank credit department, such that the franchisee appears to have responsibility akin to a mortgage broker (but without flexibility regarding choice of lender). The model has experienced difficulties. The number of franchisees fell from fell from 198 in August 2012 to 159

in February 2015 and the bank successfully defended a court action from some franchisees alleging misleading and deceptive conduct. The financial advice and remuneration issues arising from the Hayne Royal Commission and other developments has created complications for the model, requiring some readjustment in 2020.

ANZ operates a mobile lending franchising operation in which franchisees "sell" loans on a commission basis with customers within their allotted territory.

## Australia Post – Bank@Post

The 2002 Parliamentary Inquiry suggested that the banking sector could provide banking services and choice of bank to regional communities through the use of shared services, but recognized the competition and commercial impediments to doing so. Australia Post, however, has developed such a model with its Bank@Post services. Through linkages with over 80 ADIs (including CBA, NAB, Westpac – but not ANZ!), customers are able to deposit and withdraw funds from their bank accounts at Australia Post Offices around the country. Bank@Post also provides Money Transfer Orders (MTOs) enabling a purchaser of an MTO to make funds available at a convenient post office to the recipient.

These facilities have value for individuals living in locations where there are no bank branches and who need to access or deposit cash. However, the ongoing decline in the use of cash, even for small value payments, and ability to make transactions on bank accounts via the internet must raise questions over the future growth of this service. Also relevant in that regard is the availability of third-party provided ATM machines and "cash out" EFTPOS facilities in various business premises.

## "White-labelling" of banking products (BaaS)

White-labelling refers to the practice of a third party (the *brand owner*) providing a product or service which is labelled with their brand, but where it is in fact provided by some other entity (the *white-labeller)*. It is fairly common in grocery retailing where large chains market products labelled with their brand, but which have been produced by some third party. Some mortgage broking firms (or aggregators) offer white-labelled mortgages. The customer may be attracted to a mortgage labelled with the name of the broker (or aggregator) with whom they have a relationship. While they will deal with the broker, the mortgage will be a contract with a bank provider of the mortgage.

White-labelling has been widespread in the credit card business. A bank (Citi has been prominent in this area) will allow other business entities (such as airline companies) to market credit cards branded with the name of that business. But the credit card (and associated credit) is provided by the bank and transactions flow through the bank's system. The bank is also the entity that makes decisions about the card arrangements.

Similarly, deposits can be white-labelled. In late 2020, Westpac announced an arrangement with the BNPL operator AfterPay whereby, AfterPay could offer deposit facilities to its customers. While branded as AfterPay deposits, they would be legally recorded as deposits with Westpac. Financial technology enables a non-bank entity (called say NB) to accept funds as a deposit with NB via its operating platform with those funds being automatically transferred as a deposit of NB on behalf of the customer to the bank involved. While there will be a number of regulatory and compliance obligations involved in this process for NB (and the bank), NB will avoid those, very substantial, obligations associated with being a bank. Indeed, there is no reason that other banking services such as payments facilities cannot also be offered by NB

For the bank involved, the attraction of white-labelling is that the relationship can enable it to obtain business from a group of customers it may not other interact with. If white-labelling is a cheaper way of obtaining that business than directly, there can be benefits to the bank.

White-labelling of banking products is often referred to as Banking as a Service (BaaS). The non bank entity (NB), generally a fintech with “apps” available to its customers via digital technology perceives an opportunity to provide additional, new, banking services to its potential customer base and grow its business.

One way to think of BaaS might be that the app is the modern equivalent of the bank branch. Historically, an individual would access banking services of ABC bank through, say, its Brunswick branch. The customer would think of themselves as having an account at the Brunswick branch, but that was just the interface between the bank ABC (with which any deposit was held). The “app” of the fintech NB achieves the same outcome. The difference, of course, other than the technology involved, is that the owner of the provider of the app is NB rather than the bank (which historically owned the branch).

But in practice BaaS is potentially much more. Whereas the bank branch only transacted in the bank’s products (although often providing access to other services such as insurance on an agency basis) the app provider will aim to provide access to a wide range of financial and other non-financial services through the app.

BaaS is not without its complications. NB might facilitate a range of services including financial advice via its app, and this could create risks for ABC bank.

## 5.6 Bank Governance

Governance problems are particularly severe in financial institutions. Processes of financial reform and financial system design have until recently paid inadequate attention to governance considerations. Now, spurred on by clear governance failings, it is a major focus of attention.

Governance issues can be divided into external and internal governance. The former refers to the control mechanisms exerted over bank boards and senior managers by: shareholder voting, "exit", or "voice"; the takeover market; capital markets etc. Matters such as disclosure, prudential regulation, industry codes of conduct, ownership limitations are relevant in this regard (and discussed elsewhere in this book). Internal governance refers to management control, risk management, performance, and accountability systems in place to ensure that delegation of decision making power leads to actions consistent with the bank's objectives.

Following the exposures by the Hayne Royal Commission there can be little doubt that internal governance structures were severely inadequate in many Australian banks and financial institutions. Skill sets of Boards were not necessarily adequate for effectively performing the required role, even after APRA introduced prudential standard (now CPS 510) on ADI Governance in 2005. That standard focuses primarily upon requirements for: Board size and composition; independence of the Chair; policies for board renewal and assessing board performance; and remuneration, audit and risk committees. Arguably these are, at best, necessary conditions for good governance, but not sufficient. But they do, together with a requirement (para 110) which essentially prohibits prevention of "whistleblowing" to APRA, provide APRA with scope to intervene if unsatisfied with a bank's governance.

APRA used these powers to implement an independent Prudential Inquiry into governance, culture and accountability in CBA which reported in May 2018. CBA was required to implement a program of reform and hit with an increased capital requirement. It then required the largest financial institutions to undertake a similar analysis, leading it to require extra capital requirements for ANZ, NAB and Westpac, and ultimately leading it to agree in December 2020 to an Enforceable Undertaking from Westpac to improve the pace of rectifying risk governance deficiencies.

Internal governance issues such as remuneration and accountability are discussed in the following section, while problems with incentive structures for customer-facing staff which focused on sales targets led to numerous instances of miss-selling of unsuitable products are considered in Chapter 7.

## 5.7 Banker Remuneration and Accountability

Bank CEOs and other "C-Suite" executives get paid large salaries. So too do many at lower levels of management. The bank's traders can also make large money – although a larger proportion of their income is likely to come from performance-related bonuses.

The relationship between remuneration, performance, and accountability in banks has become an increasingly important topic. Important questions include:

- How should remuneration be structured to induce appropriate performance by staff?
- Are very large salaries necessary to attract suitably skilled individuals to "C-Suite" positions?
- Can risk management and institutional performance failures be attributed to particular individuals and, if so, what should be the consequences?

### Banker remuneration: what do we know?

Unfortunately, we know very little in detail about the structure of remuneration within banks. It wasn't always quite so bad. Up until 2003, banks were required under Australian Accounting Standards to include in Annual Reports the numbers of staff earning amounts above $100,000 within specified bands. From those reports we could identify, for example, that in 2003 the National Australia Bank (NAB) had 32 staff earning between $100,000 and $400,000, 43 earning between $400,000 and $1 million, and 9 earning in excess of $1 million. (Between 2003 and 2021 the Consumer Price Index has increased by about 50 per cent, so to convert those into equivalent 2021 dollars, multiply by 1.5).

Those reports weren't necessarily all that informative. They might exclude staff offshore (some of whom were among the very big earners). They didn't include a "fair" value of option-based remuneration, which could also be substantial. They didn't provide any information about the responsibilities of the individuals involved.

But they were probably more useful than the current remuneration disclosures which came into effect with changes to section 300A of the *Corporations Act* in 2003 as part of CLERP 9. Much more data (but not necessarily useful information) was required to be disclosed about remuneration of Directors and Key Management Personnel (KMPs), with the latter numbering maybe up to a dozen for each of the large banks. The reports (part of the Annual Report) are in the order of 30 pages with a range of arcane details about the nature of remuneration, which even skilled analysts would have difficulty interpreting – and assessing the likely consequences for behaviour.

Taking NAB again as an example, in 2016 there were only six KMPs identified who were employed for the full year (with a number of others employed for part of the year). The lowest level of remuneration reported was in excess of $2 million. In 2020, there were 11 KMPs identified with remuneration for those employed for the whole year all above $0.9 million.

But we have no information on how many NAB (or other bank) executives and managers earned in excess of, say, $1 million or $500,000. Probably quite a lot! Traders on the FX or Interest Rate desk would not be classified as KMPs, but can get very high remuneration. At those levels of pay, significant decision-making responsibility and accountability should be characteristics of the role.

## Recent Developments

With the fallout from the Hayne Royal Commission and the large penalties imposed by AUSTRAC on CBA and Westpac, there has been some significant executive turnover and realignment of salaries, making it difficult to summarize levels and underlying determinants of executive salaries across the sector. Voluminous remuneration reports provided as part of bank annual reports do provide lots of information, but in a form which is hard to digest.

But to illustrate, journalist Charis Chang reported the following. CBA's former CEO Ian Narev was on a package of $10 million p.a. (and agreed to forgo long term bonus of $13.9 million when he resigned following the AUSTRAC penalties and Hayne Royal Commission exposures of governance and operational failings at the bank. Then Westpac CEO Brian Hartzer earned $4.9 million in 2018. NAB's then CEO Andrew Thorburn received $6.4 million in 2017 but only $4.3 million in 2018. ANZ CEO Shayne Elliot received $5.25 million in 2018. (Of those CEOs, only ANZ's Elliot remained in the role in 2021, Hartzer leaving Westpac following their AUSTRAC penalties and Thorburn after criticism from the Hayne Royal Commission).

Since then, there has been some moderation in banker salaries and adjustments to the mix of fixed salary remuneration, versus long term and short term incentive bonuses, and grants of options and shares. But salaries are high, and the questions often posed are whether they are too high, what incentives they give to executives and managers regarding risk-taking versus prudence, and what accountability executives and managers have when things go wrong?

At less senior levels of the organisations, there are issues about the incentives which remuneration packages give to sales and advisory staff. The Hayne Royal Commission generated much concern about sales linked remuneration and targets generating behavior which was not in the best interests of, and often detrimental to, bank customers.

Regulators worry about these things. APRA has produced a guide (CPG 511), which is being revised (as a standard (CPS 511)) in 2021, setting out guidelines on how remuneration should be structured. The Federal Government introduced the BEAR (Bank Executive Accountability Regime) in 2018 legislation which is proposed to be extended to other institutions as the FAR (Financial Accountability Regime), with legislation expected in 2021. Apparently calling it the FEAR (Financial Executive Accountability Regime) wasn't seen as desirable!

## APRA's remuneration standards

APRA's initial guide specified a 50 per cent cap on using financial measures for variable remuneration. Underpinning this cap was the concern that incentives based on financial measures (profit, sales, etc) could lead decision-makers to engage in higher risk activities. The reason is that linking some part of pay to such financial measures creates an "option-like" structure for pay. Undertaking higher risk activities can generate both greater gains and losses for the bank. But self interest on the part of the decision-maker will create a bias towards higher risk activities, since the upside outcomes will be reflected in remuneration, but the fixed component of remuneration limits the downside risk (unless sacking or demotion is likely).

In addition to *financial risk,* financial institutions are also exposed to *non-financial risk*, such as operational risk, conduct risk, regulatory and compliance risk. While these risks have financial consequences, the links are less direct. The planned revision in the standard is intended to be more *principles-based* rather than *prescriptive*, and requires (for significant financial institutions) that "material weight be assigned to non-financial measures, combined with a risk and conduct modifier that can potentially reduce variable remuneration to zero" (APRA, 2020)

Other concerns are that incentive-based (variable) remuneration can lead to a short-term focus, and that the consequences of decisions by senior managers may take several years to become apparent. Consequently, requiring that variable remuneration be deferred for several years has some merit and the proposed standard requires "a reduction in the minimum deferral periods for variable remuneration from seven to six years for CEOs, from six to five years for senior managers and from six to four years for highly paid material risk takers". (APRA, 2020)

## The BEAR (and FAR)

While there have been a number of well-publicised examples of bank executives and board members being shown the door in response to major risk management failings within banks, that has not always been the case. And there are, no doubt, many examples of lower-level staff being assigned the blame for events, which should rightly have been attributed to their superiors. So, identifying accountability is an important issue, which is reflected in the introduction of the Bank Executive Accountability Regime (BEAR) in legislation in 2018. This gives APRA increased regulatory power to induce improved governance, risk culture, remuneration and accountability (GCRA) in banks (and other financial institutions which will be affected by the subsequent Financial accountability regime (FAF)).

The BEAR applies to directors and senior executives of organisations and designates relevant individuals with management or control responsibilities over significant areas of activity as an "accountable person". As set out in the Explanatory Memorandum accompanying the bill It applies where that individual's behaviour or conduct could pose risks to customers or the ADI. (For small

institutions the only staff member affected might be the CEO. For large institutions it could apply to heads of business units or risk management/compliance/audit/ human reosurces/information technology/AML functions). Institutions to which the BEAR applies are required to have an "accountability map". Accountable persons who breach the roles and responsibilities set out in the accountability map may face disqualification or lose part of variable remuneration (which is required to be deferred for up to four years). Meeting the BEAR requirements essentially involves acting with honesty, diligence, integrity, due skill, and being open, constructive, and cooperative.

As at mid 2021, there have been no prosecutions under the BEAR regime. But the main objective is ultimately one of deterrence against bad individual behaviour and lack of institutional attention to internal governance arrangements. In December 2020, APRA released an information paper on the implementation of the BEAR regime at ANZ, CBA and NAB, which provides detailed information on the substantial issues involved in implementing the regime.

# 6. The Australian Banking Market

## Contents

## 6.1 Introduction

This Chapter examines a number of aspects of the Australian banking sector. First it provides information on the structure of the market. One noticeable feature is the degree of concentration and hence the following section examines the issue of concentration versus competition in banking and economic welfare. One important potential influence on competition in the Australian banking market is the involvement of foreign banks in the market, and this is considered next. Also of interest is the activities of Australian banks in foreign markets which is then examined.

Three important issues are then considered. The first is the information disclosure required of banks. The second is the tax treatment of Australian banks. Then the question of how banks are valued by the stock market is addressed: while the principles involved are the same as for any company, the peculiar structure of bank balance sheets leads to specific approaches to valuation. Finally the chapter concludes with information on bank licensing and prudential standards applied by the regulator to banks.

## 6.2 The Structure of the Australian ADI Market[1]

Figures 1 and 2 provide information on the relative size of the largest 20 Australian banks, based on the size of their resident business. (This is transactions conducted by the bank registered in Australia, which includes subsidiaries and branches of foreign banks, with Australian residents – a category which includes foreign owned businesses based in Australia). Note that the figures only refer to resident assets and deposits, and thus do not include debt financing of the banks nor funds provided by a foreign parent.

Figure 1 shows the position of the largest nine banks – which incorporates most of the "regional banks". Only one foreign bank (ING) is large enough to make the top nine, which

[1] More detail on the structure of the Australian ADI market as at 2018 can be found in this background paper for the Hayne Royal Commission.

reflects the success of its on-line deposit strategy and financing of housing mortgage loans. Several features stand out.

- The first is the massive size of the four majors compared to the rest. The smallest of the four majors (ANZ) is almost four times the size of the next largest bank (Macquarie), which in turn is virtually double the size of the next largest (Bendigo).
- The second is the importance of funding assets by means other than deposits – in particular debt and equity. The figures vary between the banks, but generally only around half of resident assets are funded by resident deposits.

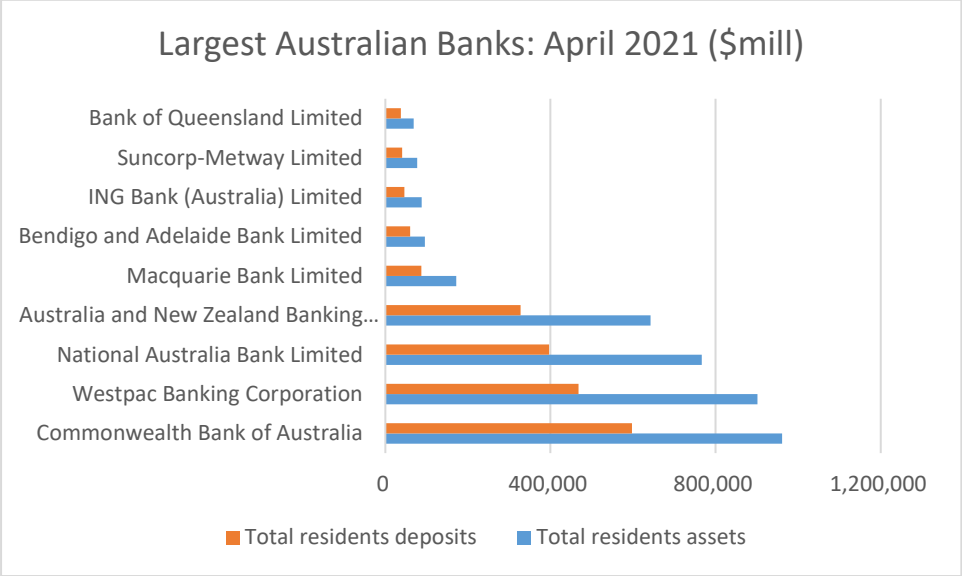



**FIGURE 1: LARGEST AUSTRALIAN BANKS - RESIDENT BUSINESS (SOURCE APRA, MADI)**

What is not shown in the MADI figures used for figure 1 is the extent of offshore business of the banks. That varies quite substantially. For example, for CBA the resident assets of $961 billion are not much different from the total assets reported for the group on the CBA 2020 Annual Report of $1,014 billion (of which the bank had $964 billion) with the difference most likely attributable mainly to NZ subsidiary operations. In contrast, for ANZ, total resident assets of $642 billion are much less than the 2020 balance sheet figure for the group of $1042 billion, reflecting a higher level of offshore activity than for CBA.

Figure 2 provides the same data for the mid-size banks (the next largest twenty or so), and includes BoQ which is the smallest bank in Figure 1 to give a perspective on size of this group relative to the large banks. Points to note include:

- The inclusion of a significant number of foreign banks in this group.
- The relatively small reliance on resident deposit funding for many of the foreign banks
- The inclusion of several mutual banks/credit unions/former (or current) building societies which are generally more reliant on resident deposit funding than other Australian banks

The smallest bank in Figure 2 has around $12.5 billion in resident assets. As one proceeds down the list further, there are around 125 ADIs/banks included in the MADI statistics, and the bottom half each have resident assets less than $4 billion and around 30 with less than $1 billion. Many of these are credit unions, and their number has been declining as mergers have occurred.

Apart from their overall size difference, the major banks have also been the dominant players in the financial markets dealing with individuals. At April 2021, the four majors had a 74 per cent share of household deposits, a 75 per cent share of ADI loans for owner occupied housing, over 80 per cent of ADI non-housing lending to households, and an 82 per cent share of investment loans for housing. The 75 per cent owner occupied housing figure slightly overstates the share of total such loans since it does not incorporate securitised housing loans not on bank balance sheets. This would reduce the figure slightly – but not dramatically.

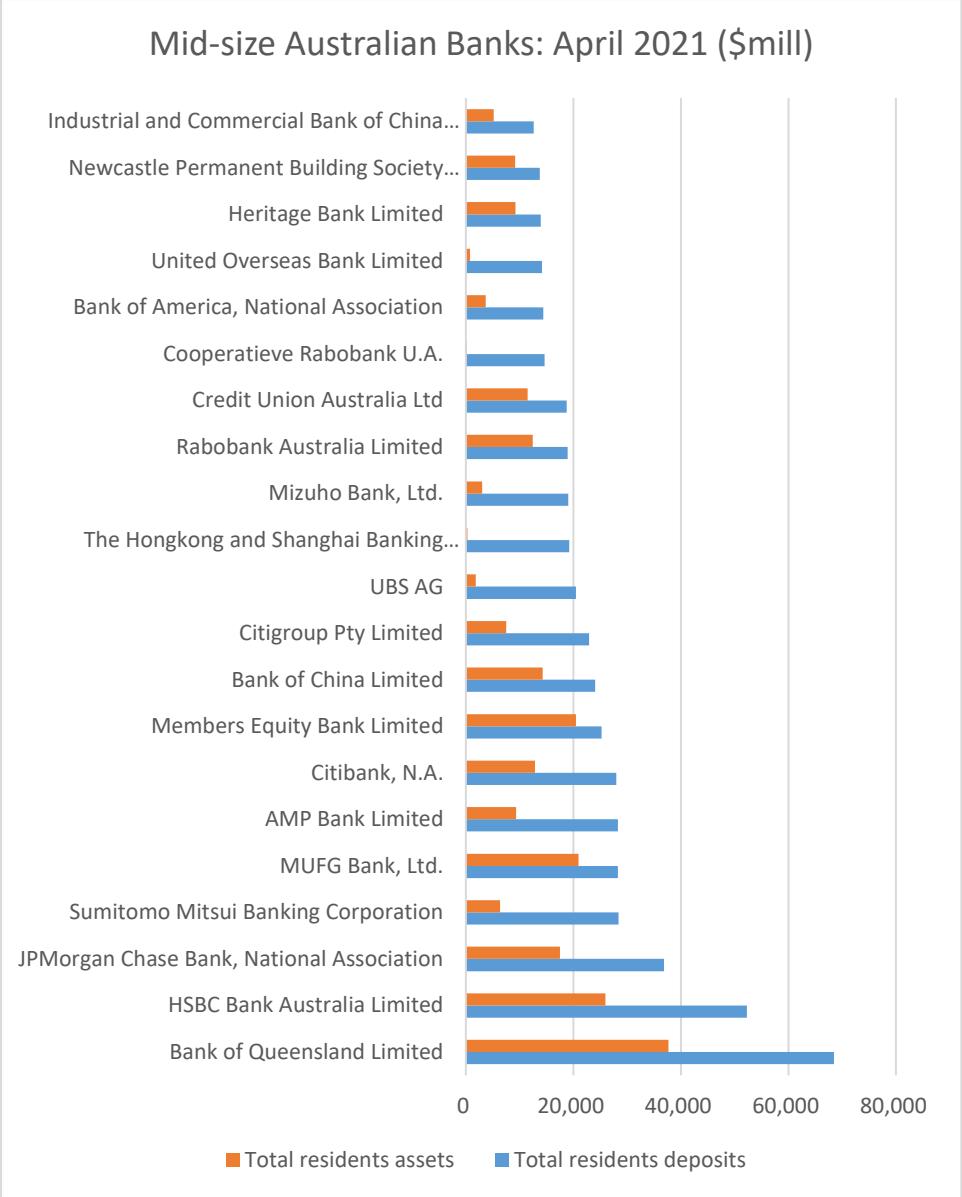



**FIGURE 2: MID-SIZE AUSTRALIAN BANKS RESIDENT BUSINESS (SOURCE APRA, MADI)**

The majors are also dominant in their role in the payments system. Table 1 shows that they provide around 80-85 per cent of ATM machines and EFTPOS terminals. (Foreign banks are not participants in the EFTPOS system and transactions of their customers are routed from the EFTPOS terminals of other participants via VISA or MasterCard networks).

**TABLE 1: POINTS OF PRESENCE 2020 (SOURCE: APRA)**

| | Total | Majors | Foreign Banks# | Other Domestic* | Bank@Post |
|---|---|---|---|---|---|
| Branches | **5173** | 3130 | 162 | 1781 | |
| ATMs | **9621** | 7708 | 35 | 1878 | |
| EFTPOS | **780861** | 666289 | 0 | 114572 | |
| Other face to face | **18053** | 2150 | 196 | 1459 | 14248 |

* Other domestic banks, building societies, credit unions and service providers
# Foreign subsidiaries and branches

It is also noticeable that the other domestic ADIs have a much higher number of branches than might be expected given their share of resident deposits. But the number of both those and major bank branches have been in decline in recent years, as electronic communications reduce the need for easy access to physical branches for many customers. In some locations however, the absence of a physical presence can be problematic, and the growth of Bank@Post[2] (where services of participating banks are provided via a local post office) has been important in that regard.

## 6.3 Competition in Banking Markets

There are few national banking markets where there is not a high degree of concentration. The USA is the main exception. In most markets, the largest four or five banks generally have a share of bank deposit and loan markets of around three-quarters or more. And while there are non-bank competitors in these markets, including them would not markedly change the picture.

Australia is thus hardly unique in having four large (major) banks which tower over a field of smaller ADI and non-bank competitors. At March 2021, APRA Monthly ADI statistics show that the four majors (ANZ, CBA, NAB and Westpac) had total residents' loans and finance leases of $2.1 billion out of a total for all ADIs of $2.9 billion – a share of approximately seventy five per cent (and a similar share for deposits). The smallest of the four majors in terms of loans was ANZ with $410 million, and the largest of the other banks was Macquarie with $80 million.

Figure 3, showing only the top twenty ADIs by loans, illustrates the dominant position of the four majors in the loans market. Notably, among the top twenty ADIs there is only one US bank – with the large US institutions having focused primarily on investment banking business rather than traditional banking deposit taking and lending.

[2] See Chapter 13 for more information

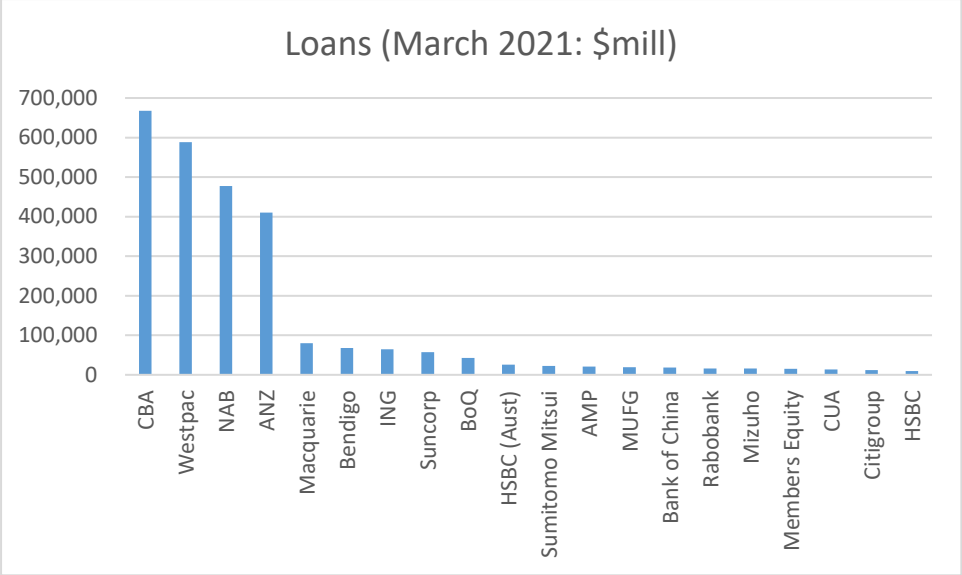



**FIGURE 3: LOANS AND LEASES TO RESIDENTS (SOURCE APRA, MONTHLY ADI STATISTICS)**

## Concentration and Competition: The Issues

The degree of concentration in banking markets has been a topic of interest to policy makers and researchers for many years. One reason is that concentration may lead to the exploitation of market power such that prices (interest rates) are not set at levels consistent with market efficiency. High interest rate margins which generate high profits, for example, would reduce deposits and loans below a competitive market, economically efficient, level. To the extent that this occurs (and historically high profit rates of the majors lead many to think this is the case) the subsidiary question arises of what prevents smaller institutions from competing away market share. Is it the existence of explicit or implicit barriers to entry, policies which generate competitive advantages for the larger banks, or economies of scale or scope which give the larger institutions a cost advantage. Even if so, why wouldn't competition between the big four lead to an erosion of any abnormal profits?

One policy issue which means that a focus on bank competition is important is the privileged position banks have in terms of relationships with the Central Bank. Generally they are the only institutions with accounts at the Central Bank (Exchange Settlement Accounts at the Reserve Bank in Australia) through which financial transactions throughout the economy are ultimately settled. Banks have access to the RBA for liquidity. Non-bank financial institutions use bank deposits as their means of exchange or liquidity. Thus the behavior of the banking sector is relevant for the entire financial sector. Securitisation is one example, where non-bank securitisers are generally reliant on bank warehouse loans to finance mortgage loans they have made until the scale is large enough to be securitised.

Another reason for interest in the level of concentration is the question of whether financial stability will be better promoted by a competitive or concentrated banking system. Competition could lead to failures of less efficient banks (as suggested by Joseph Schumpeter's phrase "creative destruction"). But, in addition to losses imposed on customers, it can create problems of instability in banking markets due to the possibility of spillovers to other banks either as a result of investor confidence or interrelationships between institutions. A wide range of policies have been put in place to try to enhance financial stability.

Yet another issue is whether innovation (relevant for "dynamic efficiency") will be better fostered in a competitive or concentrated market. There is no simple answer to that question, but the "fintech" revolution has raised the important issues of whether: (a) large "tech" firms (such as Apple, Google, Microsoft, etc) will emerge as competitors to established institutions; (b) whether smaller tech innovators will create new competition in some spheres of bank activity or be swallowed by the large institutions.

## Difficulties in Assessing Competition in Banking

One of the main problems in talking about competition in banking is that banks operate in a wide range of markets - deposit taking, lending, payments services provisions to name but a few, and within each of these there are sub-markets defined by type of customer, type of product, geography, etc. Examining relative size of institutions using aggregate shares of lending or deposit taking, such as was done above, may hide significant differences in the degree of competition in sub-markets. Moreover, customers generally deal with a bank in more than one product or service market. Bank attempts to capture "whole of wallet" business of a customer thus has implications across a range of markets (and a range of government policies have attempted to prevent banks adopting strategies aimed at "locking in" customers from dealing with other suppliers).

## Measuring Competition in Banking Markets

There are three main styles of analysis which can be found in the literature attempting to measure competition in banking. More detail can be found here.

### Structure-Conduct-Performance

The "Structure-Conduct-Performance" paradigm suggests that industry structure determines the conduct of industry participants and thus economic performance (such as profitability, margins, rates of return, efficiency etc).

Within this paradigm three types of statistics are commonly used as market structure indicators

- *Concentration ratios* (market share of the largest 3, 4 or 5 banks) are generally readily available for most nations (eg from the World Bank), but do not provide information on the composition of market share of the remaining institutions. Figure 4 shows 5 firm bank concentration ratios for a number of countries.

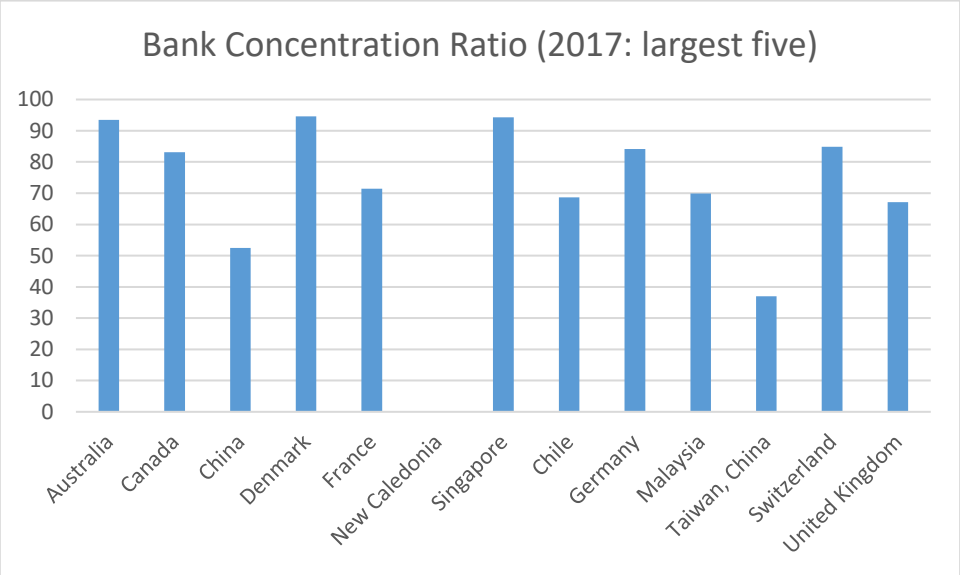



**FIGURE 4: 5 FIRM BANK CONCENTRATION RATIO - 2017: SOURCE: HTTPS://DATABANK.WORLDBANK.ORG/HOME.ASPX**

- *The Herfindahl-Hirschman Index (HHI)* attempts to correct for the concentration ratio focus on only the few largest firms. It is calculated as the sum of squared market shares of all participants in the industry. [3] If market shares are expressed as a percentage, the maximum value of the index is 100,000 (ie $100^2$) when there is only one participant. The index falls as the number of market participants increases and the level of disparity of market shares declines. In the USA, a value for the HHI in excess of 1,800 has been regarded by competition authorities as highly concentrated. Four firms with 20 per cent market share each, 5 firms with 2 per cent share each, and 50 with 0.02 per cent share each (roughly representative of the Australian ADI market) would lead to a HHI value of around 1,620. The US competition authorities criteria would suggest the Australian market is concentrated, but not highly so.
- *Performance measures*, such as high profit rates might be seen as indicating monopoly power. Similarly a larger gap between output price and average costs would be indicative of less competition. In banking, this approach is complicated by the difficulty in clearly identifying outputs and inputs. One simple approach has been to

[3] If $s_i$ is the market share of participant $i$ (expressed as a percentage), HHI = $\Sigma s_i^2$. If market shares are expressed as a fraction (eg 0.10) the index has a maximum value of 1

consider measures such as NIM (the net interest margin between interest earned on assets and interest paid on deposits). Apart from problems in controlling for different types of assets and deposits (and thus different operating costs which are covered by the NIM ) there is also a problem of banks using pricing strategies which involve different mixes of fees and interest. Where banks operate across a wide range of financial markets and activities, it is also not possible to identify the degree of competition in specific markets. More "sophisticated" approaches involve econometric exercises which aim to determine whether differences in performance indicators (across time or markets) can be explained by measures of industry structure.

A major problem with these market structure based approaches is that they generally ignore the role of contestability, whereby the threat of potential entrants can induce competitive behavior in a concentrated industry. Another problem lies in the fact that performance data is generally based on firm level data which reflects activities across a number of markets which may have differing competitive features. A third problem is that the approach is implicitly based on a static equilibrium framework in which structure is assumed exogenous and where dynamic innovation and its benefits are ignored.

## New Economic Industrial Organization (NEIO) approach

A second type of approach is commonly referred to as the New Economic Industrial Organization (NEIO) approach. This relies on considering the nature of profit maximizing conditions under differing assumptions about market structure and consequent hypothesized reactions of price setting to exogenous changes in costs or other market factors. Shaffer and Spierdijk (2017) provide an overview of the various measures developed in the literature. This approach has generated a number of indicators of competitive structure. Unfortunately, none of them is definitive and there is generally not a high degree of correlation between them.

### The Lerner Index

While the Lerner Index (traced back to Lerner, 1934, see Elzinga and Mills, AER 2011) precedes the NEIO approach, it is based on an analysis of profit maximizing conditions. The Index is calculated as:

Lerner Index = 1 – marginal cost/price.

In a hypothetical perfectly competitive industry, marginal cost equals price and thus the index should equal zero. If there is monopolist, price will exceed marginal cost, with the difference depending on the elasticity of the demand curve confronting the producer. Thus an index of

less than unity is interpreted as reflecting market power, and the lower the value the greater the loss of "consumer surplus" discussed in microeconomic textbooks. The Lerner Index is relatively easy to calculate, but its simplicity also creates problems in interpreting it as a measure of competition in real world situations of imperfect competition and dynamic interactions among market participants.

### The Rothschild – Bresnahan – Lau Indicator

This indicator is related to the Lerner Index, but involves an adjustment for the market elasticity of demand. Inchauspe and Cronje (ER, 2021) analyse the Australian banking sector using this indicator

### Panzar-Rosse H statistic

The Panzar-Rosse "H-statistic" is based on the insight that the extent of the transmission of an increase in marginal and average costs (input factor prices) into product prices will depend upon the nature of competition in the market. In a perfectly competitive market, an increase in marginal costs should be reflected one-for-one in product prices. However, where the firm has market power such that the demand curve faced is less than perfectly elastic, equation of marginal cost and marginal revenue will lead to a higher increase in prices following an increase in marginal costs (and larger fall in output) than in a competitive market. The H-statistic is calculated as the sum of elasticities of total revenue to factor input prices. It is generally interpreted as a negative value signaling monopoly, a positive value of less than one signaling monopolistic competition, and a value of one signaling perfect competition.

There are several difficulties faced in applying this approach. First, it assumes that markets are in equilibrium. Hence, it is common to also test this assumption by calculating the E-statistic which is defined as the sum of elasticities of the profit rate to factor input prices. Since, in equilibrium, profit rates will be equalized across the industry, a test of E = 0 is a test of the hypothesis of equilibrium.[4] A second problem relates to that of defining banking sector inputs and outputs. The "intermediation" approach, using interest income as the measure of revenue and including the average interest paid on deposits as one of the costs of factor inputs, is commonly applied in studies. Ignoring non-interest income seems inappropriate, and general use of the intermediation approach is at variance to the common use of the production approach commonly found in studies of bank efficiency and economies of scale. Related to this is the implicit assumption that banks only produce one product, rather than operating across a number of product markets. For example, the use of the cost of deposits

[44] However, Goddard and Wilson (2008) identify problems with the standard approach used to undertake this test and in calculating the H-statistic.

as an explanatory variable assumes, if it is treated as exogenous, that banks are price-takers in the deposit market.

There have been a very large number of empirical studies estimating the H-statistic in different banking markets. However there are theoretical issues associated with interpretation of the statistic.

### The Boone Indicator

Another approach within the NEIO paradigm is that developed by Boone (EJ, 2008). The intuition behind the Boone indicator is that more efficient firms should achieve higher market shares. Hence, the sensitivity of market share to marginal cost provides an estimate of competitive forces and can be obtained as the coefficient β by estimating an equation such as:

$$\ln s_i = \alpha + \beta \ln mc_i$$

in which $s_i$ is market share of bank *i* and $mc_i$ is marginal cost. Marginal cost is estimated from the estimation of a (translog) cost function. The "Boone Indicator" β is expected to be negative (higher marginal costs lead to lower market share) and stronger competition implies more sensitivity and thus a larger absolute (more negative) value.

Davis (2007) summarizes the results of several older studies which indicate little correlation between concentration measures and NEIO measures.

## Behaviour and Characteristics

A third approach is to examine behaviour and characteristics within banking markets. This can overlap the NEIO approach, such as in empirical studies of conjectural variation (competitor responses to particular actions).

Many analyses of bank competition rely on additional indicators such as interest margins or profitability measures (such as the *Lerner Index* giving the markup of price over marginal cost) to supplement imperfect concentration or other measures. There is also a need to recognize the existence of non-price competition, such as by way of branches.

The Productivity Commission calculated the Lerner Index for both the major and other Australian banks. In a competitive market the Index should be zero, since price equals marginal cost. The existence of market power and price exceeding marginal cost indicates market power. For the Major banks the Index had hovered in the range of 40-50 per cent for the decade up to 2018. For other Australian-owned banks it had increased gradually to a figure of around 20 per cent in 2018. These figures are consistent with the argument that the major banks are the price-setters and that other banks, with higher costs of funds and lower

efficiency, are price-followers not earning significant above normal profits. The Lerner Index for the major banks was also around 10 percentage points above the figure found in other high income countries.

Another type of approach is to examine information about rates of entry/exit, changing conditions in the market, innovation, customer relationships, product pricing, and behavior in order to infer how strong competitive conditions are. The weakness in such an approach is best illustrated by noting that low switching rates of bank customers might reflect either high switching costs, lack of information about alternatives, or satisfaction with existing suppliers.

## 6.4 Australian Competition Policy towards Banking

There have long been concerns that the oligopolistic structure of the Australian banking sector does not generate adequate competition. (See, for example the 2011 Senate Economics Committee Inquiry into Banking Competition) Prudential regulation is also argued by some to not pay sufficient attention to ensuring adequate competition (and capital requirements which favour the large banks using the internal ratings based approach are often referred to in this regard). Australia's dividend imputation tax system is also argued by some to reduce the competitive ability of mutual ADIs (because they are unable to distribute franked dividends to members). The Murray AFSI 2014 report argued that regulators needed to give more regard to competition (having it included in their mandates), and that regular reviews of banking (and financial sector) competition be undertaken. The Productivity Commission produced a report in 2019 on this matter, and the ACCC has undertaken a number of market studies (home loan pricing, foreign currency conversion services, residential mortgage products pricing, investigating specific competition related issues.

The Productivity Commission was not convinced that competition was sufficiently strong in the banking market, with smaller banks not providing effective competition to the major banks[5] and limited scope for consumers to offset market power of the larger banks. What participants claimed was competition was viewed by the PC as being primarily marketing activity involving product alternatives with inadequate information provision. They recommended the introduction of a *Principal Integrity Officer* for banks. Whereas the initial growth of securitization and mortgage brokers provided a period of increased competition, the PC argued that mortgage broking no longer fulfilled that role and recommended, consistent with the Hayne Royal Commission recommendation rejected by the government,

[5] In 2010, then Treasurer Wayne Swan was pushing the idea that the mutual ADIs could become a "fifth pillar" to challenge the four majors.

that mortgage broker remuneration needed restructuring. Others have noted that platforms operated by aggregators may reduce opportunities for smaller lenders to effectively market their products via mortgage brokers. As at mid 2021, the government had not responded to the recommendations of the PC.

One important features of Australian bank competition policy has been the Four Pillars policy, preventing mergers between the four major banks. There is no well articulated rationale for this policy (and the PC report argued it was redundant and should be abolished), other than that having four large banks may be more conducive to competition than having a lesser number. It is worth noting that should a merger between two of them occur, it is quite likely that the other two would consider merging – leading to only two majors. It is also worth noting that this policy does not preclude takeover by a foreign bank.

In principle, the FCS, by guaranteeing retail deposits (up to $250,000) of all ADIs should have improved the competitive position of small ADIs (removing perceptions of inherent greater safety of large banks, or implicit guarantees) but there is no evidence of such an effect having occurred. Relatively higher safety could also be perceived to arise from being labelled a "bank" rather than an ADI, creating a competitive disadvantage for credit unions and building societies. APRAs 2011 decision to allow large mutuals (with capital above $50 mill) use the term mutual bank, and subsequently remove the minimum capital requirement should, again have removed any such competitive distortions.

APRA has also relaxed entry restrictions into banking by allowing restricted licences. These allow a potential entrant to undertake limited banking activities to assess whether its business model is likely to be viable and successful, before requiring the investment of fixed or sunk costs required for full banking activities. At mid 2021, restricted licence holders were Alex Bank and IN1 Bank. Volt Bank had "graduated" to a full banking licence while Xinja Bank had relinquished its restricted licence. Direct entry for new domestic banks via full bank licences was granted in 2019 to Judo Bank and 86400 Bank (whose controlling shareholder is CUSCAL which was established as a service provider for credit unions).

One concern of many commentators has been the extent of vertical and horizontal integration within the financial sector. Recent divestments of wealth, insurance and financial advice activities by banks have tended to reduce horizontal integration.

A range of somewhat *ad* hoc regulatory measures have been implemented to improve competition. Concerns that switching costs inhibited financial consumers from changing banks led to legislation in 2011 to prevent exit fees being charged on variable rate mortgages (as

explained in ASIC RG 220. Despite that there remains significant inertia among consumers which has enabled the banks to make significant profits on their "back book" of loans – even though cheaper loan rates could be obtained from switching to access new borrower loan rates available at other lenders. In this regard, policy makers have hopes that Open Banking (a first step in consumer data access rights) may lead to fintech innovations assisting financial consumers to better understand alternative options and promote switching.

Concerns about possible coordination of interest rate changes following RBA cash rate decisions led to a no "price signaling" requirement – introduced by legislation in 2011 – preventing bank executives from intimating how they might adjust interest rates. The 2015 Harper Report into Competition Policy recommended the removal of this requirement directed solely at the banking market in favour of a more general "concerted practices" legislation

In contrast, faced with the potential loan repayment problems arising from economic shut down in response to the Covid Crisis – the government permitted banks to adopt a coordinated approach to approving deferrals of loan repayments.

## 6.5 Foreign Banks in Australia

Foreign banks were not allowed to enter the Australian banking market until regulatory changes in 1984 – although there were three long-standing foreign owned banks operating, with a small presence in Australia. These were the Bank of New Zealand, The Bank of China (1942) and the Banque Nationale de Paris (which came under the restrictions applied to branch status in 1992). Restrictions on allowing foreign bank presence in domestic banking markets were quite common internationally. Other foreign banks participated in the Australian financial sector via equity interests in non-bank financial institutions such as merchant banks, finance companies, and money-market dealers.

Now, foreign banks have a significant presence in the Australian banking sector by number although their market penetration, particularly of retail banking, is relatively low.

### The Introduction of Foreign Banks

The Final Report of the Campbell Australian Financial System Inquiry, published in 1981 considered (in Chapter 25) the case for allowing entry of foreign banks.[6] It recommended that entry should be allowed in a controlled fashion, with *reciprocity* (ability of Australian banks to

[6] The committee drew on a report on foreign bank entry it had commissioned from Kevin Davis and Mervyn Lewis.

enter the foreign bank's home market, an important consideration). It was hoped that entry would generate increased competition in Australia's banking market and that foreign banks would bring enhanced skills and expertise into the Australian market.

Subsequently in 1984 (after several further committees reviewed the arguments) the Labor Government announced that foreign bank entry would be permitted in the form of subsidiaries. While it was indicated that the number of entrants would be limited to around six to eight, the government ultimately announced that sixteen banks (out of 42 applicants) would be offered licences. Not all sixteen took up the offer of a licence, and some subsequently relinquished their licences. Relaxation of foreign investment rules also led to substantial consolidation in the merchant banking sector which had been a main method of access to the domestic financial market.

In 1992, following recommendations of a Parliamentary Inquiry entitled "A Pocketful of Change", foreign bank branch entry was permitted, but restricted essentially to wholesale banking (which was the main interest of foreign banks) by limiting the minimum initial deposit which could be taken to $250,000. The limit on foreign subsidiary licences was also removed.

Only a few of the foreign subsidiary banks survived and prospered (and some converted to branch status when permitted) such that at March 2021, only the seven foreign subsidiary banks listed below were operating, and Citigroup was in the process of exiting from retail activities (including a large presence in credit card issuance). Several of the foreign banks, including Citi, have both a subsidiary and a branch operating in Australia. Foreign branches are focused on wholesale activities.

**TABLE 2: FOREIGN BANK (SUBSIDIARIES) IN AUSTRALIA; 2021**

| Foreign Subsidiary Banks in Australia | Total Resident Deposits ($ mill) | Loans to Households ($ mill) |
|---|---|---|
| Arab Bank Australia Limited | 863 | 473 |
| Bank of China (Australia) Limited | 2,552 | 3,725 |
| Bank of Sydney Ltd | 2,027 | 1,201 |
| Citigroup Pty Limited | 7,463 | 11,287 |
| HSBC Bank Australia Limited | 27,444 | 23,068 |
| ING Bank (Australia) Limited | 45,910 | 52,027 |
| Rabobank Australia Limited | 12,676 | 250 |
| *Memo (Comparison) Items* | | |
| *ANZ Bank* | 326,915 | 280,492 |

| | | |
|---|---|---|
| *Bendigo and Adelaide Bank* | 59,460 | 52,383 |
| | | |

## The Theory of Foreign Bank Entry

There is a large academic literature examining the reasons behind the decisions of banks to expand offshore from their domestic markets.

One argument has been that the global expansion of the bank's customers either via foreign trade or establishing foreign operations, creates an incentive for the bank to expand internationally into those jurisdictions where its customers are active. That suggests that expansion will be primarily in the area of wholesale banking.

Another argument is that banks perceive opportunities in foreign markets for the application of skills and expertise developed in their home markets. This suggests diversification into foreign markets where the banking sector is relatively underdeveloped – perhaps due to regulation.

While retail banking markets are a potential area for foreign expansion, history shows that this has not been an easy route to take. One reason is a natural preference for retail customers to deal with domestic banks, due to either lack of knowledge about foreign banks, or perceived greater safety of domestic banks. Another, albeit less relevant as electronic commerce has evolved, has been the significant cost of establishing the "bricks and mortar" presence in the host market necessary for dealing with retail customers. A third reason has been widespread existence of government barriers to entry to domestic retail banking markets.

Yet another possible reason is the globalization of financial markets. Particularly for large banks actively engaged in international securities markets and the facilitation of international capital flows, a presence in major financial centres is a virtual necessity. However, that does not necessarily require involvement in the host country's domestic banking market.

A further possibility is that international differences in regulation and taxation create incentives to undertake certain activities in foreign rather than domestic markets in order to profit from regulatory or tax arbitrage.

In understanding the growth of foreign bank presence in the Australian market, these theories provide some insights. For example, in the years since the GFC, there has been a relative increase in the number of Asian banks (and their size) in the Australian banking sector. In the

decade after the GFC, European banks holding of Australian domestic assets fell substantially, while those of American banks grew relatively slowly.

## The Current Position of Foreign Banks

At the start of 2021, of the 66 foreign banks operating in Australia, 19 were from Europe, 11 from North America, 8 from the UK, 28 from Asia (with Japanese and Chinese having the largest representation)

While deposits in foreign subsidiary banks are covered by the Financial Claims Scheme (FCS), deposits in branches of foreign banks are not. Typically, the deposit insurance scheme operating in the home jurisdiction of the branch will apply to deposits in the branches, but possibly not if the scheme has limitations on insurance of foreigners. In any event, the restriction preventing foreign branches from accepting initial deposits of less than $250,000, which is the FCS cap and of similar size to the cap in overseas schemes, effectively means that no deposits would qualify for coverage anyway.

As at 2021 there are three major factors likely to influence future developments in foreign bank presence in Australia. One is the international restrictions on travel and impediments to trade arising from the Covid Crisis. A second is the fraught political position with China, which has included the introduction of tariffs on Australian exports and threats regarding Chinese investment in and trade with Australia. A third is the ramifications of Brexit, including changes to trade and financial flow patterns and financial institution location decisions.

## Foreign Banks: Their Impact

The original arguments for allowing foreign bank entry revolved around the potential benefits they could bring to the domestic economy. These included: increased competition in banking and greater choice for customers; lower cost banking due to greater efficiency of foreign banks; technology transfer as processes and methods employed by foreign banks spread to local competitors.

While relatively low market penetration might be thought to suggest little impact on the domestic market, that is not necessarily the case. Competition from efficient foreign banks may lead to domestic banks protecting their market share by improving their efficiency or reducing prices (less exploitation of market power). If so, it could be expected that either local bank efficiency would have improved and/or profitability would have declined following foreign bank entry. These types of issues (as well as investigating whether foreign banks do have an efficiency advantage) have been examined empirically by a number of researchers.

While it seems reasonable to conclude that only limited overall effects have been found from the empirical studies, some specific situations such as the impact of ING Direct on retail deposit markets and mortgage loan markets have been noticeable.

## 6.6 Global Strategies of Australian Banks

The major Australian banks have a chequered history in their more recent global expansion strategies and activities, although Merrett (JFIFMIM, 2000) indicates that earlier expansionary moves were relatively well founded. Significant holdings of overseas assets reflected NZ and London activities as well as balances in branches in major international money market centres. Merrett traces the earlier global expansions to motives of: providing trade related services to customers; undertaking treasury functions for their own balance sheets; providing banking services (similar to those in the Australian market) in markets such as New Zealand and the Pacific Islands.

More recently, both NAB (in the 1990s) and ANZ (following the GFC), driven by grandiose visions of their then CEOs embarked on ambitious globalisation strategies which have since been reversed. Westpac and CBA have developed significant international presences in the Asia-Pacific region, but have also pulled back from some of those activities to focus primarily on Australia and New Zealand activities. As well as a geographical refocusing, this is also associated with a divestment of many insurance and wealth management activities.

The exception to the retreat to Australia is the Macquarie Group (incorporating Macquarie Bank) which has diversified into a range of activities in many overseas markets. This 2018 AFR article by Joyce Moullakis provides an overview of that history – but it is worth noting that the overseas activities of Macquarie relate primarily to its funds management and investment bank activities rather than commercial banking.

### NAB

NAB's period of global expansion, and subsequent retreat is well outlined in a Pat McConnell article in The Conversation in 2016. It was largely driven by Don Argus who was CEO from 1 Oct 1990 (and before that Executive Director Banking) who retired as CEO 1999.

In 1987 NAB bought Clydesdale Bank, Northern Bank in Northern Ireland, and National Irish Bank in the Republic of Ireland from Midland Bank. The latter two were sold in 2004 to Danske Bank, for an accounting profit of around $1 bill. But in the interim, in December 2004, the Northern Bank was subject to a robbery in Belfast of GBP 26.5 mill, purported to be by the IRA – one of the largest bank robberies in the UK's history

In 1990 NAB bought Yorkshire Bank (which was subsumed into Clydesdale in 2005) and in 1992 bought Bank of New Zealand (BNZ). It then expanded into the USA, initially buying Michigan National Corporation (MNC) in 1995 (which it sold 2000 to ABN-AMRO for an accounting gain of $1 bill). Its largest disaster was the 1998 purchase of Homeside, a US mortgage servicing company for $1.2 billion. Eventually it was discovered that the profit forecasts were completely erroneous due, *inter alia*, to wrong assumptions about mortgage duration and fees to be received, requiring massive write downs of asset value. It was sold in 2002 for a $2 bill plus loss which never received the headlines or public explanation which might be thought appropriate for such a massive loss.

In 2007 NAB purchased the US bank Greater Western Bancorp (GWB) for a cost of $1bill.

In 2009, the new CEO Cameron Clyne announced the bank's focus was to be on Australia, reversing the global expansion strategy. In 2015 GWB was sold for a small accounting loss. In 2016 Clydesdale Bank was spun-off (and later acquired by Virgin Money) – involving an accounting loss $4 bill. In the interim, Clydesdale, like other UK banks, had suffered significant reputational and financial costs through the need to make provisions for and make reparations for miss-selling of PPI (Payments Protection Insurance) policies.

NAB's overseas expansion involved acquisition of a range of banking activities where there was little apparent scope for transfer of knowledge and expertise, or strategic market impact.

## ANZ

ANZ had long had a presence in the Asia-Pacific having established operations in 1970 in Vanuatu, and in 1977 establishing ANZ PNG. It substantially also increased its international footprint with the purchase of Grindlays in 1985. After some significant losses in its Indian operation it sold Grindlays in 2000 to Standard Chartered for $1.6 bill. It also started a Cambodian joint venture *ANZ Royal* in 2005, and had a Hanoi branch since early 80s.

The new CEO (Michael Smith) launched a 2008 strategy for becoming a super regional bank, with an objective of twenty per cent of revenues coming from Asia Pacific, Europe and America by end 2012. (He also introduced a new logo thought to be more appealing to Asian customers)! The strategy also involved increased location of operations and technology centres offshore (eg Bangalore).

ANZ acquired Asian assets from RBS in Taiwan, Singapore, Indonesia, Hong Kong, Philippines and Vietnam for $550mill.There was local incorporation in China in 2011, and partnership investments with Shanghai Rural Commercial (20%) and Bank of Tianjin (12%). ANZ increased its presence in Indonesia and increased its stake in PT Panin Bank to 39%

It obtained a universal banking licence in Philippines, locally incorporated in Vietnam, and re-commence operations in India with a branch in Mumbai. It had 18 branches in Taiwan and commercial hubs in HK and Singapore with large numbers of employees. It increased its stake in Malaysia's AmBank from 19% to 24% (which was involved in the 1MDB scandal)

Before the new CEO Shayne Elliott appointed in 2016, announced a reversal of the Asia strategy, ANZ had around 2.6 mill customers in the Asia-Pacific, 8,200 employees and 100 branches/points of presence. Since then the bank has sold down or closed many of its Asian operations to focus its activities on the domestic market.

## Westpac

Even though Westpac never had the same global expansion strategy of NAB or ANZ, it did undertake a number of significant investments in both banking and non-banking businesses in the 1980s, many of which were divested in the early 1990s following the bank's domestic problems at that time. Now, the Westpac website 3 May 2021 stated that the bank was "Returning to our core businesses of banking in Australia and New Zealand, including exiting some businesses and international locations". It had long had a presence in the Pacific nations, but in 2015 sold banking operations in Samoa, Cook Islands and Tonga to the Bank of South Pacific. It still retains branches and/or representative offices in Fiji, PNG, Vanuatu and Westpac Fiji has a 40% market share

Expansion into China was contemplated in 2018 – looking at taking advantage of Chinese liberalisation, with a focus on institutional business. But by 2020 it was closing offices in Shanghai, Beijing, HK, Mumbai and Jakarta, and aiming to consolidate offshore business in NY, London, and Singapore

## CBA

As a government owned bank until its privatisation in the first half of the 1990s, CBA did not pursue significant offshore expansion other than into NZ via acquisition of ASB in the late 1980s. CBA's Asia-Pacific presence was partly due to its acquisition of Colonial Mutual in 2000 and its offshore insurance operations. These included operations in Hong Kong Fiji, China, Vietnam, Indonesia. In addition it had 99% of PT Bank Commonwealth in Indonesia, 20% in Qilu Bank and Bank of Hangzhou in China and 20 % stake in Vienam International Bank.

As a result of an August 2018 strategy review it undertook sale of its 37.5% equity in BoComm Life Insurance company to Mitsui Sumitomo, the planned sale of shareholding in TymeDigital in South Africa and undertook a review of shareholding in Vietnam International Bank and Indonesian life insurance business PTCL

## New Zealand Activities

All four banks have significant presence in New Zealand and dominate the financial markets there to even a greater degree than they do in Australia. Each has had a presence in NZ for a very long time (with Westpac having had a branch presence in NZ since 1860's). ANZ increased its role through the purchase in 2003 of the National Bank of NZ, and its eventual integration with its existing operations of ANZ NZ in 2012.

In 2001, the RBNZ required those of the major banks with NZ operations not already structured as subsidiaries (but as branches) to convert to subsidiary form. In 2021, the RBNZ announced very substantial increases in capital requirements for NZ banks, which could possibly influence the Australian banks to divest their NZ subsidiaries.

## Reasons for a Retreat from Asia

History shows that successfully becoming a multinational bank operating in many countries is difficult. Many banking skills are transferable across national borders, but there are institutional and cultural impediments to overcome, not to mention regulatory barriers.

And at this point in history, those regulatory barriers are significant, particularly for expansion into Asia.

First among these is the ASEAN Banking Integration Framework (ABIF) initiated at the end of 2014. This involves the designation of banks headquartered in the ASEAN region as Qualified ASEAN Banks (QABs). Such a designation, not available to Australian banks, means that they will be able to operate in other ASEAN countries under exactly the same regulatory arrangements as domestic banks. While the specific competitive advantages this will provide over non-QABs are unclear (and may vary from country to country), this is in essence a barrier to entry for banks from outside the ASEAN region.

It remains to be seen whether the ABIF will succeed, given the vast differences in banking structure and development across the region, not to mention political factors. Nevertheless. the development is not conducive to an Asian expansion strategy for Australian banks.

A second factor is the regulatory arrangements driven by the Basel Committee, and implemented in Australia by APRA. Capital requirements associated with offshore subsidiaries or joint ventures can be higher than for purely domestic operations. The Australian banks have complained about this in the past, and given bankers' aversion to higher capital, that also creates a disincentive to offshore operations. (Given generally poor experience with bank offshore expansion over the years, that may be a good result for bank shareholders arising from such regulation).

A related regulatory consideration is the imposition of higher capital requirements on banks which are regarded as systemically important. The major Australian banks are already subject to a higher capital charge for being Domestic Systemically Important Banks (D-SIBS), but offshore expansion could ultimately lead to a Global SIB categorisation and further capital imposts. In general, the thrust of post-crisis regulation is towards disincentives for banks becoming "too big".

A final factor, virtually unique to Australia, arises from tax considerations. An increasing share of earnings generated offshore would reduce the ability of Australian banks to pay fully franked dividends. This is equivalent to banks facing a higher cost of capital for overseas activities than for domestic activities.

For shareholders in Australian banks, this would mean that offshore expansion would need to be even more profitable than domestic activities to be value adding. Then, and it is an unlikely outcome, higher partially franked dividends could be paid to offset the reduction in franking.

So: the cost of capital is probably higher for overseas versus domestic activities of Australian banks (due to dividend imputation); capital requirements are a bigger problem; and the ASEAN region is putting some potential roadblocks in place which hinder ease of foreign bank entry and competitiveness. And added to all that is the massive potential disruption to traditional banking being posed by innovation and Fintech, requiring a focused response to preserve competitive advantages in existing markets and products.

Given these problems retreat to Australia appears like a sensible response for Australian banks.

## 6.7 Bank Taxation and Large Bank Levies

Special tax and levy arrangements are applied to the banking sector in many countries, reflecting the special nature of bank activities and their implications for the economy. One example is liability for supervisory levies which aim to recover, in part or whole, the cost of prudential supervision. Another is the application of size-related levies to compensate for their role in creating systemic risk or to partially offset the benefits they receive from implicit guarantees (reflecting perceptions of being Too Big to Fail (TBTF)). In some cases these levies are explicitly directed towards creation of a "resolution fund" to assist regulators and government in dealing with bank failures and crises. (These are in addition to deposit insurance fees which are levied in exchange for the protection of retail deposits from loss due to bank failure, and which are best considered separately).

Taxes or levies have also been applied to particular types of transactions conducted via banks or on balances in some types of accounts. In some cases, but not all that often, these have been justified as compensating from the exemption of banking from value added taxes (VAT) such as the Goods and Services Tax (GST) in Australia. In 2017 the South Australian government proposed, but ultimately did not proceed with, a levy on the major banks as a substitute for their exclusion from the GST (revenues from which are paid by the Commonwealth government to the State governments). Often, other general forms of taxes can significantly impact on specific types of bank transactions – such as stamp duties on documentation of financial transactions (such as creation and discharge of mortgages).[7] The Australian Banking Association provides information on taxes paid by Australian Banks here.

## FID and BAD

Historically, there were several specific taxes related to bank (and financial institutions) activities. The poorly named BAD (Bank Accounts Debit Tax) was initiated by the Federal Government in 1982, and responsibility transferred to the State Governments in 1991, before being abolished as part of the introduction of the GST in the early 2000's. The tax involved a charge against all debits to an account with chequing facilities on a sliding scale from zero for smaller transactions up to a maximum of $4 for large transactions ($10,000 or above).

The FID (Financial Institution's Duty) Tax was levied by State Governments on amounts deposited with financial institutions. It was introduced in different states between 1982 and 1992 and abolished in 2001 as part of the agreements involved in the introduction of GST. In most states the ta was 0.06 per cent of amount deposited with a maximum amount of $1,200.

Both taxes were generally viewed as distortionary.

## Large Bank Levies Internationally

In the wake of the Global Financial Crisis, there was widespread adoption of specific taxes (levies) on large banks (and some other financial institutions). In Europe, the UK did so in the budget of June 2010. Levies were introduced in Germany and France in 2011 and in a number of other European countries at around the same time. While some see such an impost as an *ex post* charge for the costs incurred by governments and national economies for excessive risk taking by banks which led to the GFC, most support was based on a forward looking view. Thus the IMF argued in 2010 that "[e]ven countries that provided little or no support to their

[7] Governments may also aim to fund costs of certain activities by levies on particular types of financial instruments. In Australia, a (declining) number of State governments have in the past applied a Fire Services Levy on house insurance contracts written by insurers as a means for funding fire brigade services.

financial sectors during the recent crisis should consider forward-looking contribution schemes."

There was not unanimous support for such an approach, as reflected in the communiqué of the G20 leaders Toronto Summit declaration. "We agreed the financial sector should make a fair and substantial contribution towards paying for any burdens associated with government interventions, where they occur, to repair the financial system or fund resolution, and reduce risks from the financial system. We recognized that there are a range of policy approaches to this end. Some countries are pursuing a financial levy. Other countries are pursuing different approaches."

This reflects the fact that other strategies such as increased risk-based capital requirements are an alternative to taxation of banks in terms of their potential effects on risk-taking. There was also relatively little evidence on what effects such taxes would have, and how best to structure them. The USA did not proceed down this path (except for a proposal to levy a fee on banks which had not repaid funds provided under the TARP scheme).[8] Nor did Canada, Japan, China or many other non-European countries.

In Europe, individual national schemes have been overtaken by the Single Resolution Mechanism and establishment of the Single Resolution Fund.

The UK levy was set at an initial rate of 0.04 per cent, eventually rising to 0.07 per cent, of a bank's aggregate liabilities excluding tier 1 capital (equity), insured retail deposits, repo funding backed by sovereign debt, and any retail insurance policy liabilities. There is also a reduced levy rate for long-term wholesale liabilities, reflecting the intention of the levy to encourage adoption of funding arrangements less exposed to instability. In this regard, it would have interactive effects with Basel II proposals for a *Net Stable Funding Ratio* requirement.

## The Australian Major Bank Levy

The Major Bank Levy was announced in the 2017 budget.

The levy has the following features.[9] The four majors and Macquarie pay a levy of six basis points p.a. on liabilities other than deposits protected by the Financial Claims Scheme (ie

[8] Proposals for a levy funded Systemic Dissolution Fund as part of the Dodd- Franks Wall Street Reform and Consumer Protection Act were dropped in in favour of expanded resolution powers for the FDIC

[9] It is not clear from the budget papers, but by categorising the impost as a levy rather than part of company tax, the banks may not generate further franking credits from payment of the levy (which otherwise could be passed on to shareholders and, through use of those credits, offset a large part of the revenue consequences for the budget).

under $250,000) and additional Tier 1 capital instruments. As a ballpark estimate, it applies to around 50 per cent of a bank's total funding, raising the overall average cost of funding for the affected banks by around three basis points.

While the government did not initially provide a justification for the levy, a number of arguments can be advanced. One argument is that the large banks a perceived as receiving a competitive benefit (lower borrowing costs) from an "implicit government guarantee" associated with being "Too Big To Fail". On this basis the levy could be seen as a charge for that benefit.

A second argument could be that (as in Europe) it would be desirable to establish a "resolution fund" to enable APRA to facilitate a smooth exit (eg by merger) of a failing bank. Although the levy goes into general budget revenue rather than a distinct fund, it could be further argued that by improving the fiscal health of the government it makes them better placed to support APRA in any needed bank resolution activities.

A third argument could be that the nature of the regulatory system (such as capital adequacy requirements) creates a competitive imbalance favouring the big banks. Operating under the Advanced Internal Models approach for determining capital requirements, the big banks face lower capital requirements than do others operating under the Standardised approach.

A final argument could be that Australian banks have relied too much on funding other than "core/stable" deposits and capital, with potential consequences for safety and systemic stability. Indeed, the large banks have funded their increased share of home mortgage lending since the GFC to a significant degree from wholesale borrowings.

The levy has a number of significant effects on financial markets and consumers of financial services. The first point is to note that the levy will flow through the banks' funds transfer pricing systems to affect loan pricing. In this regard it is somewhat silly to simultaneously suggest that the big banks shouldn't increase loan interest rates, but that the measure will improve the competitive position of smaller banks. The latter will only happen if the large banks do respond in that way! The ACCC was tasked by the Treasurer in 2018 with examining the extent to which the MBL was passed on to mortgage borrowers by the banks – a bit like looking for a needle in a haystack, given that the introduction of a levy of 6 basis points on a part of bank borrowings is relatively small compared to other impacts on interest rates – such as the 25 basis point changes in the cash rate which the RBA usually makes when policy is adjusted.

A second effect is that the incentives for large banks to fund loans differently. In particular, by originating and then securitising loans (to get them off-balance sheet and funded by the capital market) they will avoid the levy on that part of their activities. However, that benefit won't apply if they use "covered bond" securitisation. The levy is thus likely to give a kick to traditional securitisation over on-balance-sheet lending, but stymie the growth of covered bond funding.

A third effect will be upon the structure of bank deposit interest rates. Because retail deposits are exempt from the levy, the large banks can be expected to bid for these deposits – pushing up the interest rates offered relative to the cost of borrowing in wholesale and large deposit markets. That is going to compound the already apparent effect on relative interest rates due to recently and forthcoming liquidity regulations being applied by APRA. But it will worsen the relative returns that superannuation funds can get on (their large) bank deposits and possibly induce them to look towards investing more in securitised products.

A further likely effect is to encourage banks to make more use of equity capital and additional Tier 1 (AT1) capital funding (the preference share structures listed on the ASX and held by many retail investors) relative to Tier 2 capital funding (provided by the wholesale and institutional markets) or other wholesale funding.

How much of the impact of the changes will fall on shareholders in the large banks (and how large will the effect be) rather than upon customers? That is difficult to answer with any confidence without further detailed analysis beyond the scope of this article. The revenue to be raised is large in absolute dollar amount – but is relatively small as a percentage of current bank profits (in the order of 4-5 per cent).

## The MBL and the FCS

Is the imposition of a levy on non-insured liabilities consistent with the government not charging an insurance fee for sub-$250,000 deposits covered by the FCS. Yes.

The reasoning starts with the principle that those who provide insurance should be paid for the costs, and those that receive insurance should pay for the benefits from this transfer of risk.

The logic for absence of an ex-ante fee paid to the government for insuring sub-$250,000 deposits under the Financial Claims Scheme is simple. It is not the government that bears the ultimate risk of paying out those depositors in a failed bank.

If APRA liquidated a failed bank it would pay insured depositors but would then have first claim on the proceeds of the sale. Given the structure of Australian bank liabilities it would recover all it paid out – so the government does not incur a cost – and shouldn't receive a fee for insurance it will never have to pay out.

Who is bearing the risk in that case? It's the other uninsured creditors of the bank – wholesale funders and uninsured (large) depositors, who will not get back full value of their claims. Because such creditors realise such credit risk, they charge the banks a correspondingly higher interest rate. In that way the banks effectively pay their uninsured creditors for the insurance received by insured depositors.

But is that the likely scenario? Many would argue, validly in my view, that the response of government would instead be to take actions, such as injecting funds or providing guarantees, to prevent the bank from failing – particularly for large banks. This is typically referred to as the Too-Big-To-Fail problem (TBTF).

If that is the likely response of government, uninsured bank creditors will (arguably) take the view that they are in fact protected from loss from a bank failure. The government is providing implicit insurance to them. They will thus not require a higher interest rate from the banks to compensate for possible default risk.

In this scenario, the banks benefit from not having to pay an "insurance premium" built into higher interest rates on uninsured liabilities. It is the government who is ultimately providing this insurance to the banks via taking on the risk of making uninsured creditors whole in the event of looming bank failure.

If that scenario is credible, it provides an economic case for a levy on uninsured bank liabilities. But is it credible?

There is certainly a widely held view that TBTF exists. Many researchers have produced studies indicating that, in banking systems around the world, large bank borrowing costs are lower as a result of perceived implicit guarantees. Those studies can, of course, be challenged – but it should be noted that for many years the ratings agencies have included an "uplift" to bank ratings to reflect perceived government support.

If this argument is accepted, is the bank levy the appropriate approach? An alternative is higher capital ratios and other prudential measures to ensure that banks are "unquestionably strong". That would remove the value of implicit guarantees, since they are then redundant.

## GST and Banks[10]

Currently, some financial services (such as insurance) for which explicit fees are levied are subject to GST. But a major part of banking - taking deposits and making loans - is not. Historically it was seen as too difficult because of the nature of financial intermediation, but modern technology should make it feasible – albeit still difficult.

To understand the issues involved, a short primer on GST is required. GST, or Value Added Tax (VAT), applies a rate of tax (eg 10%) at each stage of the production process, based on the value added by the business (essentially equal to wages and profits). It achieves this by levying the tax on the value of the goods sold by the business but allowing tax credits for the GST included in the price paid by the business for purchases of goods and services as inputs (referred to as input tax credits).

Each business in the production process supply chain pays a net tax amount equal to the GST tax rate applied to its value added. When the completed good or service is sold to a consumer, the price incorporates all the net GST amounts paid in the production process, such that total GST revenue is essentially the 10% tax rate applied to the pre-GST sale price of goods and services sold to consumers.

## The challenge

How would this apply to taking deposits (on which interest is paid) and making loans (on which interest is charged)? The value added in this process is relatively easy to identify. The difference between those interest rates (the net interest margin), if we ignore explicit fees charged for services provided, must cover costs of purchased inputs of goods and services by the bank (such as paper, pens, ink, or nowadays computer services) plus wages and profits.

So total value added by a bank can be readily calculated as the sum of its wage bill and its profits. The problem lies in splitting the value between business and retail customers and providers of deposits and loans.

As a very simplistic example, suppose the bank has $90 of deposits and $100 of loans (and $10 of equity capital) and a total value added (net interest margin minus purchased input costs) of $5. What method can be used to divide that $5 between depositors and borrowers as the value of services provided to each? And if there are numerous depositors and borrowers (and some of them business and some retail customers), possibly receiving or paying different interest rates, how much of the value added represents the cost of services provided to each?

[10] Adapted from an article published on The Conversation

## Why it makes sense

Putting this process into the "too hard" basket, however, creates distortions to production and consumption. First, banks pay substantial amounts of GST on purchased inputs, and receive input tax credits which they are largely unable to use. Of course, banks can be expected to pass on the taxes paid to customers in the form of lower deposit rates or higher loan rates.

This creates a distortion of costs for business customers of the bank. For example, the loan interest they pay indirectly includes an implicit GST cost, but they do not receive any input tax credits to offset the GST amount they add to their product price.

As a very simplistic example, consider an individual who provides personal services using no purchased inputs for deferred payment and has a bank loan to meet living expenses until the payment is received. The loan interest is $10 and the individual needs a net $1,000 for those services and is subject to GST as a business. If there is no input tax credit on the loan interest the individual will need to charge GST on $1010, or GST of $101 such that the gross price charged to the purchaser of these services would need to be $1,111. If the loan included (for example) an input tax credit of $1 because intermediation services were "GST-able", the gross price would only need to be $1,110 (because the net GST bill paid by the individual would only be $100).

Because of the current GST exemption, businesses do not get the benefit of all the GST paid in the "upstream" parts of the production process and therefore need to charge higher prices.

A second type of distortion arises from consumer demand for financial services. While the GST paid by banks is reflected in interest rates paid and charged, the absence of GST on the value added by bank intermediation reduces the relative price of financial services. Arguably, this contributes to higher demand for financial services relative to other goods and services, perhaps contributing marginally to the growth in size of the finance sector over recent decades.

A third type of distortion arises from decision making by banks regarding supply and pricing of different types of financial services. For example, costs of intermediation can be recouped by the net interest margin or by explicit fees for services associated with intermediation – some of which may be "GST-able".

### Difficult to measure

Is it possible to overcome these difficulties? One would hope so. Banks have very sophisticated activity based costing systems and funds transfer pricing systems which are designed to

identify the cost and value created by each transaction. Using these to identify value added for each type of transaction, and thus the base for applying GST, may be complicated but not infeasible.

Is it worth doing? Certainly the sum of profit and wages paid (ie value added) of banks, is a very large sum, much of which is not subject to GST. While the banks will claim they pay large amounts of GST (on their purchased inputs) which they can not claim as input tax credits, it is ultimately the users of bank financial services who pay those amounts.

Broadening the GST base to fully include financial intermediation would increase GST revenue (estimated at around A$3.5 billion from households) and would remove a number of distortions from the current system (including almost A$1 billion from over-GST taxation of business. But identifying precisely the overall effects, the benefits, and the cost of change is a fairly Herculean effort.

## 6.8 Bank Disclosures and Market Discipline

Banks have traditionally been relatively secretive about their activities. One reason is customer confidentiality. Another is the concern about how public disclosure of information might affect public perceptions of their financial condition, perhaps sparking "runs" by depositors or other counterparties, or adversely affecting their stock prices and borrowing costs.

At the international level, banks have been major participants in, and facilitators of, transfers of assets and flows of funds involving international tax haven countries, for which secrecy is needed to achieve the tax avoidance or evasion prompting those actions. Historically, the Swiss banking sector was long regarded as attractive for the rich seeking to hide their wealth because of the nation's privacy laws.

AML/CTF issues and tax avoidance and evasion are discussed in Chapter 13. The focus here is upon bank disclosures of their financial position and other aspects of their activities (such as ESG strategies).

### Basel 2's Pillar 3

When Basel 2 was released in 2006, it emphasized the role of "market discipline" as the third pillar of the regulatory framework (with pillars one and two being capital requirements and effective supervision respectively). The rationale was that market discipline, informed by public disclosures of financial information which allowed assessment of bank capital adequacy, would complement regulatory and supervisory measures in ensuring bank safety.

Informed market participants might come to different opinions about a bank's capital adequacy than that indicated by regulatory measures – particularly where bank capital positions would be determined using the Internal Models approach. Resulting effects upon the bank share price or cost of borrowing could then act as another influence upon the bank's financial policy.

## Basel 3 Disclosures

The Basel 2 disclosure requirements were overtaken by the introduction of Basel 3. Following the Global Financial Crisis, the Basel Committee announced in 2010 (as part of Basel 3) increased disclosure requirements for banks. These were designed to address substantial gaps in publicly available information about banks' practices and conditions. With such gaps, effectiveness of the "third pillar" of the Basel framework for banking strength and stability, that of market discipline, was seriously undermined. In Australia APRA adopted the Basel 3 disclosure requirements in its Prudential Standard APS 330 Public Disclosure, which initially came into effect on 30 June 2013 and which has since been broadened in its scope.

In its revised Pillar 3 disclosure requirements the Basel Committee notes that "provision of meaningful information about common key risk metrics to market participants is a fundamental tenet of a sound banking system. It reduces information asymmetry and helps promote comparability of banks' risk profiles within and across jurisdictions." One consequence is the specification of common templates for provision of required information by banks across a number of disclosure categories.

### What is disclosed?

Originally, the Basel 2 disclosure requirements involved relatively limited provision of certain information on a quarterly basis, with more substantive disclosures required annually. And the requirements were significantly more substantial for the large banks operating under the Internal Models (Advanced) capital requirements than for those on the Standardised approach. Information on capital ratios, credit risk exposures (by portfolio), and loans past due was required quarterly with annual disclosures also providing more detail including information about capital instruments.

Now, the regulatory disclosures include: Capital and Risk Disclosures; Capital Instruments Disclosures; and Remuneration Disclosures. For the large Australian banks APRA also requires

disclosure of some components of the Basel G-SIB disclosure requirement[11], and if the group contains insurance activities, there will also be an insurance capital adequacy disclosure.

Apart from the required differences in disclosure for large banks operating under the internal models (Advanced) approach there are significant differences in presentation relative to the smaller banks and ADIs (operating under the standardised approach). An important difference is in the qualitative information provided, with the large banks providing extensive discussion of risk management practices (as required of Advanced IRB Banks) , but smaller banks general present only the required statistics without supporting discussion. The large banks are required to provide information on their leverage ratio. Banks operating under the Liquidity Coverage ratio approach (rather than the Minimum Liquidity Holdings approach used for smaller banks) are also required to make liquidity disclosures. The disclosure of capital instruments on issue is relatively substantial for major banks, but for smaller banks, credit unions and other mutual ADIs there is generally little to show.

### Using Disclosure Statements

Banking is, unfortunately, sufficiently complicated that there is likely to be only a relatively few specialists who can make much sense out of the disclosures provided. But, of course, it only requires a few well informed participants to create market discipline – if they can easily access, and compare across peers, timely information. Unfortunately, the Basel disclosures do not really meet those conditions of easy access, comparability and timeliness, which might facilitate greater and better analysis of our banks.

There are at least three failings in the nature of disclosure by Australian banks.

### Data Extraction and Comparability

The first failing is impediments to easy comparability. Even if banks use the common template required by APRA, such as for provision of information about capital instruments, there are considerable resource costs in collecting that information into a manageable form for analysis. Information is generally presented on banks' websites in a tabular form based on the common template provided by APRA. However, the coding or formatting of the information is such that it is not always possible to simply "cut and paste" the data into a spreadsheet or other data management software. A row of information copied from a table, generally pastes into software as something quite different. This is easy to fix, and could create the suspicion that many banks don't want to make it easy for analysts or researchers to study the data. It would

[11] These extra disclosure requirements include information on size, interconnectedness, substitutability, financial institution infrastructure, complexity and cross jurisdictional activity.

be easily fixed by APRA requiring the banks to provide the information to it and publishing it in an easy to access form on their website.

### Capital and Risk Disclosures

Information extraction is even more complex when the Capital and Risk disclosures and Remuneration disclosures are considered. One reason for this is the flexibility which APRA provides to the Advanced banks to provide commentary and information reflecting their specific arrangements while providing some minimum required amount of information. One consequence is that the annual disclosure documents for capital adequacy and risk run, for the major banks, to around 100 pages, and the quarterly disclosures to around 15-20 pages. APRA specifies that certain types of information are to be provided consistent with a list of table templates given in the attachments to APS 330. And while Australian banks provide such information (and provide a guide to how tables in their disclosure match the APRA requirements) again it is virtually impossible to extract data easily into a spreadsheet for comparison purposes.

### Frequency and Timeliness

A third complication lies in the frequency and timeliness of bank disclosures. Quarterly disclosures may be an acceptable frequency if more frequent compilation and publication of data imposes significant costs on banks, and if there is little public benefit in increased frequency. However, it would be surprising if bank managements did not provide data such as capital ratios as part of monthly reporting to the board – such that some level of monthly reporting was not feasible.

Also there are significant delays in publication of the quarterly disclosures: in general, the average reporting delay is around 39 days (compared to the APRA requirement of no more than 40 days)! It may be that it takes this long to compile such information, but “stale” information is not much use for analysis of current bank conditions.

### Finding Basel 3 Disclosures

A final issue concerns ease of discovery of location of Basel disclosures. Generally, APS 330 disclosure documents are only a few clicks away from any given bank’s homepage. However while every bank is required by APS330 to have a “Regulatory Disclosures” section on its web page, it is not always easy to navigate to it. Finding the disclosures can be particularly frustrating, if one attempts to step through what would appear to be a logical sequence of web pages – rather than using the search button to look for “regulatory disclosures”. Table 3shows the URLs of Basel 3 regulatory disclosures for the benefit of readers

**TABLE 3: URLS FOR BANK BASEL 3 DISCLOSURES**

| |
|---|
| https://www.commbank.com.au/about-us/shareholders/financial-information/regulatory/basel-iii-pillar-iii-disclosure.html |
| https://www.anz.com/shareholder/centre/reporting/regulatory-disclosure/ |
| https://www.nab.com.au/about-us/shareholder-centre/regulatory-disclosures |
| https://www.westpac.com.au/about-westpac/investor-centre/financial-information/regulatory-disclosures/ |
| http://www.macquarie.com/au/about/investors/regulatory-disclosures |
| http://www.suncorpgroup.com.au/ (search for "APS330" – not collated on website, released as announcements!) |
| http://www.bendigoadelaide.com.au/public/shareholders/announcements/aps_330.asp |
| https://www.boq.com.au/Shareholder-centre/financial-information/Regulatory-Disclosures |
| https://www.mebank.com.au/about-us/governance/disclosures/ |

## 6.9 Bank Valuation

To executives and boards of banks listed on the stock exchange, the behavior of the bank's stock price is an important concern. There are, at least, four reasons. One is that the stock price is an indicator of the market's perception of the performance and future prospects of the bank. A second is that the stock price will affect the cost of equity capital for the bank – raising a given amount of new equity when the share price is low means that more shares need to be issued, which dilutes the interests of existing shareholders. A third is that the requirement of management to act in the interests of shareholders is generally interpreted as consistent with undertaking policies which aim to maximize the bank share price. (Of course, since payment of dividends reduce the share price, this maximization should be interpreted as being prior to payment of dividends). Fourth, senior bank executives will generally have remuneration contracts which are structured to provide greater rewards when the bank share price increases.

While individual investors will focus on the share price, it is more useful to consider the total equity market capitalization of the bank, which equals the share price multiplied by the number of shares on issue. For example, the share price could be doubled by the simple accounting act of halving the number of shares on issue by consolidating every two shares into one – an act which would have no effect on the value of the shareholder's wealth.

Bank analysts spend much time attempting to determine whether the current share price of a bank is justified by the underlying "fundamentals" of the bank. To do that, they attempt to incorporate all available relevant information into their private models of bank valuation. They may be able to better interpret the available information than other investors leading them to a view that the stock price is currently over- or under-valued. It is important to be aware

that bank valuation requires recognition of the special nature of bank balance sheet and income-expenditure characteristics, and thus requires adjustments to the normal methods of stock valuation.

The market capitalization (stock market value of shares on issue) of banks typically differs from the accounting (book) value of shares on issue – often substantially. In Australia, the shares of the major banks traded for a long time at market to book (M/B) ratios of close to two as shown in Figure 5. In recent years those ratios have fallen quite substantially. Other than CBA (which was higher), the M/B ratios were around unity in 2020, but have since bounce back in 2021, reflecting the strong rebound in bank share prices. In contrast, smaller listed banks have often had M/B ratios below unity.

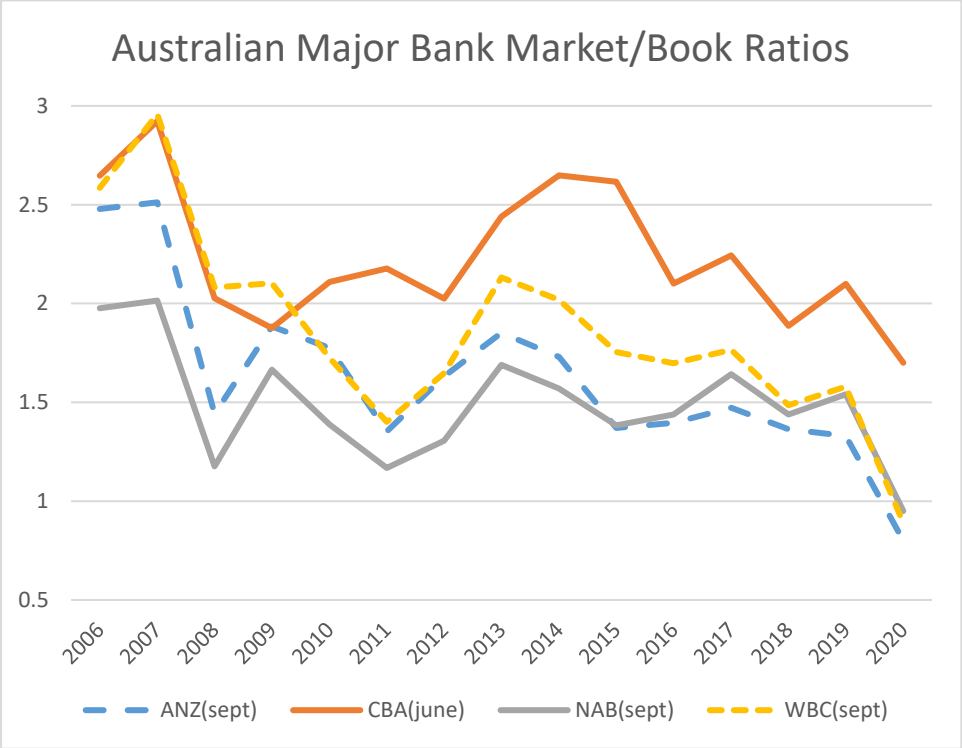



**FIGURE 5: MAJOR BANK M/B RATIOS**

An obvious question is what determines the share price of banks and causes the M/B ratios to deviate from unity. Bank analysts spend considerable time estimating what they think is the fundamental value of a bank and deriving their "target price" – which if higher or lower than the current share price leads them to recommend buying or selling respectively the shares of the bank.

To examine alternative valuation methods we will consider the simple case of *Hypothetical Bank* which at the end of 2021 presents the following financial statements. A number of

important features need to be noted. The risk weights of Cash, Mortgage, Personal and Business Loans are assumed to be 0, 0.5, 1, and 1 respectively, giving total RWA = 13. The bank has a target Equity/RWA = 10% which it currently just meets. Its loan loss provisions are currently (and planned to be maintained at) 0.2% of total assets. NII/Assets = 2%, NonII/NII = 20%, OC/(NII+NONII) = 60%. In the year just completed, it has experienced higher than usual loan losses and the CIC was $0.01 billion. It pays a tax rate of 30 per cent. (Because it leases buildings and equipment, these costs are included in operating costs (OC) and there is no depreciation cost). It anticipates real growth in assets of 2 per cent p.a.. While it paid a reduced dividend this year of $0.1 billion, it expects to be able to pay a dividend next year of $0.19 while maintaining its equity/RWA at the target level. It plans to finance required increases in its capital base from retained earnings.

Hypothetical Bank Financial Statements (2021: $ Bill)

*Balance Sheet*

| Assets | | Liabilities | |
|---|---|---|---|
| Cash | 2 | 18.7 | Deposits |
| Mortgage Loans | 10 | | |
| Personal Loans | 1 | | |
| Business Loans | 7 | 1.3 | Equity |
| Total Assets | 20 | 20 | Total Liabilities |

* Loan Loss Provisions = 0.04

*Income Statement*

| | |
|---|---|
| NII | 0.4 |
| NONII | 0.08 |
| OC | 0.29 |
| Earnings pre CIC | 0.192 |
| CIC | 0.01 |
| PBT | 0.182 |
| Tax | 9.055 |
| PAT | 0.127 |

## Valuation Methods

There are three commonly used approaches to valuing company share prices – and these are also used in the case of banks (albeit with some modifications).

### Dividend Discount Model

The first is the dividend discount model (DDM) which is based on the assumption that the share price should be equal to the present value of expected future dividends. This requires both a forecast of future dividends and an estimate of an appropriate required return on equity to derive the discount rate. Denoting $E_0(D_t)$ as the date zero expectation of the future dividend at date t, and r as the discount rate, the current (date zero) share price ($S_0$) is given by:

$$S_0 = \sum_{t=1}^{\infty} \frac{E_0(D_t)}{(1+r)^t}$$

A simplified version of the DDM (often referred to as the Gordon growth model) is derived from assuming that dividends will grow at a constant rate forever, leading (after some algebra) to an estimate of the share value $S_0$ given in the simplest case by:

$$S_0 = D_1/(r-g)$$

where $D_1$ is the dividend to be paid at the end of the current period, r is the required return on equity per period, and g is the growth rate per period of dividends. If dividends are paid half-yearly (as is typical in Australia) the required return and growth rate are rates per half-year (approximately half the annual rates)[12]. If the date of valuation is partway through a period, the valuation can be done by calculating the share value as at date 1 (using $D_2/(r-g)$ and discounting the sum of that value plus $D_1$ back to the current date.

One complication in using the dividend growth model in the case of banks arises from the requirement for the bank to maintain its desired capital ratio. Dividend payments may be constrained by the need to retain earnings to accumulate capital if the bank is growing rapidly. More detailed modelling of earnings prospects and capital needs is warranted for forecasting expected future dividends.

### Hypothetical Bank Example

Hypothetical expects to pay a dividend in one year of $D_1$ = \$0.085 billion and for that dividend to grow at g = 4 per cent p.a. (reflecting inflation of 2 per cent and real growth of 2 per cent). The assumed required return on equity is r = 10 per cent p.a. Then, $S_0$ = \$0.085/(0.10-0.04) = \$0.085/0.06 = \$1.417 billion. (This compares with a book value of equity of \$1.3 billion).

Dividends in any period are equal to earnings (E) for that period multiplied by the dividend payout ratio (d). Thus, an alternative (equivalent) approach is to forecast future earnings and make some assumption about future payout ratios. Dividends tend to be "sticky" in dollar terms, which suggests a higher payout ratio in periods of low earnings, But as the Australian banking experience during the Covid crisis demonstrates, when the major banks were advised by APRA to limit dividends, leading some to suspend dividends, this is not always so.

[12] In theory, since compounding applies the half yearly rate ($r_{sa}$) should be calculated from the annual rate ($r_a$) using $(1+r_{sa})^2 = (1+r_a)$. Generally, using half the annual rate should not matter a great deal, particularly given the uncertainty over what is the appropriate values of $r_a$ and the growth rate.

### "Multiples" Approaches

One of the most commonly used valuation techniques is to apply an industry-wide price earnings (PE) multiple to expected (annual) earnings of the bank. Thus, for example, if banks normally trade on a PE multiple of 10, then a bank with expected earnings for the coming year of $2 billion will have a valuation of $20 billion.

The PE approach can be linked back to the DDM in the following way, using the Gordon growth model. Letting d represent the payout ratio, D = dE, and then P = D/(r-g) = dE/(r-g) giving P/E = d/(r-g). If, for example, the bank has a payout ratio of unity (d=1) and dividend growth of zero then P/E = 1/r, ie the inverse of the discount rate. A higher growth rate will lead to a higher PE ratio. Note that if the dividend payout ratio is lower this should lead to a higher growth rate as retained earnings augment the capital ratio and can be used to generate higher future earnings.

#### *Hypothetical Bank Example*

Hypothetical has expected after tax earnings for the coming year likely to be in the order of $0.14 billion (which is around $0.01 billion higher than 2021's figure which was affected by the unusually high CIC in that year). If the current P/E multiple for the banking sector was, say, ten, this would lead to a valuation of $1.4 billion.

An alternative multiples approach is to use "market/book" (MV/BV) multiples. If the average listed company in the sector (in this case banks) has an MV/BV multiple of say 1.25, then the implied market value of the bank under consideration is easily calculated. In the case of Hypothetical with a BV = $1.3 billion, this would give MV = $1.625 billion. Of course such a simplistic approach assumes that the bank is an "average" bank – and the strength of any analyst in undertaking a valuation should hopefully be in identifying why and by how much the bank is different from the average.

### Net Present Value (NPV) Modelling

Typically company valuation will proceed by estimating the present value of future operating cash flows of the company using a weighted average cost of capital approach. This gives the value of debt plus equity, and the value of equity is then derived by subtracting the market value (or book value) of debt outstanding. Given the very high leverage of banks and the problems of estimating the true total cost of non-equity funds (deposits) because of associated operating costs, it is preferable to estimate the present value of cash flows available to equity directly using the cost of equity capital as the discount rate.

Since banks have relatively little in the way of physical assets/ total assets and thus depreciation expenses are relatively low, earnings (profits) can be used as a proxy for cash

flows (with care!). Expected earnings can be calculated for future periods using the relationship:

Profit = Net Interest Income + Fee Income - Non Interest Expense

and making forecasts of those variables (or their components for a more detailed analysis).

Because the focus of the valuation is upon cash flows to equity and banks must meet certain minimum capital requirements, it is important to recognise that all earnings will not be available for distribution to shareholders if growth is assumed and a target capital ratio is to be maintained. Over the forecast period, cash flows available to shareholders will be earnings less the required increase in capital.

It is obviously impractical to make forecasts out to infinity, so a common approach is to make annual estimates of cash flows for a specified number (eg 10) of years and then estimate a "terminal value" which is the assumed value of the entity at that time (ie 10 years hence). That substitutes for the present value of all cash flows from that time on, and hence is discounted along with cash flows up till that time to obtain the present value. In estimating a terminal value, subsequent earnings are generally assumed to be a perpetuity (or a growing perpetuity) enabling the use of the perpetuity formula. It is important to make consistent assumptions in calculating the terminal value. If future earnings are modelled in real (ie year 10 price) terms, a real cost of equity should be used in the perpetuity formula. If nominal earnings are modelled, the nominal cost of equity should be used. Some analysts will argue that it is preferable to assume that over such a long horizon, the forces of competition mean that it is best to assume that the firm will only be able to earn its required rate of return. Then the book value of equity at that date could be used as the terminal value of the stock price. That argument essentially implies that the firm can make above normal profits over some moderate horizon, giving a current market value above book value, but will eventually transition back to just earning normal profits.

The attached spreadsheet outputs provide an indication of the approach for Hypothetical Bank. Key assumptions are:

Bank Valuation: Hypothetical Bank

**Assumptions**

| | | | | |
|---|---|---|---|---|
| Cost of Equity | 10% | NII/Assets | 2% | |
| Fee Income/NII | 20% | OC/OI | 60% | |
| Inflation Rate | 2% | Loan Risk Weights | | |
| Company Tax Rate | 30% | Mortgages | | 0.5 |

| | | | |
|---|---|---|---|
| Real asset growth rate till 2028 | 2% | Personal | 1 |
| Real asset growth rate after 2028 | 2% | Business | 1 |
| Equity/RWA target | 0.1 | | |
| Provision/Loans | 0.002 | | |

| | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NII / Assets | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% | 2.0% |
| Assets ($ Bill) | 20.00 | 20.81 | 21.65 | 22.52 | 23.43 | 24.38 | 25.36 | 26.39 | 27.46 | 28.56 | 29.72 |
| Loans ($Bill) | 18.00 | 18.73 | 19.48 | 20.27 | 21.09 | 21.94 | 22.83 | 23.75 | 24.71 | 25.71 | 26.75 |
| Mortgage loans | 10 | 10 | 11 | 11 | 12 | 12 | 13 | 13 | 14 | 14 | 15 |
| Personal Loans | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Business Loans | 7 | 7 | 7 | 8 | 8 | 8 | 8 | 9 | 9 | 10 | 10 |
| Non-int expense/Operating Income | 0.29 | 0.30 | 0.31 | 0.32 | 0.34 | 0.35 | 0.37 | 0.38 | 0.40 | 0.41 | 0.43 |
| NII ($ Bill) | 0.400 | 0.416 | 0.433 | 0.450 | 0.469 | 0.488 | 0.507 | 0.528 | 0.549 | 0.571 | 0.594 |
| Fee & Other Income | 0.080 | 0.083 | 0.087 | 0.090 | 0.094 | 0.098 | 0.101 | 0.106 | 0.110 | 0.114 | 0.119 |
| Operating Income | 0.480 | 0.499 | 0.520 | 0.541 | 0.562 | 0.585 | 0.609 | 0.633 | 0.659 | 0.686 | 0.713 |
| OC | 0.288 | 0.300 | 0.312 | 0.324 | 0.337 | 0.351 | 0.365 | 0.380 | 0.395 | 0.411 | 0.428 |
| Underlying Earnings | 0.192 | 0.200 | 0.208 | 0.216 | 0.225 | 0.234 | 0.244 | 0.253 | 0.264 | 0.274 | 0.285 |
| Credit Impairment Charge | 0.010 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| Operating Profit | 0.182 | 0.198 | 0.206 | 0.215 | 0.223 | 0.232 | 0.242 | 0.251 | 0.262 | 0.272 | 0.283 |
| Income Tax | 0.055 | 0.059 | 0.062 | 0.064 | 0.067 | 0.070 | 0.073 | 0.075 | 0.078 | 0.082 | 0.085 |
| Net Profit after tax | 0.127 | 0.139 | 0.144 | 0.150 | 0.156 | 0.163 | 0.169 | 0.176 | 0.183 | 0.191 | 0.198 |
| Terminal Value | | | | | | | | | | | 2.4782158 |
| PV of Terminal Value | 0.95546 | | | | | | | | | | |
| RWA Capital Target | 1.305 | 1.358 | 1.413 | 1.470 | 1.529 | 1.591 | 1.655 | 1.722 | 1.791 | 1.864 | 1.939 |
| Dividends Payable | 0.050 | 0.086 | 0.090 | 0.093 | 0.097 | 0.101 | 0.105 | 0.109 | 0.114 | 0.118 | 0.123 |
| PV of Dividends Payable | | 0.078 | 0.074 | 0.070 | 0.066 | 0.063 | 0.059 | 0.056 | 0.053 | 0.050 | 0.047 |
| Sum of PV of Dividends Payable | 0.617 | | | | | | | | | | |
| PV of Terminal Value | 0.955 | | | | | | | | | | |
| Total PV | 1.572 | | | | | | | | | | |

One of the key elements of this approach is to note that the bank will have a capital target each year (reflected in its ICAAP) and that dividends are constrained by the need to retain sufficient earnings to meet that target.

The assumptions built into this valuation lead to a value for Hypothetical Bank of $1.572 billion. It is also worth noting (as shown in the spreadsheet itself in Figure 6 which can be opened) - that the terminal value, which is calculated under the assumption that the year 10 real earnings are maintained in perpetuity and discounted at a real cost of equity of 8 per cent, is 1.28 times the book value at that time (which is given by the capital target for that year). Using the book value as the terminal value would clearly have a significant negative effect on the current valuation – showing how sensitive the valuation estimates are to the assumptions made.

Microsoft Excel Worksheet

**FIGURE 6: HYPOTHETICAL BANK VALUATION SPREADSHEET**

## Triangulation

Even though the Hypothetical Bank example is purely fictitious, the different results derived from alternative modelling approaches lead to an important point. If the different approaches give substantially different results, it is important to revisit the assumptions in the models to identify determinants of the discrepancies. If the assumptions of each are correct (ie we have perfect foresight) then each approach should generate the same valuation. In reality, we should check if the assumptions are consistent across the alternative approaches, and if not adjust assumptions as appropriate to get a better convergence of valuations.

In the case of Hypothetical, the NPV approach gave a value of $1.57 billion, the earnings multiple approach suggested $1.4 billion, the market/book multiple indicated $1.625 billion, and the dividend discount model generated a $1.417 billion valuation. If that range of valuations was felt to be too great (and it may not be given that the uncertainty of the future can be expected to generate uncertainty about current value) then various assumptions (such as lowering the M/B ratio used, or replacing the terminal value in the NPV approach with the book value at that date) could be adjusted. Of course, these should not be arbitrary adjustments, but based on careful analysis of the merits of those assumptions.

## Recent Bank Sale Price Valuations

While bank analysts are regularly providing valuations of banks, a critical test of a bank's value is what a purchaser is willing to pay for it. Unfortunately, there have been very few public sales of Australian banks in recent decades which provide such information.

The most recent has been the purchase of ME Bank by the Bank of Queensland in 2021. The purchase price was $1.325 billion which was 1.05 times book value and implied a P/E multiple of 11.9 times. Since ME Bank was not listed on the ASX (being owned by institutional super funds) there was no prior market price to compare the acquisition price with.

St George Bank "merged" with Westpac in December 2008, with St George shareholders receiving 1.31 Westpac shares for each share they had held, implying a purchase price of approximately 2.7 times book value. The Independent Expert's report is available here and illustrates the use of the various methods of valuation (and role of assumptions about future scenarios) discussed earlier. BankWest was bought by CBA in October 2008 for $2.8 billion which was around 80 per cent of the book value (reflecting the "distressed sale" nature of the transaction.

In November 1995, Westpac bought Challenge Bank and then the Victorian banking business of Challenge Bank (not the whole bank) were purchased by Bank of Melbourne from Westpac. The deal involving a $69 million goodwill component (ie in excess of shareholders funds) and a total price of around 1.7 – 2.0 times book value. (The final purchase price could be adjusted dependent on future deposit growth).

Westpac subsequently purchased the Bank of Melbourne in 1997 for $1.43 billion (see here) which was a premium of approximately 20 per cent on the current share market value. The purchase price was almost twice the book value of the bank's equity .

The "good" assets of Bank of South Australia were purchased by Advance Bank in June 1995 and Advance Bank was subsequently purchased by St George Bank in November 1996.

# Appendix 1 Bank Licensing, Regulation, and Prudential Standards

## Main Australian Legislative/Regulatory Requirements

### Legislative

- Corporations Act
  - Requirement for Australian Financial Services Licence (AFSL) to provide financial products and services
- National Credit Code
  - Australian Credit Licence required to supply credit or give advice re credit (Note: credit not a financial product under Corps Act )

### Regulatory requirements

- ASIC: market conduct, financial consumer protection
  - Manages AFSL and ACL licensing
  - Produces regulatory guides
- APRA: prudential regulator
  - issues ADI and other licences
  - Produces &enforces prudential standards

### Financial entities also need to consider:

- ALM/CFT obligations – AUSTRAC
  - CBA experience of $700 mill fine in 2018!
- Cartel/Competition regulation – ACCC
  - ANZ $2.5 bill equity issue in 2015 leading to criminal cartel charges laid in 2018 against ANZ, Citigroup and Deutsche Bank and senior executives. (Also civil proceedings by ASIC regarding breach of continuous disclosure obligations)
- External dispute resolution – AFCA
  - If internal dispute resolution process (required for AFSL or ACL) fails. (AFCA a merger of FOS, COSL, SCT)

- Foreign jurisdiction legislation/regulations

## Appendix 2 APRA Standards for ADIs

In recent decades, with the progression of the Basel Accord from Basel 1 to Basel 3, there has been a virtual explosion in the number (and detail) of prudential (and other) standards produced by APRA with which ADIs must conform. They cover the following areas – with the various standards grouped by the following categories with numbering as indicated below:

- Capital (1xx)
- Economic and Financial Statistics (7xx)
- Financial Statements (3xx)
- Governance (3xx and 5xx)
- Other Requirements (a range of numberings)
- Risk Management (2xx)

As well as the prudential standards applying to ADIs (labelled as APSxxx) there are Consolidated standards applying to a wider range of institutions (labelled as CPSxxx). These have legislative backing (and can be found at www.legislation.gov.au by following the links from the APRA website). In addition, there are:

- Prudential Practice Guides (APGxxx and CPGxxx)
- Reporting Standards (ARSxxx)
- Reporting Forms (ARFxxx amd CRFxxx)

While this labelling system is consistent, such that (for example) the Capital Adequacy Standard is APS110 and the Liquidity Practice Guide is APG210, there are some unusual cases such as the Aggregate Risk Exposures prudential standard which is labelled 3PS221. The use of "3" as the starting number reflects the fact that these documents apply to institutions at the consolidated level - known as "level 3" in APRA terminology.

The complete list of standards for ADIs, as at January 2021, are shown in the screen shots from the APRA website on the following pages. Note that revisions are made to standards and new standards introduced from time to time.

Many of the standards are voluminous and complex and it is easy to understand why smaller ADIs complain of the costs of compliance with regulation – which many argue is one cause of mergers and the decline in the numbers of smaller ADIs. Offsetting these costs somewhat, Industry Associations, Law Firms, and consultants provide services helping Boards and Senior Management to understand compliance

requirements (and "good (or best) practice" – which naturally goes beyond compliance). At the same time, the emergence of a number of new small banks in recent years indicates that the cost of compliance is not prohibitive to new entrants.

The process for becoming licensed as a bank )or ADI) is set out on APRA's website. Authorisation under section 9 of the Banking Act is required, and use of certain words such as "bank" and "ADI" is restricted to authorised ADIs. (Thus use of the term "investment bank" is restricted). In 2018 APRA allowed a new category of *restricted licence* (explained here) enabling small institutions to undertake a restricted range and scale of banking activities prior to applying for a full licence within two years. Prior to that APRA allowed mutual ADIs above a certain size ($50 million capital) to rebrand themselves as mutual banks, and subsequently removed the minimum size restriction.

It should also be noted, that as well as APRA regulations, ADIs, as registered companies, must meet various requirements imposed by ASIC. As well as the usual requirements applying to any company, there are others such as those associated with having an Australian Financial Services Licence (AFSL) and an Australian Credit Licence (ACL).

## Capital

110 Capital Adequacy
APS 110 APG 110 ARS 110.0

110 Internal Capital Adequacy Assessment Process and Supervisory Review
CPG 110

111 Capital Adequacy: Measurement of Capital
APS 111 ARS 111.0

112 Capital Adequacy: Standardised Approach to Credit Risk
APS 112 APG 112 ARS 112.1 ARS 112.2

113 Capital Adequacy: Internal Ratings-based Approach to Credit Risk
APS 113 APG 113 ARS 113 ARS 113.1 ARS 113.2 ARS 113.3 ARS 113.4

114 Capital Adequacy: Standardised Approach to Operational Risk
APS 114 APG 114 ARS 114

115 Capital Adequacy: Advanced Measurement Approaches to Operational Risk
APS 115 APS 115 APG 115 ARS 115

116 Capital Adequacy: Market Risk
APS 116 APG 116 ARS 116

117 Capital Adequacy: Interest Rate Risk in the Banking Book (Advanced ADIs)
APS 117 APG 117 ARS 117.0 ARS 117.1 ARS 117.1

118 Off-balance Sheet Business
ARS 118 ARS 118.1

120 Securitisation
APS 120 APS 120 APG 120 ARS 120.1 ARS 120.2

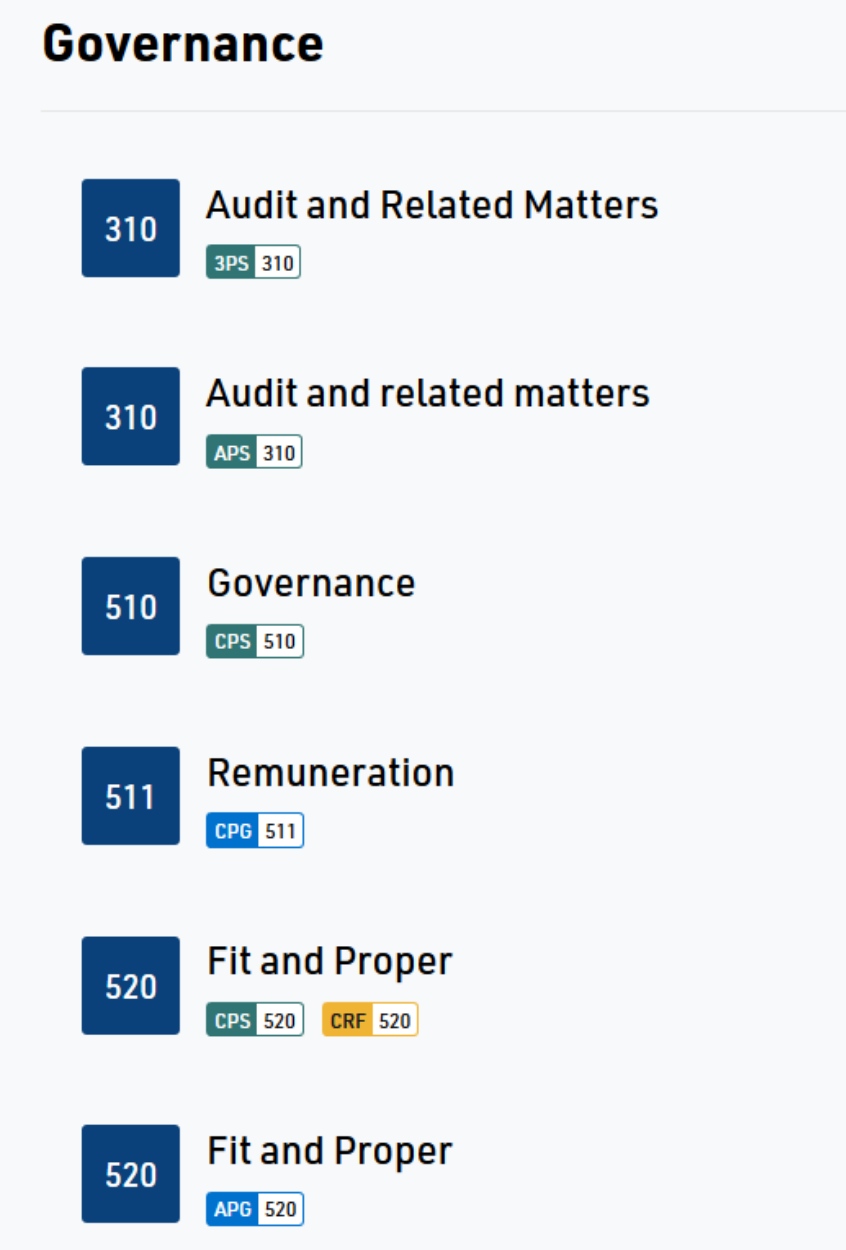
121 Covered Bonds
APS 121

180 Capital Adequacy: Counterparty Credit Risk
APS 180 ARS 180

*Source:* https://www.apra.gov.au/industries/1/standards#category-1


*Source:* https://www.apra.gov.au/industries/1/standards#category-6


*Source:* https://www.apra.gov.au/industries/1/standards#category-5




*Source:* https://www.apra.gov.au/industries/1/standards#category-2


*Source:* https://www.apra.gov.au/industries/1/standards#category-4



*Source:*

https://www.apra.gov.au/industries/1/standards#category-3

# 7. The Hayne Royal Commission and Banking

## Contents



## 7.1 Introduction

The Royal Commission into "Misconduct in the Banking, Superannuation and Financial Services Industry" under Justice Kenneth Hayne (hereafter referred to as the Hayne RC or RC) was a damning indictment of bad behaviour in the finance sector – with the banking sector a prime offender. It was established in December 2017 and provided its Final Report in February 2019 after almost a year of hearings. It made 76 recommendations including: 17 regarding banking, 10 regarding financial advice, 9 regarding superannuation, 15 regarding insurance, 7 regarding culture, governance and remuneration, and 14

regarding regulators. The government accepted and agreed to act on most of the recommendations – with a few significant exceptions. In December 2020 legislation was passed enacting around twenty of the recommendations.

The following sections cover: the background to the establishment and method of the RC; the main findings of misconduct by RC; the RC's assessment of the causes of misconduct; the recommendations of the RC and their implementation; an assessment of the likely lasting effects on banking in Australia.

## 7.2 Background to the Royal Commission

For several years, various politicians and commentators, reacting to reports about mistreatment of financial consumers by advisers, banks and insurers, had been calling for a Royal Commission. Some (myself included) doubted the need for a RC, arguing that misconduct could be investigated and prosecuted by ASIC. (In hindsight, the RC identified many issues that had not received proper public attention and where the regulator had not been sufficiently able to or active in pursuing and prosecuting wrongdoing). The federal government and the financial sector had been opposed, but ultimately the government's hand was forced when the major banks, hoping to call a halt to a plethora of other inquiries advocated the creation of the RC.

The terms of reference, and short time allowed, for the RC limited what it could investigate. It was only charged with investigating the period since the GFC (2007 onwards) which meant that many dubious financial sector activities in the years prior to that time were not examined. ADIs, Financial Advice firms and Insurers and intermediaries between borrowers and lenders were clearly targets for the RC given prior exposures of misconduct – and the government also included superannuation in, what appeared to be a political move reflecting its antipathy to unions, hoping to find problems with the industry super funds. The misconduct to be investigated included not just breaches of law and regulations but also behaviour falling below community standards and expectations (but without providing guidance on what such standards and expectations might be).

The process of the RC involved:

- Commissioning of thirty background papers providing valuable information on the financial sector
- collection of internal (otherwise confidential) documents and submissions from financial firms
- receipt of (over ten thousand) submissions from the public about financial firm misconduct
- hearings in which case studies of such misconduct were presented

- hearings in which financial firm representatives and regulators were subject to detailed examination by the legal counsel assisting the Commissioner
- production of interim and final reports, with the latter including recommendations to the government
- confidential remittal to public prosecutors of cases identified where prosecution is warranted

It is worth noting that, prior to the announcement of the RC, APRA had in August 2017 initiated a prudential inquiry into governance, culture and accountability at CBA in response to a number of matters which had damaged the bank's reputation. These included poor financial advice, unfair denial of insurance claims, miss-selling of financial products and allegations of major failings in its compliance with ALM/CTF requirements. (In December 2017 CBA admitted ALM/CTF compliance failings, ultimately leading to a major fine). While ALM/CTF was not a subject of the RC, the other issues were on its agenda. The APRA inquiry (which led to it requiring self-reviews by other major banks) focused attention on governance, culture, and risk management failings in large financial institutions, which the RC ultimately determined as factors relevant to explaining the pervasiveness of misconduct.

Essentially, the RC had three main tasks. First it was to investigate the extent of misconduct and misbehaviour. In doing that its hearings focused on the areas of Consumer Lending; Financial Advice; Lending to SMEs; Financial Services provided to Regional and Remote Communities; Superannuation; Insurance; and Causes of Misconduct and Regulatory Considerations. Second, it was to try and find explanations and causes for misbehaviour and misconduct. Third, based on those findings, it was charged with making recommendations which, if implemented, would prevent repetition of such behaviour.

## 7.3 Types of Misconduct

As noted above, the Hayne RC had to examine not just breaches of law and regulations, but also conduct falling short of community standards and expectations. That can be best interpreted as conduct which people would generally regard as not fair. At one level that could involve institutions exploiting a power imbalance to capture a disproportionate share of the "gains from trade" where consumers might still benefit from the interaction with the institution, but not as much as might be thought appropriate or available elsewhere. More serious are cases that involve institutions making profits at the expense of financial consumers (ie making them worse off) by (for example): selling them unsuitable products; charging fees which were not warranted; not meeting expected obligations associated with products and services sold; providing poor or inadequate information and advice leading to poor consumer outcomes. Some of these activities were clear violations of law or regulations, but many fell into that "grey" area,

common with principles-based regulation, where the intent of the law was breached, but not in a way that a clear violation could be proven. And a common response was that such breaches were not intentional but reflected undetected flaws in operating systems and procedures. All of those activities and more were found to have occurred in abundance and are briefly outlined below!

Before considering those areas though, it is worth noting a particular feature of financial products and services which are being provided to customers who (commonly through no fault of their own) do not have the information or ability to fully assess the value and risks involved, and are dealing with "expert", knowledgeable providers. Those providers may have incentives to overcharge for the quality of the product (including delivering an inferior quality), or recommend a supply of the product different to what the customer needs. This information asymmetry is a feature of what are referred to as *credence goods*, where the purchaser may not even be able to assess the quality after the purchase. (Medical treatment and car repairs are oft-cited examples). Balafoutas and Kerschbamer (JBEF, 2020) provide a recent survey noting "evidence from the field suggesting that expert sellers exploit their informational advantage in order to increase their profits at the expense of uninformed consumers". Financial advice, insurance, and wealth management are areas where "experts" possess such an information advantage. In a number of the examples outlined below, many customers did not even know that they had been exposed to losses due to the poor behaviour of the financial institutions they had dealt with. While not all financial products and services are credence goods, the problem of asymmetric information between provider and purchaser is pervasive.

## Fees for No Service (FFNS)

Commissioner Hayne described several types of activity by banks and financial advisers as "taking money for nothing". The common practice of advisers (including in some superannuation scheme arrangements) of charging their clients an annual fee for managing their affairs, such as involving an annual review, but not actually having provided any such services over the year was one example. ASIC had reported on its investigations into this in 2016 and reported in 2019 that it had been unable to get the major banks and AMP (the chief offenders) to quickly rectify such problems and provide remediation to customers. The Hayne RC induced more concerted efforts by those institutions to resolve the issue (and led to legislation in March 2021 aimed at preventing repetition of FFNS). As well as paying large amounts of remediation to customers, incurring significant resource costs in identifying and dealing with cases, and in some cases incurring fines and being required to enter enforceable undertakings (EUs) to take specified actions, the banks accelerated their exit from financial advice subsidiaries.

Another was numerous instances of advice, management and insurance fees being charged by major bank wealth management divisions and AMP to superannuation accounts of dead customers. Arguments that these resulted from deficiencies in systems and lack of reporting of deaths, rather than reflecting a pursuit of profit were generally found by regulators to be wanting (particularly given the long time such practices had continued in many cases).[1]

Precise figures on the costs which Australian financial institutions have incurred by way of remediation payments and associated expenses for these specific types of misconduct are hard to calculate (since they are often reported as part of broader provisions etc). But it seems clear that they are approaching $10 billion or more for the industry. (For comparison total annual profits of the four major banks in 2019 was $26.9 billion).

## Sales of Unsuitable Products (including "Add-On" Insurance)

The Hayne RC observed many instances of sales of unsuitable products. Insurance products were one such area. Funeral insurance, for example, often sold to very young people, generally had a very low "money's worth" feature, meaning that the ratio of claims paid to insurance premiums received was very low, and there was a high rate of cancellations.

A common practice exposed by the Hayne RC was that of sales of "add-on" insurance at the time of purchase of a product. One example is a contract (policy) providing an extended warranty period following purchase of a car or a white good. The available data indicates that, in general, such insurance is not worth anywhere near the money paid for the policy with overall payouts being a quite small proportion of policy premiums received. By being sold at the time of the product purchase, there was considerable evidence of high-pressure sales tactics often of unsuitable insurance which would be difficult for the customer to claim against.

One particular type of "add-on" insurance is "consumer credit insurance" or "payments protection insurance " (PPI) which has been a cause in the UK of large penalties and remediation expenses incurred by banks (see Chapter 25). Supposedly, such insurance provides protection if a credit card user or borrower finds themselves in circumstance which make them unable to meet repayment obligations. But, generally, terms and conditions were specified in such a way as to make it exceedingly difficult to claim. This was also found to be a problem in Australia by the RC, with examples (sixty-four thousand at one

[1] One response aimed at reducing exposure to such risks of breaches of law (and good conduct) has been the creation by a private business of an improved "deaths registry" available to financial institutions.

bank) of unemployed credit card applicants being sold such insurance, despite their unemployment being a condition which would preclude them from being able to make a claim.

The Hayne RC recommended that a "deferred sales" model be required, such that add-on insurance could not be sold at the time of the product sale, but only after some specified elapse of time. While the government passed legislation in December 2020 specifying a required time gap of 4 days, it has since provided a number of exemptions to that legislation for certain insurance products which consumer groups assert are unwarranted.

The RC also found many instances of unsuitable lending practices, violating responsible lending obligations (RLOs), including undue reliance on information about borrower's payment capacity submitted by intermediaries (such as mortgage brokers, or "introducers")[2]. Offers of special, low, interest rates for transferring the balance owed to another bank on a credit card to a new credit card of the offering bank, have also been subject to concern. Marketed as a "debt solution", the minimum monthly repayment requirements and complex arrangements for determining how the low rates apply when new borrowings interact with the transfer balance raise questions of suitability of such offers.

Given its mandate, and time limitations, the Hayne RC did not focus on sales of unsuitable investment products or securities or derivative products. That is an area which has been, and remains, of concern for financial consumer protection (see Chapter 25).

## "Hawking" of Financial Products

A harmful practice identified by the Hayne RC was consumers purchasing unsuitable products as a result of "offers to sell or issue financial products to a retail client in the course of, or because of, unsolicited contact". Case studies identified such "hawking" of superannuation and insurance products as particular areas of concern, although offers of securities or interests in managed investment schemes are also relevant. The December 2020 legislation (to commence in October 2021), reflecting the RC's recommendations, imposed a general ban on financial product hawking.[3]

This is a potentially problematic area which impacts upon sales practices of financial institutions. Banks and other financial institutions had adopted sales and marketing practices giving staff incentives to try and sell customers additional products and services with an objective of capturing a "larger share of wallet". If a bank customer purchasing a particular product (eg a term deposit) is advised about and

[2] Some banks provided remuneration to third parties (including hairdressers or other providers of services) who "introduced" a potential borrower to the bank, leading to a loan.

[3] Because "credit" is not defined by law as a financial product or service, unsolicited offers to lend money would appear to fall outside the hawking prohibitions!

offered an additional product (eg a bank issued security) without requesting it – is that "hawking"? The explanatory memorandum for the December 2020 legislation indicates that it intends to "clarify the definition of hawking for a financial product to include selling of a financial product during a meeting, call or other contact initiated to discuss an unrelated financial product".

Also problematic is the issue of how retail customers obtain information about the existence and features of financial products of which they have had no prior experience or knowledge. Advertising and marketing of financial products is not considered hawking – as long as it is merely a provision of information and does not incorporate an explicit offer of sale or invitation or request for the customer to purchase. So, in the case of the bank employee referred to above, providing information about the product is not "hawking", but providing (for example) an application form if that has not been requested most likely constitutes hawking. Nor would a registered financial adviser issuing securities to a client as part of providing advice be considered "hawking" because of their requirement to act in the best interests of the client.

The explanatory memorandum for the legislation provides a number of explicit examples which illustrate how difficult it can be to draw the boundary between hawking and non-hawking. A consequence for financial institutions is the need for significant investment in staff training to create awareness of the boundary.

## Commission Payments and Remuneration Practices

The Hayne RC highlighted the inconsistency in the wide-spread practice of agents in the financial sector supposedly acting in the best interests of their clients, but receiving remuneration from other parties whose products and services they were recommending or selling to their clients. The practice was common in the areas of mortgage broking, financial advising, wealth management and insurance. For example, mortgage brokers receive remuneration in the form of an up front and trailing commission from the bank with whom their client takes out a loan – giving a self-interested broker an incentive to direct clients to banks offering the best commissions – even if that was not the best deal for the client. The same applies for insurance brokers (although in years gone by many insurance agents sold products of only their employing company, thus somewhat lessening the problem). Likewise with financial advisers who could direct clients to invest in financial products generating the best commissions (including "in-kind" or "soft" commissions)[4] for the adviser. The agent needs a strong "moral compass" to avoid putting their own self-

[4] In-kind or soft commissions could include the product manufacturer providing the adviser with free access to computer software, entertainment, travel to conferences etc.

interest ahead of the best interests of the client. While law and regulations might try to ensure that client interest takes precedent, it can be very difficult to prove violation of that principle.

Such practices emerge because the remuneration of the agent does not then involve an explicit payment by the client – which, if required, might deter them from using the services of the agent. While informed clients should be aware that they are, in some way, indirectly bearing the cost of using the agent, few would be aware of how much that cost might be. Similarly, few would be aware of the conflicts of interest which such remuneration practices create and which can work to their disadvantage.

For example, if commissions are positively linked to the size of a product, the agent has an incentive to recommend a larger sized product to the client. Unless the size of trail commissions relative to up-front commissions deter such behaviour, the agent will have an incentive to "churn" the client – swapping them between products to maximise commission income.

Justice Hayne was firmly of the view that to avoid such conflicts of interest, the client should be the one paying the remuneration of the agent, and made recommendations aimed at changing commission arrangements and ensuring adherence to client "best-interest" responsibilities.

As well as financial advisers, high commissions were also paid by insurers to car dealers for sales of "add-on" insurance products. Car dealers (and also retail outlets) also received remuneration from banks via the practice of them signing up car purchasers to loans to finance the purchaser, under the "Point of Sale" exemption. This exemption, initially introduced as a temporary measure in 2010, meant that such entities could act as a loan intermediary without having an Australian Credit Licence (or being a representative of an ACL holder) and thus avoiding a range of resulting (consumer protection) requirements. Often that remuneration came via interest rate on the loan exceeding the bank's base rate for such deals, with the dealer benefitting from the difference via commission payments from the bank.

## Claims Handling and Settlements

One of the features of financial products is that they involve future cash flows, which may be contingent on certain events – such as in the case of insurance. Financial consumer harm can occur when the provider of the product (such as an insurer) does not abide by the terms of the contract – or has written the contract in such a way that consumers are unaware that certain claims, which the consumer expects will be met, are excluded from the coverage. This issue had already been a cause of concern with regard to life insurance, with a Parliamentary Inquiry into it commencing in September 2016, and ASIC report 498 being published in October 2016. Similar concerns existed for the general insurance industry – and had become a major issue of contention over the lack of coverage of flood damage in home insurance policies.

Bushfire natural disaster related claims were one focus of the RC with issues arising surrounding house replacement and temporary accommodation arrangements. Substantial concerns also existed in the settlement practices over workers compensation claims and total and permanent disability (TPD) claims.

Even where ASIC had concerns over such practices, it was unable to act to resolve those because of an anomaly in the legislation that did not include claims handling and settlement as a financial product – putting the area beyond ASIC's remit. As well as the insurers involved, other entities involved in the claims handling process include intermediaries acting on behalf of, or providing advice to, claimants as well as third parties to whom some of the handling and settlement processes have been outsourced. All of these entities face compliance and licensing requirements as a result of the RC recommending that claims handling should be classified as a financial product.

The RC exposed a number of case studies of poor claims settlement practices. In some cases insurers took several years, and only after multiple complaints, to pay income protection claims resulting from an event resulting in disability. In others, the definition of trauma used was so restrictive as to enable the insurer to avoid making expected payments. A general concern was that claims officers had incentives to find reasons to avoid the insurer making a payment to the insured. Another was the way in which terms and conditions were written so as to enable the insurer to avoid a payment which the insured could reasonably be expected to be received.

## 7.4 Causes of Misbehaviour

Before discussing the RC's analysis of the causes of misbehaviour, it is worthwhile noting that there is a substantial literature examining determinants of outcomes in markets for credence goods. In their survey Balafoutas and Kerschbamer (JBEF, 2020) illustrate how different outcomes regarding under-servicing, over-servicing, over-pricing, cheating can emerge depending on specific market characteristics. These include *inter alia*: the nature of liability rules; verifiability of outcomes; presence or absence of sellers who have preferences incorporating social outcomes rather than just self-interest; relative numbers of informed versus uniformed customers; competitive conditions in the market; the degree of asymmetry of information.

These are clearly important considerations, but most of those studies do not focus on the nature and conduct of the organisation which is the ultimate seller of (in the current context) financial products and services and credit – employing and motivating sales staff via remuneration structures and KPIs etc. And

that was the focus of the Hayne RC, since it was directed to examine bad behaviour of banks and other financial **entities**, rather than primarily bad behaviour of individuals.

In its Final Report (pages 1-3), the RC made clear its perspective on the underlying cause of problems.

> "First, in almost every case, the conduct in issue was driven not only by the relevant entity's pursuit of profit but also by individuals' pursuit of gain, whether in the form of remuneration for the individual or profit for the individual's business. Providing a service to customers was relegated to second place. Sales became all important.".[5]
>
> "Second, entities and individuals acted in the ways they did because they could…. There was a marked imbalance of power and knowledge between those providing the product or service and those acquiring it."
>
> "Third, consumers often dealt with a financial services entity through an intermediary…. [who is] paid by, and may act in the interests of, the provider of the service or product."
>
> "Fourth, too often, financial services entities that broke the law were not properly held to account."

Davis (ELRR, 2019) describes the institutional failings found by the RC as follows.

> "Competency standards were not always adequate and business remuneration models gave rise to conflicts of interest which were not necessarily disclosed to the customer. Governance arrangements were inadequate to ensure that ethical standards and behavioural objectives professed by company leaders were maintained throughout the organisation. Legal and regulatory complexity allowed for unscrupulous actors to find loopholes for personal enrichment at the expense of customers. Regulatory enforcement practices did not appear to provide adequate punishment nor general deterrence to inhibit unacceptable behaviour. Self-regulation by industry and professional associations failed to prevent misconduct and poor behaviour (at least partly attributable to self-interest of decision-makers in those bodies)."

[5] It is perhaps worth noting that the "not-for-profit" institutions, mutual ADIs and industry superannuation funds, emerged largely unscathed by the RC (although that is not to say that further investigation might not have identified problems of misconduct by some).

## 7.5 The Recommendations and Government Response

The RC Final Report provides 76 recommendations most of which it indicates (page 43) can be classified under the headings of:

> " • How can the law be simplified so that its intent is met?
>
> • How should the approach to conflicts of interest and conflicts between duty and interest change?
>
> • What can be done to improve compliance and the effectiveness of the regulators? and
>
> • What more can be done to achieve effective leadership, good governance and appropriate culture so that financial services entities obey the basic norms of behaviour that underpin the proper regulation of the financial services industry?"

Some of the recommendations involved maintaining current regulations or supporting regulatory changes already underway or under consideration. Rather than attempting to summarise all the recommendations, this section focuses on a few which have either proven controversial or are particularly significant and novel, and of particular relevance to banks. Some others have also been referred to above, such as recommendations regarding "no hawking of financial products", "deferred sales model for add-on insurance", and claims handling being classified as a financial product.

### Responsible Lending Obligations (RLOs)

The RC recommended that the RLO regime should be maintained for the protection of retail borrowers, and this was accepted by the government. However, the government subsequently tried unsuccessfully in 2021 to remove the RLO regime.

### Remuneration

Concerns about conflicted remuneration and adverse incentives arising from remuneration models underpinned a number of RC recommendations. One was that that the borrower, not the lender should pay mortgage brokers, to give greater incentive for brokers to put the best interests of their clients first. The government rejected this recommendation following intense lobbying from the industry. More generally (and particularly for advice and insurance) the RC recommended that steps should be taken to remove conflicted remuneration, including supporting the recommendations of the 2017 Sedgwick Review (commissioned by the Australian Banking Association) regarding retail banking remuneration. The RC also recommended that APRA should increase attention to remuneration systems as part of its prudential regulation and supervision.

## Best Interest Duties

Conflicts between self interest of agents/intermediaries and interests of a client were seen as an important problem by the RC. It recommended legislative changes to ensure brokers act in best interests of borrowers. It was also recommended that mortgage brokers should be subject to the same legal and regulatory requirements as financial advisers.

## Point of Sale (POS) Exemption

The RC recommended that the POS exemption which enabled retail dealers in goods and motor vehicles to offer loans from banks, without having an ACL, should be abolished.

## Industry Codes of Conduct and Role of Industry Bodies

The RC recommended certain changes to industry codes of conduct, and that such codes should be approved and become enforceable by ASIC. The Australian Bankers Association made a number of changes to its banking code of conduct (which is being reviewed in 2021) as a result. In some sectors the mechanisms (or incentives) for industry bodies in disciplining members for poor behaviour were seen as inadequate and recommended for improvement.

## BEAR Product Responsibility

The RC recommended that in addition to other bank executives responsible for key areas being subject to the BEAR regime, an executive should be identified as having responsibility for all aspects of financial product design, delivery, and maintenance, as well as any resulting remediation requirements.

## Culture and Governance

Given the responsibility for misconduct and misbehaviour attributed by the RC to poor culture and governance, it is hardly surprising that several recommendations were directed towards this issue. However, other than exhorting financial entities to continuously pay attention to, and recommending APRA focus on, these topics, there is little regarding specific actions in the recommendations. Given the somewhat nebulous nature of these issues, a lack of detail is perhaps not surprising.

## Regulation and Supervision

The RC criticised ASIC and APRA for inadequacies in the performance of their duties. In particular, it suggested that ASIC should adopt a “why not prosecute” approach to misbehaviour instead, as had generally been its practice, of engaging with institutions to negotiate settlements, and agreeing enforceable undertakings to prevent re-occurrence of such behaviour. While ASIC initially appeared to adopt the recommended approach, it is unclear whether that is a better approach. As noted earlier, one issue with credence type goods is in identifying the extent and nature of wrong-doing,

including by receiving information from other industry participants, or by "self-reporting". Regulators need to take the effect of their enforcement and prosecution approaches on incentives in this regard into account in design and application of enforcement actions.

Relevant in this context are the resources available to, mandates of, and incentives and accountability of regulators. The RC made some recommendations regarding powers available to regulators and an accountability framework for regulators, but did not recommend increased resourcing of regulators unless the regular "capacity reviews" it recommended suggested such a need.

## Omissions from the Recommendations

It is worth noting that the RC did not make recommendations in a number of key areas. This is perhaps to be expected given its limited mandate and time, and the fact that "large" fundamental changes to the structure of the financial sector warrant more detailed scrutiny. However, having identified the pursuit of profit as a key cause of problems, it did not recommend any changes to the usual profit-orientation model of financial institutions which operate as joint-stock (eg ASX-listed) companies and which have received valuable "social licences" to operate as banks (or other types of financial institutions). It also did not recommend examining whether the "not-for-profit" area of the financial sector (eg mutual ADIs) could (or should) be encouraged as an alternative.

Also, while governance was seen as a major failing, the RC did not suggest any specific changes to governance models – which give primacy to shareholder interests. Adopting a "dual-board" model common in Europe, or other mechanisms to give other stakeholders (employees, customers) a measure of influence via board representation, were possibilities not pursued. Nor did the RC pursue the possibility of requiring bank boards to give priority to depositor interests (noting that equity only provides around 5 per cent of the funds used by a bank). Such a requirement applies in life insurance where boards are required to give priority to policy-holder interests.

By focusing on misconduct by suppliers of financial products and services (as per its mandate), rather than financial consumer protection, the RC did not explicitly consider measures associated with the demand side of the market, such as improving financial literacy and education.

The RC also did not provide any recommendations regarding structural restrictions on banks and other financial institutions. For example, it did not examine the consequences of vertical and horizontal integration – areas where many have argued that restrictions have merit on competitive or behavioural grounds. Perhaps this was unnecessary since the banks have since been going through a rationalisation

process of discarding "non-core" businesses (see Chapter 5) which have not proven as profitable as hoped and where many of the problems identified by the RC occurred. It also did not consider whether "ring-fencing" restrictions, such as applying in the UK (see Chapter 4), might have merit by limiting adverse cultural, remuneration, and behavioural spillovers from trading and investment banking activities (as well as hopefully improving financial system stability).

## 7.6 Consequences for Banks

Identifying potential consequences of the RC for banks is confounded by the concurrent implications of the fintech revolution and the ongoing agenda of financial regulatory change which was occurring independently of the RC.

While the reputations of banks suffered during the course of the RC, the Final Report did not appear to bring any unpleasant surprises in terms of recommendations adversely affecting future bank profitability and growth. (There was no significant decline in bank stock prices when the Report was released)!

In the short run, the "naming and shaming" and exposure of poor behaviour which inadequate internal governance mechanisms and "cultures" permitted, combined with increased regulatory scrutiny, has led to much greater attention being paid within banks to governance, culture, and compliance. Increased, or "tougher" regulatory and supervisory oversight is likely to persist. Banks had already decided that exiting from "non-core" businesses was a desirable strategy.

There is little if anything in the RC recommendations which would adversely affect the size and growth of "basic banking" – the process of intermediating between depositors and borrowers – by significantly affecting the costs associated with intermediation. Likewise, while the RC was primarily focused on harm caused to retail financial customers, there is little reason to expect any shift in the composition of intermediation – even though the relative profitability of past retail intermediation was part "illusory" when remediation payments are taken into account.

The RC coincided with a trend decline in profit rates and market/book ratios of the major banks, but it is unclear how much of that (which had been happening since around 2014) can be attributed to the RC rather than other factors. The RC's effect was via short run costs of customer remediation and business process changes to ensure compliance etc., and gains or losses on divestments of non-core businesses (which was in train anyway).

Overall, any longer term effects of the RC on banks are likely to be swamped by fintech developments and the emergence of the COVID crisis in 2019. The latter has led to major changes in government policies including ultra-low interest rates, high system liquidity, cheap funding for banks, and government

"business/bank friendly" policies (designed to offset the effects of lock-downs) which may have the potential to undermine some of the financial consumer protection benefits of the RC recommendations.

# 8. Credit Providers: An Overview

## Contents



## 8.1 Introduction

In thinking about credit providers it is often useful to distinguish between the *primary* and the *secondary* markets for credit. The former involves the initial provision of funds to a borrower and the creation of a loan (debt) contract. In the secondary market, such contracts are traded, to be held in asset portfolios of the purchasers (or on-sold to others if so desired). The initial provider(s) of funds, by selling the contracts, may thus not be the ultimate providers of funds. The *originator* of a loan or debt contract, by selling it, can recover the cash provided to the borrower and use that to originate further loans for resale.

In practice, those "resales" may involve creation and sale of different types of contracts such as occurs when intermediaries are involved – and this muddies the distinction between primary and secondary markets. Bond financing of companies is a good example of a relatively clear distinction between primary and secondary markets. But even there, take-up of unsold securities by an investment bank

underwriter for subsequent sale into the secondary market creates an overlap. Securitisation is another example. It involves origination of loans (clearly a primary market activity) – but with the intention of repackaging them into a marketable form through an SPV to be sold as RMBS tranches to investors. The initial sale of those tranches to investors is a primary market in those securities (which may be subsequently traded between investors in the secondary market).

The Figure below provides an overview of the "Credit Market" illustrating the diversity of institutions and agents involved. The following figure illustrates the types of regulation and compliance activities with which they are confronted

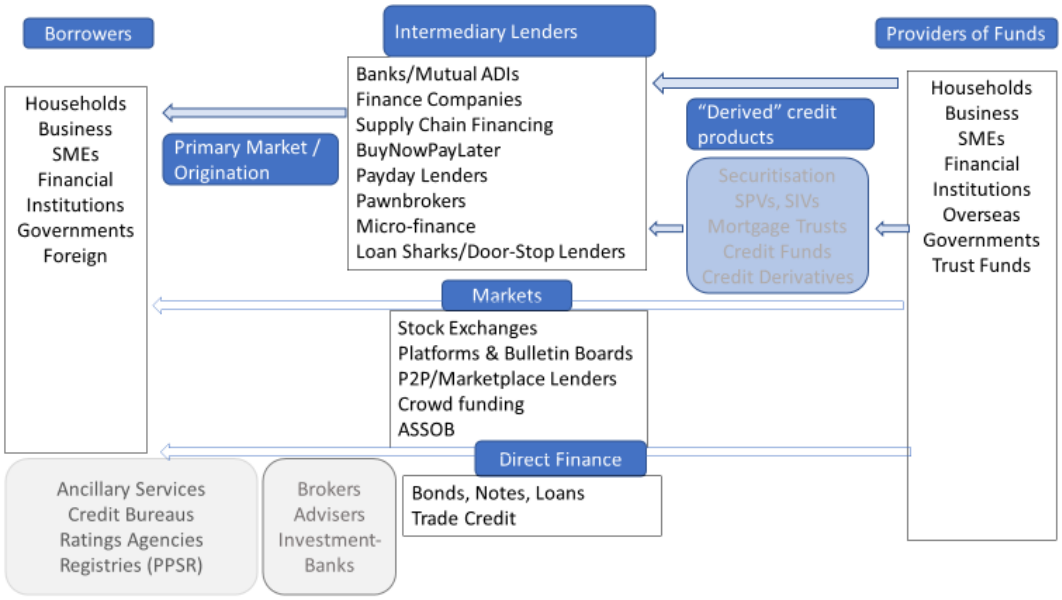



**FIGURE 1: CREDIT MARKET STRUCTURE**

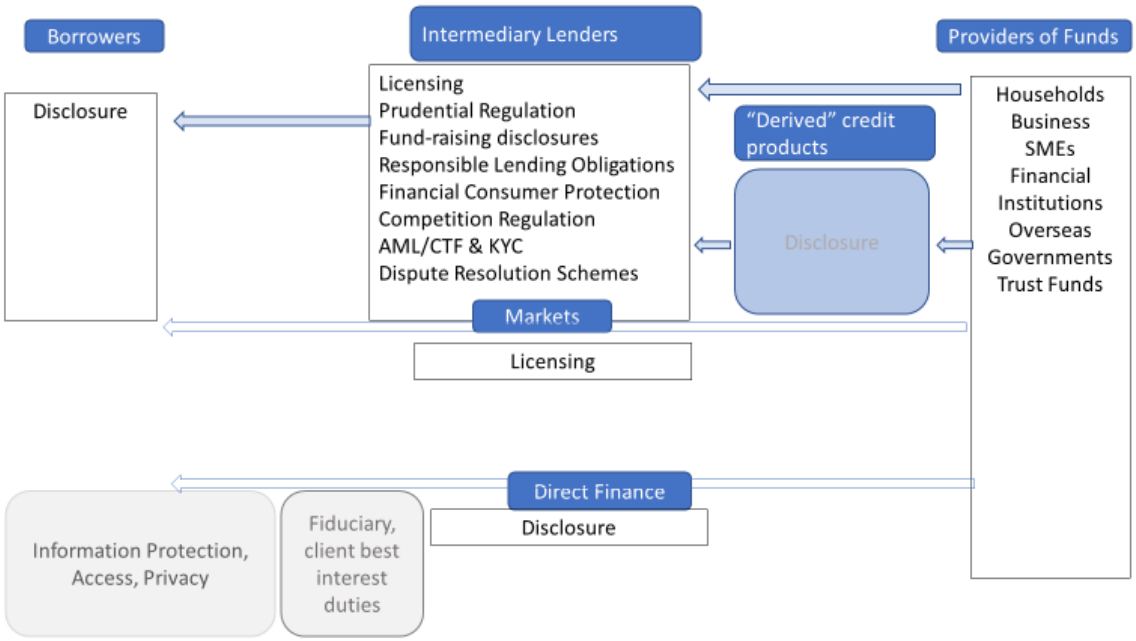



FIGURE 2: CREDIT MARKET REGULATION

There are numerous examples of "derived" credit products, where loans are transformed into another form for purchase by investors. One example is securitisation, where a package of loans is sold by the originator to a *Special Purpose Vehicle* which finances the purchases by issuing *asset backed securities (ABS)* to investors. ABS are claims promising various priorities of entitlement to the cash flows of the loans it has acquired. Another example is a *mortgage trust*, which purchases (or could originate) mortgage loans and offers investors in the units it issues a pro rata claim on the portfolio of assets it holds.

While some originators provide the initial funds to the borrower and often retain ownership of the loan, others may act more in a *brokerage* role, bringing together potential lenders with the borrower. Investment banks, for example, in managing a corporate bond issue, are connecting the borrower with potential investors, and not providing the finance themselves (except perhaps via some contingent exposure as part of the underwriting agreement). In recent years, the emergence of peer-to peer (P2P) lending platforms provide a similar service for retail or SME borrowers (and there have always been finance brokers whose role has been to connect borrowers with potential lenders).

The origination process can involve multiple parties. Banks may use the services of mortgage brokers who advise potential borrowers about loan options available, and collect information required for a loan application which is submitted to a chosen bank. In recent years in Australia around half of bank residential mortgage loans have been made via the "broker channel" (rather than via applications direct to the bank). The role of mortgage brokers has not been without its critics, because of concern that commissions paid by banks to brokers can create a conflict of interests. This could manifest itself

in brokers, acting in their own rather than customer interests, directing customers to banks paying the highest commissions. The Hayne Royal Commission recommendations aimed at preventing this were not accepted by the Government.

Of course credit is also created (loans are made) without the involvement of financial institutions. Individuals may borrow from friends or family (the "bank of mum and dad"). Firms can provide facilities for retail customers to defer payment for their purchases of household goods (although this is more often done by arranging for the customer to receive credit from a finance company, or under Buy Now Pay Later (BNPL) schemes). Businesses extend *trade credit* to other businesses when they allow purchasers of their goods to pay at some later date (such as 30 or 60 days). Trade credit is an important source of credit for many companies, and most are both trade creditors (extending credit to purchasers of their output) and trade debtors (owing payment on purchases of inputs from other firms). There are many examples of financial firms providing services competing with such *direct finance*, by interposing themselves between the two end-parties. *Factoring* involves a financial firm (the factor) purchasing yet to be paid invoices of a buying firm from the selling firm – providing immediate cash to the latter and collecting from the former when the invoice is due. *Buy-now-pay-later (BNPL)* schemes such as Afterpay provide an alternative to store provision of credit (deferred payment) to retail customers.

The primary focus of this section is upon the originators operating in the primary market. As well as providing the initial financing, they determine characteristics of the loan contract - such as price, term, collateral provided. But the importance of participants in the secondary market for credit should not be ignored. Securitisation vehicles transforming (particularly mortgage) loans into asset-back-securities (ABS) are important. Managed funds investing in loans (such as mortgage trusts) are also relevant, and some are also participants in the primary market – originating new loans as well as purchasing existing ones.

## A Taxonomy of Credit Providers

There are many different types of financial institutions that provide credit (as well as performing other economic functions). Alternative ways of categorising them could include:

- To whom do they provide credit (households v business v other financial institutions, etc)?
- What types of credit do they provide (short term v long term v revolving facilities/lines of credit)?
- What are the common features of the credit contracts used (secured v unsecured?
- How do they fund their lending (deposits, wholesale borrowings, owner's equity)?

Unfortunately, while there are some specialist lenders who could be categorised in one such way, many span large parts of the range. Banks are an obvious example. Hence most analyses are based on institutional distinctions. However, there are also analyses of the involvement of various lenders in particular types of lending such as that of residential property market lending – such as in this RBA Bulletin article September 2017.

There are a number of non-ADI institutions engaged in providing credit or originating loans in Australia. These include: institutions who are primarily securitisers; peer to peer or market place fintech lenders; finance companies; individuals such as solicitors managing trust or other funds for clients; private equity firms; hedge, and other managed, funds. Some, such as payday lenders, pawnbrokers, "loan sharks", micro-finance associations, buy-now-pay-later providers are focused almost exclusively at the retail market for personal lending.

## 8.2 Finance Companies

Finance companies are non-bank providers of credit financed by sources of funds other than deposits (which only banks are allowed to offer). Their funds may come from wholesale issues of debt (including securitisation) or loans from large investors or through issues of secured or unsecured debentures into retail markets. Debentures can only be issued under a prospectus, and finance companies come under ASIC's oversight. In 2012 ASIC introduced Regulatory Guide RG69 imposing "If not, why not" requirements for such prospectuses, aimed at assisting investors in assessing potential risks. These require companies to disclose if various operating and financial characteristics differed from usual industry and regulator-preferred benchmarks, and if so why. It is not obvious what, if any, effect these requirements have had.

Historically in Australia, finance companies grew substantially in the post-war era when banks were subject to heavy regulation including interest rate ceilings. Finance companies were able to offer higher interest rates for funds and charge higher interest rates on loans which enabled them to finance more risky borrowings. Most of the Australian banks had finance company subsidiaries that were largely unregulated. Often restrictions on the amount of first mortgage financing from a bank would result in the borrower also taking out second mortgage financing from that bank's finance company subsidiary at a significantly higher interest rate. Following the deregulation of the 1980s, and with Basel capital requirements applying to the banking group (including subsidiaries), there was little value for banks to maintain separate finance company subsidiaries to avoid regulation.

Finance companies undertake a variety of forms of credit provision. As well as personal and mortgage lending, they provide finance by way of leasing and credit cards. Probably the largest finance company operating in Australia is Latitude Financial (formerly GE Finance) which as well as direct lending also

offers credit facilities through arrangements with major retailers. In late 2019, an IPO was mooted, aiming to raise at least $1.25 billion in new equity funding but did not proceed. At June 2019 it had total assets of $8.9 billion (largely consumer loans – having 2.6 million customer accounts) and borrowings (primarily from wholesale markets) of $7.9 billion. The equity/assets ratio was around 4.25 per cent (and would have increased substantially if the IPO had proceeded. Illustrative of a smaller finance company financial structure and activities is Balanced Securities which had $167 million of secured notes on issue and over $235 million of mortgage loans (in around 37 loans) at June 2020.

At June 2020, RBA data indicated 129 finance companies operating in Australia with a total of $251 billion of assets (substantially less than the size of the resident loan portfolios of each of the major banks, which APRA data indicate ranged between $400 to $600 billion in April 2020 ).

Over the years there have been numerous failures of finance companies and a deal of regulatory and community concern that retail investors were not aware of the risk to their funds. Some of these failures were particularly relevant for regional communities where their business was concentrated.

Following post-GFC failures, including that of *Banksia finance company* in October 2012 with $663 million raised from debenture holders, APRA introduced in 2013 restrictions on Finance Companies.[1] These included:

- Can't use word "deposits" in fund raising
- Precluded from issuing "at-call" liabilities. This implies preclusion from providing transaction facilities (access to ATMs, EFTPOS) unless done by way of a credit card.
- Can't use the term bank.[2]
- Precluded from issuing retail debentures with under 31 days maturity,

## 8.3 Supply Chain Finance

The objective of this section is to explain the activities of financial institutions known as "supply chain financiers". In essence, they intermediate between trade creditors and their trade debtors, providing an alternative to direct financing of a purchaser of goods and services by the seller over the period

[1] This was done under arrangements whereby APRA gave registered finance corporations exemption from complying with Section 8 of the Banking Act (which precludes non-banks from carrying out "banking business" of taking deposits and making loans) provided there was compliance with conditions set out in the exemption order.

[2] The prohibition on use of the term bank also has meant that since an APRA determination in 2012 registered financial corporations cannot call themselves "merchant bank" and that "investment bank" is also not a permitted term unless an exemption is granted by APRA (as it has done for several foreign entities). While various directories list investment banking firms, only ANZ Investment Bank uses the term in its name.

between sale and payment being made. Often, as in the case of banks, this activity will be one of many forms of financial services associated with working capital and cash management (including lines of credit and short term loans).

Precisely defining supply chain financing is problematic, since there are a range of techniques potentially involved. The *Global Supply Chain Finance Forum* produced a document in 2016 offering some standardised definitions. Udell (2015) provides a valuable framework of "lending technologies" for categorising and explaining use of different types of lending (focusing on SMEs) within which various types of trade finance and supply chain finance fit.

Among the providers of supply chain finance have been Greensill (headquartered in London and founded by an Australian – and which collapsed amid controversy in 2021), TIM Finance, Fifo Capital, and the major and other banks. Whereas banks can rely on their deposit base and other borrowings to fund the credit provided, non-bank financiers will rely on own funds (equity), wholesale market borrowings, or securitisation solutions using trade invoices as the underlying assets. Many of the providers are unlisted companies.

Unfortunately, there are no official statistics available for Australia on the size of the supply chain finance sector, nor on the size of aggregate outstanding trade credit amounts or flows. In part that may reflect the problems of precise definition, and the variety of types of supply chain financiers. There are also accounting presentation complications (see Stebbens, 2020) since some trade finance solutions could (or perhaps should) lead to the amounts being presented on company balance sheets as debt rather than as accounts payable (and receivable). Nevertheless, the amount of credit outstanding via domestic (ie ignoring international trade) trade credit arrangements (either via direct financing or intermediated) is large. Udell (2015) notes that "Berger and Udell (1998) show that in the United States, trade credit provides 31 per cent of debt financing to SMEs, nearly as much as commercial banks (37 per cent)" and that this phenomenon is "globally ubiquitous".

## Cash and Working Capital Management

Companies face a time lag between payments for purchases of inputs of goods and (labour) services and receipts from sales of output. This creates an ongoing need for funds to bridge the "cash cycle" gap which could be met by funds provided by the owners or by borrowed funds. Some part of the gap reflects characteristics of the physical production process affecting the time between acquiring inputs and production of final output, while some part reflects payments practices. (See here for a brief discussion). The longer the gap, the more costly it is for the firm.

Changing the nature of the production process, such as "just in time" inventory management can affect the timing of cash flows, as can changes in payments practices such as time taken to pay invoices

for goods supplied. Thus, the nature of the "cash management" problem reflects both physical supply chain features and supply chain finance features.

### Value creation from shortening the cash-cycle: an illustration

Consider one product cycle and assuming that the company operates its finances via a bank overdraft. As production proceeds (starting at date 0) the overdraft increases until the product is produced and sold at date T for a total cost and sale price of say $X. (For simplicity assume zero profits).

If expenses were incurred smoothly over that period, and payment immediately made by the purchaser at date T, the average overdraft over the T day production period would be $X/2. Interest costs incurred in financing production and sale of the product would be r.T.(X/2), where r is the interest rate charged by the bank.

If payment by the purchaser is delayed till T + t, the company will incur the extra cost of the bank overdraft which at date T is $X for the additional t days, giving total interest costs of r.T.(X/2)+ r.t.X. If the payment lag (t) can be shortened, the company benefits from lower interest costs.

Alternatively, suppose the company can defer payments for its inputs by t days (but

Deferral of payment by a purchaser from the company leads to the company being a *trade creditor*, reflected in the value of invoices issued to purchasers which have not been settled. Conversely, its deferral of payments to providers of inputs leads to it being a *trade debtor*, reflecting invoices it has received but not yet paid. Most companies will simultaneously be both trade creditors and trade debtors.

In issuing invoices, companies will typically specify a payment due date (such as 30 or 60 days) and may offer some discount on the invoice amount for early payment. Setting of that discount rate will reflect a range of factors including the financing cost to the company from extending credit to the purchaser. But, in practice, the payment terms can also be specified by the purchaser if they have substantial bargaining power, such as arises if a large company is purchasing inputs from one among many possible small suppliers. As well as offering a low price to a possible supplier, it may also specify extended payment terms (such as 90 days).

This issue of possibly unfair use of bargaining power by large companies in dealing with small suppliers attracted substantial media and political attention in Australia in 2018 and 2019. An Inquiry and Final Report by the Australian Small Business and Family Enterprise Ombudsman (ASBFEO) ultimately led to the introduction into Parliament in May 2020 of the Payment Times Reporting Bill 2020. This will require large companies to report on their payments practices with the objective of preventing them from exploiting their market power to impose costs of extended payments terms on small counterparties.

The company selling goods and issuing invoices allowing deferred payment is providing liquidity to its trade debtors, but is also exposing itself to default risk should the trade debtor be unable or unwilling to make payment. There are a range of institutional trade credit facilities provided by banks and other intermediaries which facilitate trade. As well as loans or revolving credit facilities to finance the company's costs prior to receipt of payment for goods supplied, there are a range of facilities which enable the company to reduce its exposure to default by the purchaser. These are particularly important in international trade where the default risk of an overseas purchaser may be hard for the company to assess. Bank letters of credit, guarantees and arrangements with correspondent banks in the purchaser's country to ensure funds are available and will be released to the selling company following receipt of goods are common. Financial institutions such as banks may be better able to assess the default risk associated with the purchaser and more able to bear that risk than the selling company.

Another common technique is for the seller of goods to sell the invoices it has issued to a bank or other financial institution for an immediate cash payment. That sale, at some discount to face value of the invoice, could be either "with recourse" or "without recourse". Both provide the company with immediate cash, but in the "with recourse" case, if the trade debtor defaults the company will still be exposed to the loss. This process is generally referred to as "factoring". Figure 1 provides an illustration of the process. When there is no recourse, generally referred to as "forfaiting", the bank (or "factor") takes on the risk of loss from default.

Specialist companies and banks provide such factoring services, essentially acting as financial intermediaries between trade creditors and trade debtors. Rather than the trade creditor providing loan finance (via deferred payment) to the trade debtor, the intermediary pays the amount owed (less some discount) to the trade creditor and provides the loan finance to the trade debtor using its own funding. Among the economic efficiencies which can make this viable are: lower cost of funding for the intermediary than for the trade creditor, improved payments processing arrangements, better debt collection/enforcement techniques (if the trade debtor is not meeting their obligations), better

assessment of credit risk and ability to diversify credit risk across many trade debtors. Also relevant can be the information acquired about the trade creditor and trade debtor.

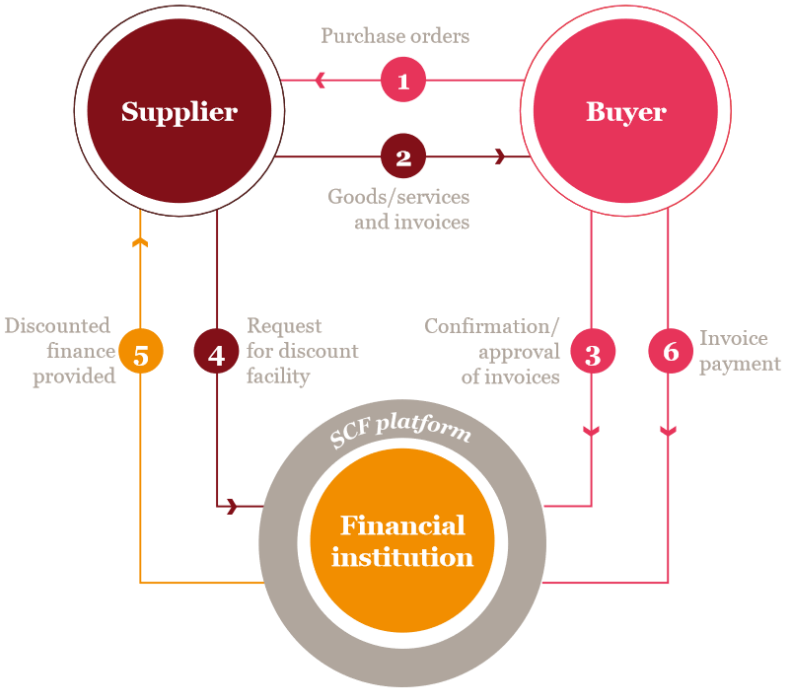



FIGURE 3: SUPPLY CHAIN FINANCE (SOURCE PWC)

Another option for trade creditors is to take out *trade credit insurance* offered by insurance companies. QBE is one company offering such insurance in Australia, details are here.

An overview of the market for supply chain finance and techniques used in Australia can be found in the ASBFEO report published in March 2020. One feature of the market has been the growth of what is referred to as *reverse factoring.* This differs from traditional factoring in which the trade creditor is the initiator, discounting invoices it holds with a financial institution (the factor) for immediate cash rather than waiting for eventual payment by the trade debtor. In reverse factoring, a company which is regularly purchasing inputs from, and becoming a trade debtor to, many suppliers, establishes a facility with a supply chain financier. That facility enables its creditors to discount the invoices from the company that they hold for immediate payment by the supply chain financier. This can reduce the transactions costs for the creditor and possibly reduce the discount required by the supply chain financier (since it has a relationship with the trade debtor). Figure 4 illustrates.

***Reverse Factoring***

Establishing the Program: A Buyer company will enter into an early payment program for its suppliers with a third-party SCF provider. An 'application programming interface' (API) is installed on the buyer company's internal systems which interacts with the buyer's ERP systems, providing visibility of supplier invoices.

Joining the Program: The buyer company, not the SCF provider, approaches suppliers about their interest in opting into the program.

Invoice Approval and Advice: When the buyer approves the supplier's invoice, it is visible to the SCF third party finance provider who contacts the supplier and notifies them of their commitment to pay the invoice immediately.

Supplier action: The supplier effectively "sells" the receivable / sales invoice to the SCF third party finance provider at a discount and the buyer pays the third party the full amount on the due date.

SCF Third Party Provider: The supplier is paid the lesser value and the buyer reimburses the SCF provider at the end of the standard payment term. The financing of the early remittance is through the aggregation of receivables into financial products, such as bonds. The terms reflect the credit rating and risk profile of the buyer, as this reflects the buyer's ability to reimburse the SCF provider at the end of the buyer's standard payment term.

FIGURE 4: REVERSE FACTORING ARRANGEMENTS (SOURCE, ASBFEO, 2020)

In practice, in Australia, one of the concerns leading to the ASBFEO inquiry was evidence that large companies were simultaneously increasing their payment terms (eg to 90 days) and setting up reverse factoring facilities with a specified SCF intermediary. Doing so, increased the funding costs imposed on small suppliers who either had to wait longer for payment or accept a larger discount for immediate payment from the supplier chain financier. Whether this involves anti-competitive behaviour is unclear (and the report recommended a review by the ACCC), but it does raise issues of fairness. The ASBFEO report also expressed concerns about the purported use by SCF intermediaries of information technology which enabled them to gather information about the financial condition of a trade creditor in order to determine the largest possible discount it could impose on the trade creditor.

It is worth noting the similarities and differences between SCF and BNPL schemes or consumer leases and hire purchase. In all cases, someone receives goods in exchange for deferring the payment. In SCF, however, the purchaser is generally perceived as setting the terms (and policy concerns focus on treatment of the supplier – such as the SMEs that ASBFEO is concerned with). In BNPL, consumer leases, and hire purchase, the BNPL intermediary or the goods seller sets the financing terms (and policy concerns focuses on the impact of the financial arrangements on the buyer of goods).

## 8.4 Pawnbroking

Pawnbroking is a long standing credit industry common to most countries based on provision of very small, short term, loans to retail customers with liquidity needs. These are secured by the pledging of some durable good (the "pawn") which the pawnbroker holds and can sell (and retain some or all of the proceeds) in the event of default.

Throughout time and across countries, the principal features of pawnbroking are common, albeit with differences reflecting regulatory, social, and economic factors. The standard pawnbroking loan is characterized by: short term maturity (weeks or months); small scale (average size of around $100 in countries such as the USA and Australia); lodgment (pledging) of durable goods (of value well in excess of the loan amount) as security with the pawnbroker; minimal documentation; relatively high default rates. Pawnbroking customers are typically those in immediate need of cash, and unable to access other sources of funds. They potentially include those without proper title to goods proffered as security (ie stolen goods), who seek immediate cash in exchange for goods which they have no intention of redeeming.

Transactions costs of the lender are reduced by the reduced need for *a priori* investigation of the borrower's credit status and *ex post* collection costs. Monitoring costs during the life of the loan are avoided. The contract provides the lender with assets available for sale in the event of default, but the lender faces the risk that poor quality of goods which was not recognized when the loan was granted reduces the resale value. The pawnbroking contract can be seen as a precursor to modern repurchase agreements.

Traditionally, pawnbrokers operated as small shopfront stores, often as a sole trader/owner who supplied the finance for on-lending to customers. Operating costs (lease of premises and wages being the main items) were relatively high compared to the amounts lent. Thus interest rates charged had to cover operating costs as well as the financing costs and allow for default and other risks. Paradoxically, customer default was not necessarily to the disadvantage of the pawnbroker – if receipts from sale of forfeited goods exceeded the amount which the customer owed. But another risk faced was that stolen goods accepted as pledges might be reclaimed by their rightful owner (or the police) or that defective goods might not bring a sufficient sale price.

The relatively high operating costs mean that pawnbrokers need to charge high interest rates to make profits. 10 per cent per month might not be sufficient to break even, and such high interest rates generate community perceptions of "usurious" behavior. Combined with perceptions of pawnbrokers as possible "fences" for stolen goods , pawnbroking has often not had a good public image.

Consequently governments in many jurisdictions have imposed significant regulations on pawnbrokers. Among commonly found operational restrictions are:

- Minimum holding period requirements (of goods before resale is allowed)
- Disposition of sales proceeds (borrowers entitled to excess over amount owed)
- Recording, Reporting and Policing (of loans and possibly customer ID)
- Borrower protection: documentation, bonds and capital requirements (to avoid borrower loss of goods with value above amount owed should pawnbroker fail)
- Entry Restrictions (licensing)

A particularly common restriction has been imposition of maximum allowable interest rates. A natural response has been to restructure transactions as a sale of goods by the customer who then has an option to repurchase the goods at a later date.

### A "Fair" Pawnbroking Interest Rate

For the pawnbroker to achieve a required return on funds employed, a simple model of pawnbroking indicates the following condition needs to hold:

$$(1+r)L(1-p) + p.\theta V - C = (1+j)L$$

The LHS shows the gross return on a portfolio of loans of $L at an interest rate of r% per month, where there is a default probability of p, a recovery amount following default of θV (where V is value of goods pledged and θ is the resale value rate), and C is monthly operating costs. The RHS is the gross return required if the cost of funds is j% per month.

Using realistic estimates for the various components of

L (loans outstanding) = $100,000

V (goods pledged) = $200,000

p (probability of default) = 0.2

θ (resale value) = 0.7

C (operating costs per month) = $15,000

j (opportunity cost of funds per month) = 0.01 (12% p.a.)

Then solving:

$(1+r)100{,}000.(0.8) + 0.2.(0.7).200{,}000 - 10{,}000 = 1.01(100{,}000)$

Gives: r =0.10 (10%) per month!

Paradoxically, higher default rate may reduce "fair" loan rate if sale proceeds are high relative to amount owed. It can be seen that the dominant influence on the "fair" loan rate is the size of operating (real) costs.

In recent years, in a number of countries, large companies have emerged operating chains of pawnbroking stores often in conjunction with second hand dealers activities. *Cash Converters* is an obvious example in Australia (and elsewhere). Technology has also affected pawnbroker operations, with forfeited goods able to be sold on-line to a wider potential market than previously available when goods were generally only sold from the shop-front.

## 8.5 Payday Lending and Small Amount Credit Contracts (SACCs)

Payday lending is generally defined as short term, relatively small, loans made to individuals to be repaid when funds are available from a subsequent wage income receipt. In this sense they are loans with collateral provided by way of a claim on the future income stream of the borrower. Whereas this once involved the borrower signing a post-dated check due on the payday related to the loan maturity, electronic transfer facilities can achieve the same outcome by establishment of a direct debit. (In the USA, the fact that many low income households do not qualify for a cheque account, meant that the post-dated cheque approach was not feasible for them).

While the ability of individuals to access credit for small amounts for a short term can in principle be privately valuable to assist household liquidity management, there have been many concerns about the nature of the industry. These include high fees or interest rates and the apparent tendency for many borrowers to "roll-over" loans leading to an escalating debt spiral.

SACCs involve more than payday loans, including for example consumer leases, rent to buy schemes (for amounts less than $2,000 and terms of 2 years or less). Continuing credit contracts such as credit cards are excluded from this definition.

In September 2015 ASIC released a report in which it found that the implied interest rate on consumer loans was as high as 884% p.a. (for a clothes dryer). In June 2019 ASIC reported that two payday lenders were charging interest rates as high as 990 per cent p.a. and stated that it would use its new product intervention powers against them. The lenders were escaping the restrictions of the National Credit Act because credit was provided for less than 62 days, and high fees were charged for provision of collateral/arrangement services by an associated company under a service contract.

Lists of payday lenders operating in Australia can be found at https://www.finder.com.au/payday-loans or https://www.ratecity.com.au/payday-loans.

In Australia, a Government Review of Small Amount Credit Contracts (SACCs) reported in March 2016. It made 24 recommendations. Draft legislation was released in November 2017, following the government response to the Review released on 28 November 2016. Major features of the legislation are shown in the box below.

- imposing a cap on the total payments that can be made under a consumer lease;
- requiring small amount credit contracts (SACCs) to have equal repayments and equal payment intervals;
- removing the ability for SACC providers to charge monthly fees in respect of the residual term of a loan where a consumer fully repays the loan early;
- preventing lessors and credit assistance providers from undertaking door-to-door selling of leases at residential homes;

- introducing broad anti-avoidance protections to prevent SACC loan and consumer lease providers from circumventing the rules and protections contained in the Credit Act and the Code; and
- strengthening penalties to increase incentives for SACC providers and lessors to comply with the law.

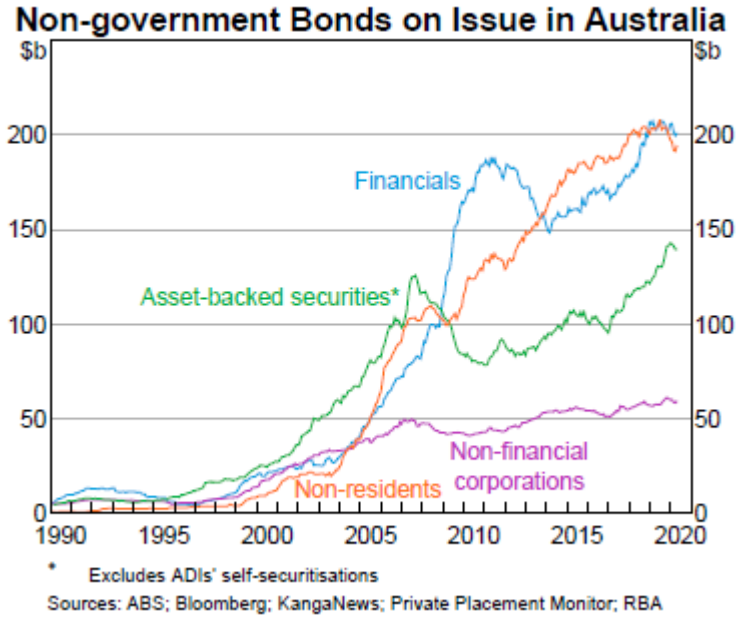
*Source :* https://treasury.gov.au/consultation/c2017-t229374

However, the Bill was never introduced to Parliament by the Government, done so by an independent member, but abandoned (pending the outcome of the Royal Commission) but not subsequently reintroduced. On 22 February 2019 the Senate Standing Committee on Economics released its Report on its Inquiry into "Credit and financial services targeted at Australians at risk of financial hardship" recommending reintroduction of the Bill and on 18 February 2019 the Labor opposition introduced a Bill replicating the original draft legislation which was not successful. Subsequently, the Bill was reintroduced into the Senate in December 2019 and referred to the Senate Economics Legislation Committee to report back by September 2020. That Report recommended that the Bill not be passed, with a dissenting report to the contrary by 3 of the Committee members.

## 8.6 Securitisers

Securitisation involves the establishment of a Special Purpose Vehicle which acquires mortgages from the originating entity, pools those mortgages, and issues a range of securities promising cash flows to investors based on payments by the mortgagees. The securitisation vehicle could be established by an ADI and acquire loans issued by that ADI, or established by a non-ADI originator of loans. Often there will be a number of separate programs (corresponding to a particular pool of mortgages) associated with a particular securitiser. At December 2019, the ABS collected data from 127 different securitisers as part of its Australian National Accounts: Finance and Wealth data (Cat. No. 5232.0, Table 25: see also Cat.No. 5232.0.55.001)

The marked downturn in securitisation after the GFC can be seen in the figure below (from the RBA Chart Pack) which shows the stock on issue. That decline reflects the drying up of new issues and maturing of existing issues. Since 2016 the market has started to grow significantly, involving both traditional securitisations and covered bonds. Note that these figures exclude internal securitisations by banks which created for eligibility for use as collateral for the CLF.




Many of the larger operators in this market (as at 2020) are shown in Table 1. That list does not include banks who are significant – particularly Macquarie Bank which has long been one of the major operators with its long-standing PUMA series.

**TABLE 1: NON-BANK LENDER/SECURITISERS (SOURCE ASF)**

| Name | Ownership | Lending focus | Outstanding Volume mid 2020 & program names |
|---|---|---|---|
| Australian Finance Group (AFG) | ASX listed | Mortgage-broking group, residential mortgages | 1.4 bill |
| Bluestone Group www.bluestone.com.au | Private (Cerberus Capital Management) | Mortgages for borrowers not meeting traditional lending criteria | $1.7 bill – Sapphire, Emerald |
| Columbus Capital www.colcap.com.au | Private | Prime RMBS | 4 bill - Triton, Vermilion |
| FirstMac www.firstmac.com.au | Private | Prime Home Loans | 9.1 bill – FirstMac Mortgage Funding Trust |
| Flexigroup www.flexigroup.com.au | ASX listed | Credit cards, consumer / business leasing, buy now pay later (humm) | 1 bill – Flexi ABS, Q Card Trust |
| La Trobe Financial | Private | Near-prime residential and commercial mortgages | 4.4 bill - LaTrobe |

| | | | |
|---|---|---|---|
| Latitude Financial | Private (Institutional owners). Was formerly part of GE Capital. | Personal and credit card loans | 2.6 bill Latitude |
| Liberty Financial | Private | Prime and other residential mortgages | 8.1 bill Liberty |
| Pepper Australia https://www.pepper.com.au | Private delisted from ASX in Nov 2017 | Residential mortgages, auto loans, equipment finance, point of sale finance, personal loans | |
| RedZed Lending Solutions | Private (established 2006, acquired business banking business of ME bank in 2016) | Self-employed – residential commercial and asset-finance loans | 1 bill - Redzed |
| Resimac | Subsidiary of ASX listed Homeloans (Originally NSW Govt established in 1985) | Residential mortgages (prime and specialist) | 7 bill - Premier, Bastille, Avoca, Versailles |

## 8.7 Consumer Credit and Buy Now Pay Later (BNPL)

The BNPL sector has seen remarkable growth and prominence in recent years as new companies have used fintech to develop new ways of providing short term finance to individuals for purchases of consumer goods. (This RBA article provides information). Provision of such finance is not new, but the ways of providing it are different from more traditional approaches. Those traditional approaches include:

- *In-store credit*, where a retailer (such as a furniture store) offers terms for deferred payments (such as monthly payments). Some large retailers offer customers a store (credit) card. Often the credit will be provided by a finance company rather than the store itself, such that the store is not regulated under the National Consumer Credit Protection (NCCP) Act, and is not required to hold an ACL.
- *Car dealer finance* (see this Royal Commission background paper for more information), is an important category of finance where a dealer can earn a commission by arranging for the customer to get finance (including via a leasing arrangement) from an associated finance company. The dealer may hold an ACL, or be an authorised representative of the finance company, but more generally rely on the "supplier of goods/point of sale" exemption in the

NCCP Act. The Hayne Royal Commission recommendation 1.7 was for removal of this "point of sale" exemption.[3]

- *Consumer Leases,* where the consumer gets immediate use of the goods, in exchange for a regular series of lease payments. At the end of the lease period, the consumer may have the right to obtain legal ownership by payment of a further amount. *Hire Purchase* is a term which was commonly used for this type of finance, but differed from a lease in that the consumer was required to complete payments and take ownership.

The emergence of BNPL providers such as AfterPay has attracted much attention both regarding the nature of its activities and the stock market valuation of the company (see Figure 5.


FIGURE 5: AFTERPAY STOCKMARKET VALUATION

Using Afterpay as an example, it provides consumers with the ability, arranged virtually instantaneously at the point of sale, to purchase (even quite low value) items from participating merchants for a series of deferred payments. These payments are made electronically to AfterPay, and if made on time involve no fees or interest charges to the customer, such that the deferred payments amount to the purchase price of the item. AfterPay pays the merchant the purchase price at (or soon after) the time of the sale, but with a discount (currently 4 per cent) applied. (These discounts or "merchant fees" are significantly higher than the costs incurred by merchants when credit cards (or Paypal) are used for payment). Afterpay's profits arise from the value of the discount more than compensating for the provision of finance to the consumer, and from any fees and charges to customers due to late payments, less any losses from default by those customers. Although AfterPay

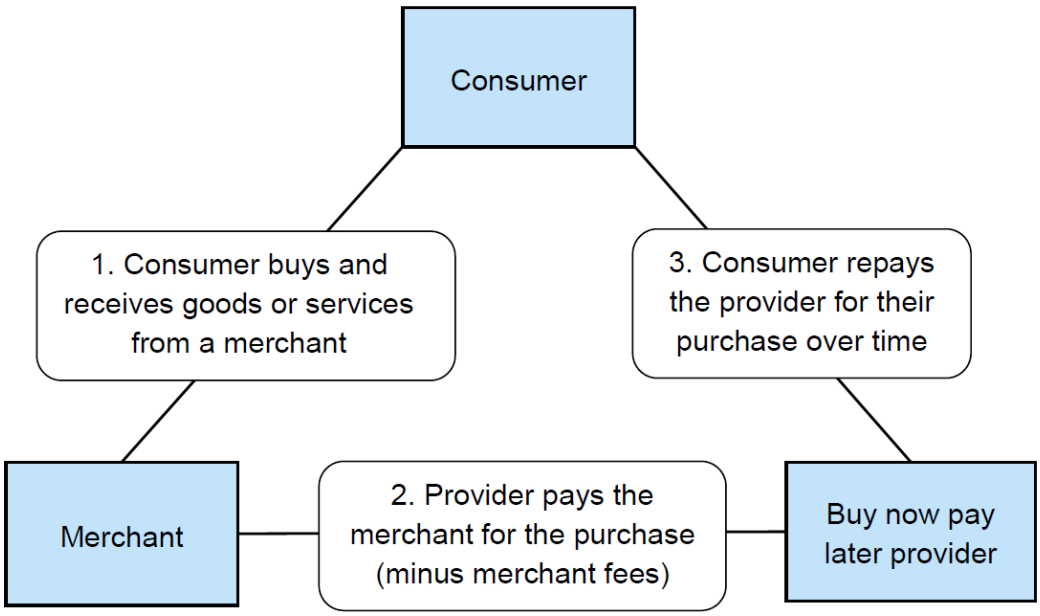
[3] The Government response to the RC recommendations agreed to this, but as at mid 2020 did not appear to have produced draft legislation for consultation.

was initially making losses, its share price has increased rapidly. An diagrammatic representation of its history and of its system linking purchasers and merchants is shown in the box at the end of this section.

Other BNPL operators include Zip, Humm, Sizzle, Openpay, Splitit. Lists of BNPL providers operating in Australia can be found here or here.

This approach can be seen as a new form of *factoring*, where a merchant's accounts receivables were sold at a discount to a financier (a *factor*). See here for an explanation while the figure below from an ASIC Report shows the cash flows in BNPL finance. The BNPL provider takes on credit risk (of consumer defaulting) and liquidity risk (if payments are late).

**Figure 1: How a buy now pay later arrangement works**




Note: This figure illustrates that when a consumer uses a buy now pay later arrangement to buy goods or services, the merchant is paid by the provider of the arrangement. The provider then collects repayments from the consumer to recover the upfront payment over time. Consumers can receive the goods or services immediately, well before the purchase price has been fully repaid.

*Source:* ASIC, 2018

Its new model, means that it is not covered by "traditional" regulation – it is not subject to NCCCP or required to have an ACL nor have membership of an external dispute resolution body.[4] It has prompted some community concerns (particularly among financial counsellors) regarding its potential

[4] An entity is not under NCCP Act 2009 and doesn't need an ACL or to comply with Responsible Lending Obligations If: (a) no charge for credit or (b) credit is for less than 62 days, fees are < 5% of amount of credit, and interest charges < 24% p.a., or (c) only include an upfront fee or periodic fee that is fixed, not related to credit amount and less than some specified amount.

to facilitate excess spending, relative to income, among particularly younger members of the community (much as ready availability of credit cards has in times past).

Consequently there have been a number of official examinations of the business model and its consequences, including a December 2018 ASIC Review and a 2019 Senate Economics Committee Inquiry. As at mid 2020, no specific regulations or legislation had been introduced. The ASIC review recommended that regulation could be achieved by application of its product intervention powers, as did the Senate Committee, which also recommended application of the soon to be introduced Design and Distribution Obligations (DDO's) as well as development of an Industry Code of Practice. In November 2020, ASIC released Report 672 reviewing the experiences of users of BNPL services, which found that 21 per cent of users had missed a payment over the past 12 months.

AFTERPAY Touch Group (ASX Code: ATG)

Comprises Afterpay and Touch products – merger of Afterpay and Touch in May 2017 (announced Feb). Expansion into US and in 2019 into UK under Clearpay brand

TouchCorp started in 2005 (but was developing systems etc since 2000), listed on ASX in Mar 2015, Co registered in Bermuda. Provides a platform for consumers to buy from merchants – revenue from transaction and integration fees – in mobility & Payments, Health & Government, Retail Services. Integrates with POS devices (eg doctors). Profitable prior to merger. Contribution (as "Pay Now" segment) still likely positive but small (given growth of Afterpay).

Afterpay platform for buy and receive now and pay later, on web page or mobile phone app for use on POS. Two components – Transaction Integrity Engine (assess customer – using information that can be garnered from transaction/payment request – or stored data), Afterpay Operating System – developed by Touchcorp. Established 2015, IPO May 2016. NAB secured receivables funding facility obtained Dec 2016. No AFSL, obtained ACL in Aug 2016 but not needed. Loss making prior to merger

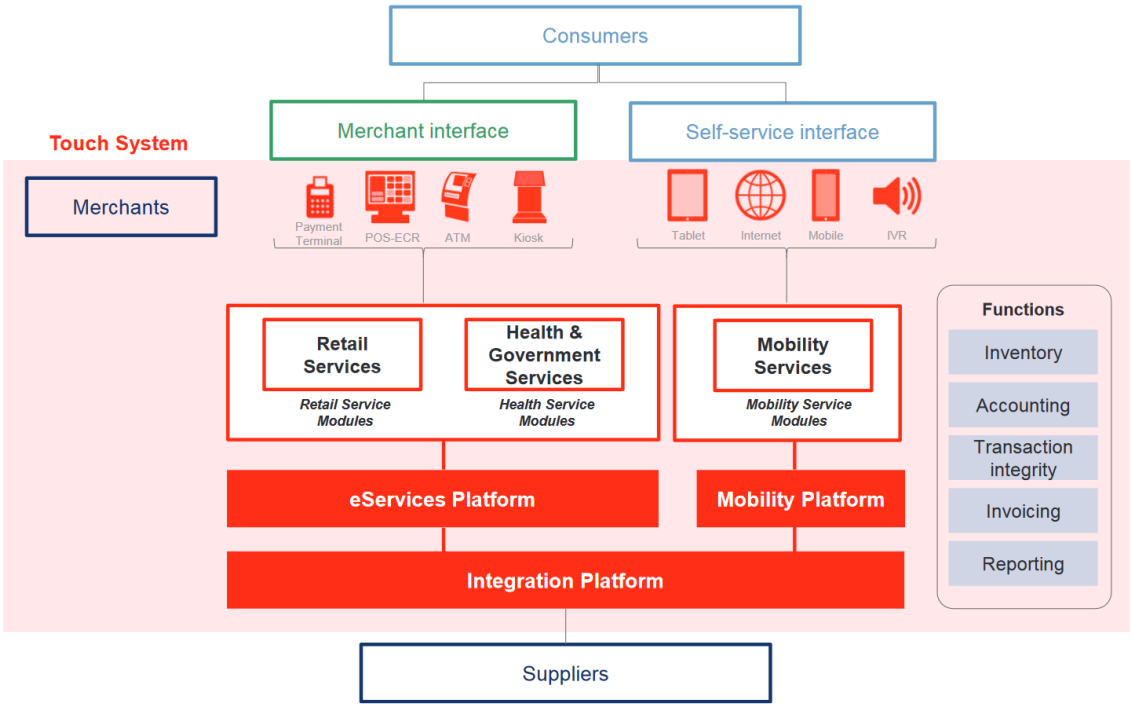



FIGURE 1
A DIAGRAMMATIC REPRESENTATION OF THE TOUCH SYSTEM PLATFORM

https://www.afterpaytouch.com/images/TCH_ASX-Announcement_Touchcorp-Scheme-Booklet_Combined-Final.pdf

(Other good examples of flow of payment instructions etc are in this document)

## 8.8 MicroFinance Institutions

As the name suggests, microfinance institutions deal in financial transactions of small scale. They are more common in less developed economies catering to individuals (or groups of individuals) not able to access funding from traditional/ mainstream financial institutions. The main activity for which they are recognised is very small scale self-employed business lending, and the most prominent example is the Grameen Bank established in Bangladesh in 1983, which styles itself as a "bank for the poor" with the founder winning a Nobel Peace Prize in 2006.

Loans made by such organisations are typically very small, such as for the purchase of a sewing machine by (typically) a woman wishing to establish a business enterprise. While the Grameen Bank and many other such institutions are not-for-profit, and some relying on charitable donations or government subsidies for funds to be lent, there are others which see such small-scale lending as able to provide a sufficient rate of return on funds invested in the enterprise. Thus, there are examples of "for-profit" microfinance organisations, although the costs associated with making small scale loans generally means that interest rates charged are relatively high, and these organisations generally make larger size loans than not-for-profit organisations. The initial enthusiasm about micro-finance as an important facilitator for economic growth and development has waned somewhat over time as discussed by Cull and Morduch (World Bank, 2017). As they note, the focus of policy is more on increasing *financial inclusion*, embracing facilitating savings, insurance, payments services as well as access to credit.

An important feature of the lending process is the loan contracting mechanism employed to encourage loan repayment. While a loan may be made to an individual, the obligation of repayment may apply to all members of the community to which that individual belongs. As well as the direct effect of spreading the non-repayment risk across a number of obligors, this structure can increase the social and moral pressure on the individual to repay the loan. Also, default by one member of a community may reduce the chances of other members receiving loans in the future.

# 9. Common Loan Types

## Contents

## 9.1 Introduction

There are many different type of loans and lenders. Loans may be for a fixed term with regular repayments of principal and interest (P&I), or interest only (IO) with principal due at maturity. Security (collateral) may be required or the loan may be unsecured, with higher interest rates for unsecured loans. Various fees and charges (upfront application fees, regular recurring fees) may apply. Interest rates may be fixed, linked to some market indicator rate, or variable at the lender's discretion. Various options (eg to extend the term, to adjust the interest rate or collateral required, or call the loan, if the borrower's conditions change) may be included in the loan contract, and penalties specified for late payments.

Since all lenders will market their loan products emphasising different features thought attractive to potential customers, there is a plethora of loan types – many of which are variations on a common theme. In the sections below some of the major generic loan types are examined.

## 9.2 Lines of Credit, Loan Commitments, Overdrafts

### Overdrafts

Historically, overdraft facilities, attached to a chequing account were a common way for banks to provide customers with access to credit on an "as needs" basis. Overdrafts, where used, are now attached to transaction accounts, for both business and retail customers. Customers arrange an overdraft limit with the bank, which enables them to overdraw their account up to that specified limit. An overdraft is one example of a "revolving" facility in which credit, up to the approved limit, can be drawn upon, paid down, and then drawn upon again. A credit card is another example. For a business customer with timing differences between cash inflows and outflows this would facilitate cash management – going into overdraft to meet payment demands and paying down the overdraft as cash inflows occurred.

Establishing an overdraft facility generally involves an upfront (application) fee and an ongoing regular fee. That latter fee might be based on the size of the overdraft limit or on the size of unused facility (more generally the former). Application fees vary but a figure of 1 per cent of the limit are common, with annual fees of perhaps 0.1 per cent of the limit. (Canstar provides current information). Amounts borrowed (ie the overdraft balance) attract the specified interest rate which will depend upon whether the overdraft is secured (using, for example, the borrower's residence as collateral) or unsecured. The fees mean that the effective annual rate can be quite high relative to the quoted rate – particularly if the average usage of the facility is relatively low. Generally banks expect that the overdraft balance would fluctuate, rather than being continuously at, or near, the limit – in which case a term loan with scheduled repayments would be seen as a preferable

alternative. Typically an overdraft facility will have no fixed term, and the bank would be able to cancel it if it wished.

## Lines of Credit

A line of credit operates much like an overdraft but with two main differences. First, there is usually a fixed term specified. Second it is not necessarily attached to a transactions account, but will be set up as a separate loan account. It may be secured (such as a home equity line of credit) or unsecured. In many respects, an unsecured line of credit is similar to a credit card (and may incorporate a debit card enabling transactions to be made directly from it). The line of credit may be revocable – where the bank has freedom to terminate the line of credit.

From the customer's perspective, lines of credit (and overdrafts) operate as substitutes for operating with higher average cash balances.

## Loan Commitments

The term "loan commitments" can be used differently by different commentators. To some it is synonymous with lines of credit. But to others it includes all loans agreed to but not yet drawn down by the borrower. Housing loans are an obvious example with several months often passing between loan approval and actual loan funding when settlement on the property is due. The ABS (Cat. No 5601.0) defines new loan commitments in this latter way as new housing loan and business term loan commitments (and also includes new or increased limits for credit cards).

Two important questions relating to commitments are as follows.

1. What is the size of undrawn loan commitments in the economy? This has macroeconomic relevance.
2. How large and how variable are undrawn commitments for each bank relative to loans outstanding? This is relevant for bank risk management.

Unfortunately, there is little public information to help answer these two questions. However, some information can be obtained regarding the second question from the major banks' Basel Pillar 3 disclosures. For example, ANZ disclosed in its September 2019 report that of its IRB-determined corporate Exposure at Default (EaD) figure of $277 billion, undrawn commitments accounted for $72 billion (approximately 25 per cent).[1] For NAB, the corresponding figure was 24 per cent. For Westpac, the corresponding figures were 33 per cent for corporates and 20 per cent for business lending.

[1] A year later the corresponding figures were $274 billion and $83 billion.

## 9.3 Mortgage Lending

A mortgage is a charge over property given by the borrower (mortgagor) to the lender. (Precise details depend upon the legal system of land ownership and other legal factors. In some other countries, the term "lien" is often used).[2] The borrower is prevented from disposing of the property or using it as security for another loan of equal or higher priority. When the debt is discharged, the title to the property is returned to the borrower.

The most common property mortgaged is residential and commercial dwellings, but "goods mortgages" over items such as motor vehicles are also common.[3] Residential mortgages are very long term (generally 25-30 years) while goods mortgages are much shorter term (a few years). Through the provision of property as collateral, default risk is reduced relative to unsecured lending.

The possible loss associated with a mortgage loan depends on:

- initial loan / valuation ratio (LVR), and 80 per cent is a common maximum without lender's mortgage insurance (LMI)
- bankruptcy/liquidation risk (ie inability to make required repayments) of the individual/company borrower;
- volatility of the market value of the mortgaged property which will be relevant for possible recovery amount if the borrower defaults;
- repayment rate of loan – a high rate means the amount owed relative to property value declines more rapidly, but may contribute to deficient cash flows of the borrower. (Typically for residential loans a maximum repayment/income ratio is set at 25 -30 % of the borrower's disposable income. The most common repayment arrangements are P& I loans where regular repayments of principal and interest (P&I) are made until the loan is repaid. For interest only (IO) loans (often attractive to investors or developers) only interest is paid until maturity when all principal is due.

Note that default loss for the lender depends upon both the borrower being unable or unwilling to repay (the probability of default (PD)) and the property value falling below the amount owed (the loss given default (LGD)). In *non-recourse* loans (found in parts of the USA) the lender is unable to recover any amounts owed from the defaulting borrower over the amount realised from sale of the property.

[2] The issue of a mortgage will generally involve valuation (of the property) fees, stamp duty, registration fees etc.

[3] The Personal Property Securities Register (PPSR) is where lenders register claims over assets.

One of the attractions of a standard "credit foncier" loan is that the regular repayments of a constant amount comprising principal plus interest (P&I) components lead to the outstanding balance declining over time, reducing possible loss given default since the underlying collateral (the property) is likely to have increased in value. Thus, *cet par*, the risk of losses on the loan "back book" (older loans) is likely to be smaller than that of the "front book" (new loans) since loan to valuation ratios are likely to have declined over the life of the loan. Nevertheless, Australian banks have typically applied a "standard" loan rate to both the front and back book, indeed increasingly offering "specials" to attract new borrowers where the rate is discounted. There has been much recent commentary about this, with suggestions of a "loyalty tax" being applied by banks to long-standing borrowers.

In July 2011, the government removed the ability of lenders to charge loan exit fees, which should have increased the likelihood of existing borrowers taking advantage of cheaper loan rates elsewhere. However, the relative lack of switching observed suggests borrower inertia or the existence of other inconvenience costs involved in switching. The introduction in 2020 of Open Banking has been suggested as likely to further facilitate switching and reduce the ability of banks to impose such a "loyalty tax".

An alternative to a "credit foncier" (P&I) loan is an Interest Only (IO) loan, which involves regular payments only of interest and a principal repayment obligation at the end of the loan term (such as five years). The regular payments are somewhat lower (since no principal is involved), making these attractive to property investors looking to (partially) cover repayments with property rental income and planning to either roll-over the loan at the end of its term or make repayment by sale of the property at (hopefully) a capital gain. (Such a strategy can involve "negative gearing" which exploits differential tax treatment of interest costs and capital gains). These IO loans had grown in popularity, but regulators have been concerned about the greater default risk (and consistency with responsible lending) and have increased supervisory intensity and bank capital and other requirements for IO and Investor loans relative to P&I owner occupier loans. Details can be found in this RBA article.

Lenders can enhance the quality of a mortgage loan by requiring lender's mortgage loan insurance (LMI), and will do so for high LVR loans. (The borrower pays the insurance premium, but it is the lender who was insured against loss). Previously HLIC, MGIC etc., provided facilities for mortgagees to insure against default by borrower. Genworth is now main provider, and some banks have "captive insurers" which they use instead. Mortgage insurers are "mono-line" and have a "diversified" portfolio of loan insurance commitments - and are only effectively insuring excess of loan obligations over property value. Details of LMI can be found at bank websites such as this one.

The most common Australian housing mortgage contracts have a somewhat unique characteristic. Australian homebuyers sign a mortgage contract with banks which gives banks the right to change the loan interest rate whenever and to whatever they want. Elsewhere, fixed rate or adjustable (tied to an index) rate mortgages are more common. This has two important consequences:

When banks change their standard variable home loan interest rate, the change applies to the "back book" (existing borrowers) as well as to new loan applicants. However, there has been an increasing trend towards "specials' and "discounts" for new borrowers which have led to significant gaps between the rates on the back book and new loans. (Marion Kohler, RBA, 2017)

The risk of bank funding cost changes (both due to general movements in interest rate levels and factors specific to that bank – such as credit rating changes) is passed on to existing borrowers.

The former Chairman of ASIC, Greg Medcraft, has argued that Australian banks should be required to make housing mortgage loans as "tracker mortgages' for which the interest rate charged adjusts in line with the RBA cash rate. Is there merit in this? (see here for my views)

Prepayments

A common occurrence is that a borrower might wish to sell the underlying asset before the maturity of loan. There thus needs to be some mechanism to facilitate this.[4] Most commonly, the borrower has an option to prepay the loan. In a variable rate loan, there should be no penalties for doing so. Australian banks used to impose penalties (partly to prevent customers switching to another bank offering better deals) but legislation prohibiting such exit fees was introduced in June 2011. Of course, if the loan is a fixed rate loan, some penalty may be appropriate (and is allowed).

One problem for lenders is that a mortgage is an illiquid (long term) asset. While it is possible to sell the loan to a third party, information asymmetries and transactions costs create impediments to a sale. For example the lender has better knowledge about default risk than a potential purchaser, and has an established mechanism for collecting repayments from the borrower. Nevertheless, some direct loan sales do occur and many are implicit in securitisation processes. In the latter, a package of loans is placed in a Special Purpose Vehicle (SPV), credit enhancement is provided via third party insurance and/or overcollateralization, to make securities issued by the SPV to investors attractive. Those securities are sold in "tranches" giving differential rights to timing of cash flows (to deal with loan prepayments) and differential seniority.

[4] One approach used in the USA is assignment of a mortgage to new owner. However the new owner may not want that loan or the lender might not like the new owner's credit rating.

## Inflation-Indexed Mortgages

As well as discretionary variable rate, adjustable rate, and fixed rate loans, a number of innovations in interest rate arrangements have been seen over time. We focus here on housing mortgage loans.

One is "fixed real rate" loans or “indexed” loans. In one approach, the nominal interest rate is determined each period as a constant real rate plus an inflation premium determined by reference to the published inflation rate for that (or the previous) period. Alternatively, the principal amount outstanding is indexed in line with inflation, and interest calculated as a fixed real rate applied to the adjusted principal. The borrower bears the risk of inflation, but not that of real interest rate changes. This may appear attractive because the borrower has "asset exposure" of the property value to inflation, providing something of a hedged position.

But also important has been the cash flow pattern consequences of an indexed loan to a standard loan. In particular an indexed loan “back-ends” nominal repayments to later periods when inflation will have increased the borrower’s income and ability to meet those payments. Naturally these types of loans have attracted more interest in periods of high inflation and consequent high interest rates, when the real repayments of a traditional loan are relatively high initially but decline over time.

Other innovations seen from time to time are shared equity loans or shared appreciation mortgages (SAMs). The borrower is charged a lower interest rate, but gives up some proportion of the increase in value of the mortgaged property to the lender.

## Determining Mortgage Loan Interest Rates

The standard (eg RAROC) approach to setting loan interest rates (discussed in Section 10.3) could be described as a "cost plus" approach. The loan rate is set to cover the cost of funds (including return on bank equity) plus a margin to reflect loan administration/operating costs and an allowance for default risk. Because there are also significant initial fixed costs in valuing properties offered as collateral, checking title, assessing the credit rating of applicant etc., there may be significant up-front fees (rather than these costs being incorporated in the interest rate charged).[5]

***Comparison Rates***

How do you compare the effective cost of two loans, which have different interest rates and different up-front fees? The pattern and amount of cash flows obviously differ between the two loans. A common (although imperfect) approach is the *comparison rate* which Australian lenders provide. This aims to convert up-front or other fees into an equivalent interest rate such that a “comparison rate” can be calculated. Examples can be found here and here. Using either, compare the rates on loans (a) $300,000, interest rate 5.00% p.a., 30 years, up front fee of $2,000, and

[5] In U.S.A these are referred to as "points" i.e. a fixed amount equal to some percentage of the loan principal.

monthly account fee of $100, and (b) $300,000, interest rate 5.20% p.a., 30 years, no up front fee, and no monthly account fee.

The problems with the comparison rate calculation (including the fact that the average loan has an actual life of around 5 years even though its contractual life may be 30 years) are discussed here.

The standard approach to setting loan interest rates raises the question of what is the appropriate cost of funds figure to use in home loan pricing. Banks typically (for a decade or so) used monthly RBA cash rate changes as an opportunity to change rates by generally the same amount. That relationship has broken down in recent times. See, for example, this analysis in the RBA Bulletin, 2017 and the Funds Transfer Pricing approach used by larger banks in determining cost of funds for different types of loans is discussed in Chapter 15.

## Repayment Terms

The standard mortgage loan is generally referred to as a *Credit Foncier* loan involving equal regular repayments consisting of a changing mix of principal and interest sufficient to amortise the loan by the required date. This is, from the bank's perspective, an annuity - an outflow of say $500,000 today, generates a number of equally spaced constant cash inflows over the term of the loan. (Of course, if the interest rate is adjusted during the life of the loan, the repayments change to ensure amortisation under the new interest rate at the maturity date. Lenders may alternatively keep the repayment rate constant but change the maturity date)

To calculate the required repayment, use the annuity formula to answer the question: what is the regular repayment required (X) if the principal amount borrowed (P) and interest charges at rate r% per period is to be repaid by N equal payments? The P.V. of that annuity must be equal to the principal handed over. Hence:

$$P = X[\,1 - (1+r)^{-N}] / r$$

Rearranging

$$X = r.P /[\,1 - (1 + r)^{-N}]$$

Example: Principal $100,000, 25 years, monthly instalments, *monthly* interest rate 1.5 %.

$$X = .015\,(100{,}000)/(\,1 - .0114865)$$

$$= 1{,}500 / .9885$$

= $1,517.45 per month

(Using a spreadsheet and the =PMT() function (or equivalent) is a very quick way to calculate repayments)

Note that for very large N, $X \approx r.P$, so that

$dX/X \approx dr/r$

In that case, a 10 per cent increase in r from say 10% to 11% increases required repayments by almost 10%. In practice sensitivity of repayment amounts to interest rate changes is not quite this large. For example a 10 per cent increase in the interest rate charged from 6.0% to 6.6% p.a. would increase monthly repayments on a 30 year loan by 6.5 per cent, which could push a borrower into financial distress or default. This is one reason why banks (and prudential regulators) when considering loan applications examine repayment capacity at interest rates several percentage points above current rates.

## Alternative mortgage options

There have been a range of alternative mortgage products developed over the years, and it is conventional wisdom that such products contributed to the GFC. Cocco (JF, 2013) suggests that many of the products have merit by providing better alternatives for households to smooth lifetime consumption and to manage risks.

But all innovations turn out to be desirable. A good example is Endowment Mortgages commonly used in the UK in the 1980s- 1990s? The problems they caused were substantial.

## Selling Mortgage Loans

Traditionally, home buyers obtained a mortgage loan via dealing with their local bank branch manager. In the last two decades that has changed to the point where around half of new mortgage loans are obtained through a mortgage broker. The mortgage brokers provide advice to borrowers on alternative loan products and their suitability and cost, and produce and send the necessary documentation for a loan application to the preferred bank. Some mortgage brokers are individuals (with an Australian Credit Licence) while others are representatives of large mortgage broking firms (such as Mortgage Choice). Those larger firms will have their own electronic systems to interface with banks' systems, while individual brokers will typically use the services of an "aggregator" to provide that electronic link.

The remuneration of brokers is a controversial topic, and has generally been by way of the bank providing a commission on loans originated for it by the broker. The commission structure has involved an up-front commission (typically around 0.6% of the loan size) and an annual trailing commission (around 0.18 % of the outstanding loan balance). Brokers may also receive "soft-dollar"

commissions in the form of free services from the bank or third parties (paid for by the bank). A report by ASIC (2017) identifies problems with this model including incentives to push borrowers into larger loans and interest only loans (which means higher trailing commissions). The Hayne Royal Commission recommended the ending of the commission structure, but this recommendation was rejected by the Government.

### Loan Pricing and Switching

Topics which have been of concern for policy-makers have been:

1. The determination and disclosure of loan interest rates
2. The ease of "switching" from one lender to another during the term of a mortgage.

These issues were investigated by the ACCC in its inquiry into home loan pricing. The first topic was addressed in an April 2020 report and the second in a November 2020 report

## 9.4 Reverse Mortgages (Equity Release) Products

Many argue that reverse mortgage products are a desirable way for retirees to "unlock" the equity in their home to generate cash flow for retirement consumption. But they have had a chequered history in Australia (partly due to some poorly designed products) and have not proven as popular as they might.

A reverse mortgage is essentially just what the name implies. An owner of a house obtains cash either as a lump sum or regular payment over time from a lender in return for agreeing to pay back those funds received (with interest) when the house is sold at some future (uncertain) date.[6] (Early repayment of the outstanding balance will also be generally possible). Most often the reverse mortgage will involve the loan providing the borrower with a regular (eg monthly) cash flow (like an annuity) to supplement pension or other retirement income. But a lump sum could alternatively be obtained to finance some large once-off expenditure.

What makes a reverse mortgage appear complicated is the potential problem that the amount owed could grow over time to exceed the value of the house.[7] The house owner would thus need to use other wealth (if they have any) to repay the loan amount owed. And from the lender's perspective there is uncertainty about the timing of the house sale (which is at the owner's discretion) and thus timing of receipt of the amount owed. Consequently, such products will typically involve (either because of legislation, or good product design) a restriction that the owner's equity in the house can

[6] Conversely, in a regular mortgage the individual receives a lump sum to help buy a house and repays it, together with interest, over time.

[7] Consider for example, if a loan of $400,000 granted as a lump sum at date 0 at an interest rate of 10%, secured against a house of value $600,000. If the house value did not grow, then the outstanding loan obligation (given by $\$400{,}000(1.10)^T$ at date T would exceed the house value after just 4 ¼ years.

never become negative. (This can be thought of as the reverse mortgage being a "limited (or no) recourse" loan where the lender can only claim repayment from the house sale proceeds and not from the borrower if the sale proceeds are not sufficient to meet the loan obligation).[8]

Another complication arises if the product design involves the house owner receiving an annuity which runs until the house is sold rather than for some fixed period (or lump sum). Then the total principal amount which will have been advanced by the lender over time until the uncertain date of future sale will be uncertain. This is in addition to any uncertainty created by future changes in the interest rate being applied to the amount outstanding.

To avoid the "negative equity" risk, reverse mortgages will generally be limited to some maximum percentage of the house value which will typically be higher for older owners. The rationale is that sale is likely to occur sooner for older owners (due to downsizing, moving into aged care accommodation, or due to death). For example, a typical loan/valuation ratio for a 65 year old homeowner could be in the order of 20-25 per cent. Generally, lenders restrict eligibility to elderly home-owners (for example of age 60 or above).

In Australia, reverse mortgages began to grow in popularity during the 1990s, but growth stalled at around the time of the GFC. (Some history, and much more information on the topic is available in Chapter 5 of this research paper by the Productivity Commission). One cause was the problem that the GFC disruption to financial markets created for the ability of reverse mortgage providers to obtain finance to fund their lending activities. Another was bad publicity arising from some unsuitable products (such as involving a sale to the lender of the home at a discounted price in exchange for a stream of cash flows and occupation agreement with, the lender)[9]. In 2012, new government regulation of reverse mortgages was introduced (including a no negative equity guarantee (NNEG) requirement, responsible lending and disclosure obligations, and prescribed maximum loan/valuation ratios for loans to be deemed suitable[10]).

The GFC experience led to a mass exodus from the industry. Following the 2012 regulation there was a further exodus, with major banks abandoning the product, such that by 2020 there were only a handful of providers. These included Household Capital, HomeSafe, Heartland Senior's Finance, and P&N Bank. Other than one equity release provider (Homesafe) associated with Bendigo and Adelaide

[8] Equivalently, it can be thought of as the owner having a put option granted by the lender to give the house to the lender to meet the loan obligation owed.
[9] The 2005 failure of a provider of such a product, Money for Living, meant that payments to the borrower ceased and created problems regarding continued occupation of the house (which had been on-sold to another party), and led to ASIC action against the product provider.
[10] For a loan to be deemed suitable by ASIC, the maximum loan to valuation ratio cannot exceed 15 per cent plus an additional 1 per cent for every year by which the borrower's age exceeds 55.

Bank[11], the remainder were non-banks. (Some have suggested that the regulatory capital requirements applied to reverse mortgages for banks has contributed to their lack of interest in the product). In 2018 ASIC released a report (Report 586) examining the reverse mortgage market in Australia. It found that while there were potential benefits for retirees from such products, there were still cases where terms and conditions and advice could be improved for enhanced financial consumer protection.

In addition to private providers, the Government operates a form of reverse mortgage scheme, the Pension Loans Scheme (PLS), available to pensioners. Participants receive the cash flows as an addition to their age pension benefits. It has not proven particularly popular, partly reflecting poor marketing, but also partly reflecting householder concerns regarding use of reverse mortgages.

There are a number of possible explanations advanced for households being hesitant to enter reverse mortgages. One is the change in psychology required from focusing on paying off a mortgage to going back into debt via a reverse mortgage. A second is the relative complexity and lack of understanding of the product (and its implications if assisted aged care accommodation is needed in the future). A third is the level of interest rates applied which are generally around 300 basis points or so higher than for normal mortgages – reflecting the higher administration costs, costs of funding to providers, and repayment risks faced by providers. A fourth is the bequest motive, with many retirees willing to accept lower living standards in order to pass on unencumbered ownership of the family home to their descendants.

Interestingly, the decision by banks to offer mortgage repayment deferrals to customers during the crisis of 2020 can be interpreted as temporary informal provision of reverse mortgages. Regular repayment obligations of principal and interest of traditional mortgages were suspended with the interest accruing and increasing the amount owed. The zero net cash flows for the customer over the period of deferral can be interpreted as equivalent to regular mortgage repayments being offset by the cash flows received from a reverse mortgage.

Equity release products have potential as one component of funding of retirement living, but that potential remains largely untapped with only around 50,000 reverse mortgages in existence in 2020. But in a period of very low interest rates such as currently, their attraction could be expected to increase (since the outstanding balance owed will grow more slowly).

[11] The Homesafe product differs from the typical reverse mortgage in that the agreement involves the provider of funds obtaining a percentage equity stake in the eventual sale price of the house.

## 9.5 Credit Card Lending

Credit cards provide both a payments service as well as being a revolving credit facility. The card holder is given a credit limit on the card and can have up to that amount outstanding on the account as a result of purchases or direct borrowings using the card. Repayments made on amounts outstanding increase the credit available for use by the cardholder. Typically there will be a requirement for the holder to make a monthly minimum payment of some percentage of the outstanding end of month balance within some specified time (such as three weeks) after the end of the month. The holder thus will have credit provided, generally with no interest charge, for up to seven weeks (for a purchase made at the start of the billing month). However, if the entire balance is not paid by the specified date, a substantial interest charge will apply to the outstanding balance – often backdated to the end of the billing month.

Card issuers charge annual (and other) fees for provision of cards, recent figures are shown in Table 1. In 2016 Australian banks generated $1.56 billion from such fees. Table 1 identifies different types of cards – rewards cards and non-rewards cards, where the former involve higher fees but where the user receives rewards (such as frequent flyer points with an airline) related to use of the card in making purchases.

Banks will generally issue a credit card which is branded with a VISA or Mastercard logo. While the credit involved is extended by the bank, that branding indicates the payments system involved – such that use of the card as a credit card means that the electronic signals are routed through that particular system.

At May 2017, aggregate credit limits on credit (and charge) cards were $151.6 billion (or about $10,000 per adult). Of $52 billion outstanding balances, $33 billion was accruing interest. Cash advances in that month (often via ATM withdrawal) were $0.84 billion.

Credit card loans outstanding (measured by balances accruing interest – Table C01 RBA Statistics) grew steadily from the early 2000's, doubling by 2010, since when it remained relatively constant until the start of 2019, since when it has declined (particularly in the first half of 2020) by about 25 percent.

Rodgers (2015) provides information on credit losses on credit cards for major banks from 2008 to 2013. The annual net write-off ratio has fluctuated around 3 per cent (slightly above credit losses on other personal lending since 2011, but below prior to then). Table 2 provides information on interest rates charged on credit cards.

Why is the standard interest rate on credit cards so much higher than the rate on personal term loans, given that default rates are relatively similar?

What are the implications of banks offering rewards cards?

What factors might explain the decline in credit card loans since the start of 2019?

**TABLE 1: CREDIT CARD FEES (SOURCE RBA)**

| | 2014 | 2015 | 2016 | Annual growth 2016 Per cent |
|---|---|---|---|---|
| Annual fees ($) | | | | |
| Non-rewards cards | 51 | 53 | 53 | 0.0 |
| Rewards cards | 186 | 185 | 191 | 3.3 |
| All cards | 134 | 133 | 137 | 3.3 |
| Other fees | | | | |
| Foreign currency conversion fees (per cent of value) | 2.9 | 2.9 | 2.8 | –1.0 |
| Late payment fee ($) | 19 | 17 | 18 | 2.3 |

(a) Simple average fees for cards issued by a sample of seven banks; only cards that are available to new cardholders are included in the sample; note that changes in the sample affect the average fee; as at June of each year
Sources: Credit card issuers' websites; RBA

**TABLE 2: PERSONAL CREDIT INTEREST RATES (SOURCE: RBA STATISTICAL TABLES – F5)**

| | Personal Term loans (unsecured) - Variable rate | Credit cards; Standard Rate | Credit cards; Low rate | Home equity (revolving credit) loans | Margin loans |
|---|---|---|---|---|---|
| Jun-17 | 14.51 | 19.77 | 12.93 | 6.35 | 7.01 |
| Jan-20 | 14.41 | 19.94 | 13.03 | 6.20 | 6.55 |
| *Notes* | *($15,000, 3 years)* | *(Visa/Mastercard)* | *(fewer features)* | (secured by propery) | |

ASIC undertook a review (Report 580) of credit card lending in Australia between 2012-2017. It found that: 18.5% of card-holders showed evidence of problematic debt (delinquencies, debt persistence, low repayments); a number had cards with characteristics which were not well suited to their behaviours; "balance transfers" to a new card were not always desirable; Card providers were not proactive in addressing consumer problems. The Senate Economics Committee also produced a report in 2015 focusing on the "stickiness" of credit card interest rates and consumer understanding of card characteristics

One commonly heard complaint (generally when interest rates have fallen) is on the lack of sensitivity of credit card interest rates to changes in the general level of interest rates. At mid 2020 Canstar indicated interest rates in the vicinity of 20% p.a. for many cards.

An alternative to credit cards is for a customer to obtain an overdraft facility at their ADI and use a debit card. The main difference is that minimum repayments of the amount owing are required on

credit cards, whereas that is not so with an overdraft (although the bank will encourage such behaviour). Also an overdraft facility will incur some annual fee.

Buy-Now-Pay-Later (BNPL) schemes are a recent challenger to credit cards. One response has been the announcement in 2020 by banks such as NAB (NAB StraightUp) and CBA (CommBank Neo) of no-interest credit cards. While the details vary, these innovations essentially involve users paying a monthly fee (linked to the size of their credit limit), but only if they use or have an outstanding balance on the card during that month.

## 9.6 Syndicated Loans

The main features of syndicated loans are that the borrower appoints a lead manager and arrangers (2-3 per deal), who put together other funders such as banks or institutional investors, both domestic and foreign.[12] Major Australian banks are lead arrangers of about half of Australian syndicated loans. The composition of a syndicate is an important decision for the lead manager, and the number of lenders varies but can be as many as twenty or so. There is one loan contract with syndicate members having a claim and associated risk on their agreed portion. The resulting efficiencies indicate why there are benefits relative to the borrower arranging smaller individual loans with a number of different lenders.

But, an important question is why would a bank syndicate a loan and share possible profits rather than make the entire loan itself. One reason is that the risk is also shared – although that raises the obvious question of why other lenders (with less detailed knowledge about the credit risk of the borrower) would participate given the likely superior knowledge about default risk held by the lead bank. That asymmetry of information problem can be overcome if the borrower is well-known to participating banks, but also important is risk to the reputation of the lead manager and arrangers, and future prospects of obtaining management/arrangement fees, if they have arranged loans which fail and involve losses to members of the syndicate. Syndicate members will also derive comfort from the fact that the lead manager will hold a significant portion of the loan itself. The lead manager plays an implicit *certification* role regarding the quality of the borrower's debt.

[12] This ANZ article indicates that the number of non-bank lenders (such as superannuation funds) involved in the market was around 40 in 2018 and likely to grow substantially to perhaps account for fifty per cent of lending in future years. (APLMA is the Asia-Pacific trade association for syndicated lenders).

As well as the *ex ante* information problems, regarding whether the borrower is a good credit risk and what risk premium should be incorporated in the interest rate charged, there is also the *ex post* information problem. Once the loan is made, who is going to monitor the borrowing company to ensure that it complies with loan covenants and is not taking actions which increase the risk of the loan. While all participants will undertake some monitoring, the existence of a lead manager with reputational incentives to perform those tasks can reduce the level of effort for other participants.

Another reason is that individual banks will have self-imposed limits on credit risk exposure to individual borrowers. Syndicating a loan reduces the likelihood of not being able to arrange a loan for a valued customer because of those limits.

Syndicated loans can be term loans or revolving lines of credit. Many syndications (about 1/3) involve a number of tranches with difference risk characteristics (eg term loans and revolving facilities). There is one loan contract, multiple lenders (banks) each with a separate claim on a proportion of the loan. Lead managers have a monitoring role.

The Australian syndicated loans market is large.[13] Over recent years the number of deals done has generally been in the 150-200 per year. (Some data providers present the data on a LTM (last twelve months) basis which smooths out the quite significant quarterly variability). The total volume lent has been in the order of $100 billion per year since 2015. Loans are of large size, the average being in the range of $0.5 – 1 billion, with many exceeding the $1 billion amount. Typical maturity is in the 3-7 year range. There is potential for secondary market trading of participations, but not much occurs in Australia. Tram Vu and Viet Do argue in this article that lack of standardisation of syndicated loan contracts is one reason for this situation. For the US Berger et al provide evidence that where lead banks have higher capitalisation the bid ask spreads in secondary markets for loan syndications are lower. This, they argue is due to lead banks being the principal market makers.

Components of a loan contract pricing can include: spread over LIBOR or BBSW; upfront fee; commitment fee (on unused amount) or facility fee (on committed amount regardless of usage); utilisation fee (when over some percentage usage); cancellation fee. Some fees may vary over time with some measure of the borrower's credit quality. Fees can be significant relative to spread.

As an example Woolworths Ltd obtained a syndicated loan in November 2016. There were three tranches of: $320m for 3 year maturity at a spread of 140bp; $200m for 4 years at a 160 bp spread; and $140m for 4 years at a 160bp spread. There were 30 banks involved. In 2019, it did another

[13] The historical development and characteristics of the Syndicated Loan market in Australia is discussed in this 2005 RBA Bulletin article.

syndicated borrowing of $1.5 billion (partly replacing existing facilities) in three tranches with tenors of 4,5 and 7 years and at spreads over the bank bill swap rate of between 95 and 130 basis points.

KPMG (among others) produces regular debt market updates (see here for the q3-2020 version) which include some information on syndicated lending.

## 9.7 Bank Accepted Bills

The *Bills of Exchange Act 1909* defines a bill of exchange as "An unconditional order in writing, addressed by one person to another, signed by the person giving it, requiring the person to whom it is addressed to pay on demand or at a fixed or determinable future time, a sum certain in money or to the order of a specific person, or to bearer". A bank accepted bill is a bill of exchange which has been “accepted” by a bank.

It is a discount security involving three parties: payer/acceptor (bank), drawer, payee. It is an instruction by the drawer to the payer to pay a specified sum on some future date to the payee, and becomes a bank accepted bill when the designated payer (a bank) accepts the obligation to make the payment. (The bank will require the drawer to reimburse it for making that payment, and charge a fee for providing the service).

Bills originally arose as trade financing instruments. Bank accepted bills enable a buyer of goods to defer payment and providing the supplier of goods with a bank guarantee of payment – in the form of a negotiable instrument (BAB) which could be sold for cash prior to maturity if so desired. (Sale requires endorsement and a contingent liability for the seller of a bill is created in that if the acceptor, drawer, and any preceding endorsers (sellers) default, the endorser is liable for payment).

Bank Accepted Bills became popular as a lending technique in the 1970s and 1980s –no underlying trade transaction is necessary, and using BABs enabled banks to avoid regulatory restrictions. Banks could either hold the BAB (and thus provide the funding to the borrower themselves), or discount (sell) it in the market such that the funds were effectively provided by a third party (the purchaser of the bill). The market has shrunk dramatically since the start of 1990s as the Basel Capital Accord capital requirements treated such financing as equivalent in terms of credit risk as making a normal loan.

Another aspect of bill financing is that it generally involves the bank providing a *facility* to the customer, giving the customer the option for some period (eg a year) to draw bills up to some limit on outstanding value for various maturities. This enables to customer to borrow via "rolling over" a series of bills – eg drawing a 90 day bill and then a subsequent 90 day bill when that one matures.

*Pricing* of bank bills Treasury Notes and other money market securities in Australia uses "Yield Rate" where:

$$P = F / [ 1 + r.t / 365 ]$$

*P* is price, *F* is face value, *r* is the yield for maturity *t.*

Note that this is just a present value relationship where a simple interest method is used to calculate the part year interest factor. Note that a 365 day year convention is used in Australia – choice between 360 and 365 differs between countries and markets.[14]

## Bank Accepted Bill Financing Example

1/4/xx, A draws a bill instructing BANK to pay A (or bearer) $mill 1.0 on 1/7/xx.

BANK accepts obligation (for a fee - say 1% - and A's promise to reimburse BANK $mill 1.0 on 1/7/xx).

A discounts (sells) bill to some third party B at 8% p.a. yield for receipt of P = $980,444.83 (typically bank will do this itself and simply provide A the funds)

| | 1/4/xx | | 1/7/xx | |
|---|---|---|---|---|
| **A:** | Receives | $980,444 | Pays (to bank) | $1.0 mill |
| | Less fee | $10,000 | | |
| | Net | $970,444 | | |
| **BANK** | Receives | $10,000 | Pays (to B or presenter of bill) | $1 mill |
| | Incurs $1 mill liability | | Receives from A | $1mill |
| | Acquires $1 mill asset (A's promise to pay) | | Net | $0 |
| **B** | Pays | $980,444 | Receives | $1 mill |
| | Receives Bank Bill | | Presents Bank Bill | |

Bank Certificates of Deposit are generally seen as perfect substitutes for Bank Accepted Bills, such that the bank bill swap rate is now calculated for "prime bank eligible securities" which incorporates BABs and NCDs.

[14] A Discount Rate approach is used in quoting of US Treasury Bills and in some other markets. If d is the discount rate, and t is the maturity (in days) of a US Treasury Bill with Par (face / future) value of F, the price of the US T Bill is P = F [ 1 – dt/360 ]. Note: a 360 day year is used.

## 9.8 Merchant Cash Advances

A different style of "loan" is available for (primarily) smaller businesses that make sales that customers pay for via some form of mechanism which enables a potential financier to verify the level of sales per period. These are known as merchant cash advances. This could be the case for an on-line retailer who accepts payment via credit cards or PayPal. The key features of such loans are that:

(a) because repayment of finance provided comes directly as an agreed specified percentage of sales revenue until repayment is completed, the provider needs to be confident that sales revenue can be verified, and

(b) the repayment obligation is specified as a percentage margin over the amount advanced (rather than an interest rate p.a.), meaning that the lender benefits when higher sales revenue means that the repayment occurs faster.

To illustrate, an online retailer might have an average sales revenue of $4,000 per month and wants funding of $3,000 for purchasing some inventory. The cash advance contract might specify that repayments will be made as 10 per cent of sales revenue until the $3,000 plus a margin of 2 per cent (ie a total of $3,060) is repaid. Based on the average level of sales, the expected time till the funding is repaid is just over ¾ months, but could be much longer (shorter) if sales fall off (improve).

The 2 per cent margin used in this example might seem like a small amount, but based on the expected time to repayment it equates to a very high effective annual interest rate. With $3,000 initially borrowed, and smooth sales and repayments the average amount outstanding is around $1,500 over ¾ months. The $60 fee (for an average loan amount of $1,500 for just under a month) expressed as an annual percentage interest rate is in the order of 60 per cent!

In practice the margin (fee) can be much higher than the 2 per cent used in the example (perhaps 10 per cent or more). It will reflect the expected length of time till repayment is completed, the volatility of the merchant's sales (which creates uncertainty over the time to repayment), as well as other factors such as default risk and administration costs. The attraction for a merchant is that the cash outflows associated with the loan are linked directly to cash inflows from sales, avoiding the problem of having to meet fixed repayment amounts in periods when sales revenue has declined. The loan is also generally unsecured. A downside may be conditions applied by the lender to ensure that sales are routed via some particular payment method(s) to enable verification of sales level.

PayPal is one provider of such Working Capital Loans, with a main target audience of on-line retailers making sales via EBay. Loan amounts of up to 25% of the retailer's PayPal sales over the last year are available, and there is also a condition that at least 5% (for longer term loans) or 10 % (for shorter

term loans) of the total loan amount must be paid every 90 days. Started in 2013 Paypal had lent more than $1 billion to over 60,000 small businesses in the U.S., U.K. and Australia by October 2015.

## 9.9 Margin Accounts / Lending

Margin accounts are a facility enabling a customer to purchase securities partly financed by loan from the financial institution, where the securities are held in the account. An initial deposit of funds / eligible securities is required and margin calls (requiring the customer to deposit more cash) will be made if the value of the securities falls (below some point) relative to the loan amount outstanding. Current margin loan facilities on offer can be found here.

In the USA typically securities purchased by customer are registered and held in "street name" (name of securities firm). The customer gets regular account statement and dividends etc passed through to customer. The securities firm has right to use securities held for collateral for bank loans to it and to borrow securities for short selling.

In Australia, new legislation (*Corporations Legislation Amendment (Financial Services Modernisation) Act)* in 2009 (following a Treasury Green Paper of 2008) introduced a "standard" margin loan facility, in which the customer retains legal title to the securities. This was a response to the failure of *Opes Prime* and some other "margin lenders" who were using a securities loan transaction involving transfer of title).

**Margin Lending Example**

Customer deposits $10,000 in margin account

Initial Margin requirement is 50%

Customer has borrowing capacity of $10,000

Customer buys $20,000 of ABC stock

Account has Asset: $20K of ABC, Liability $10K borrowed funds, net worth $10K

If ABC price drops 10%, account has assets of $18K ABC and Liability $10K, such that net worth is now $8K. The actual margin is now $(18-10)/18 = 44.4%.

This illustrates the effect of leverage, a 10% share price fall creates, 20% fall in net worth.

If the actual margin drops below some specified "maintenance margin" (of say 35%) a margin call requiring deposit of cash will be triggered (or the securities will be sold).

There was massive growth in margin lending prior to the stock market collapse at end 2007 and the financial crisis, to a peak of around $40 billion of loans outstanding, since which time the sector has been subdued. As Figure 1 shows loans outstanding have since been around $10 billion, but appear

to have increased substantially since late 2019. Within margin lending, capital protected products have fallen in use dramatically.

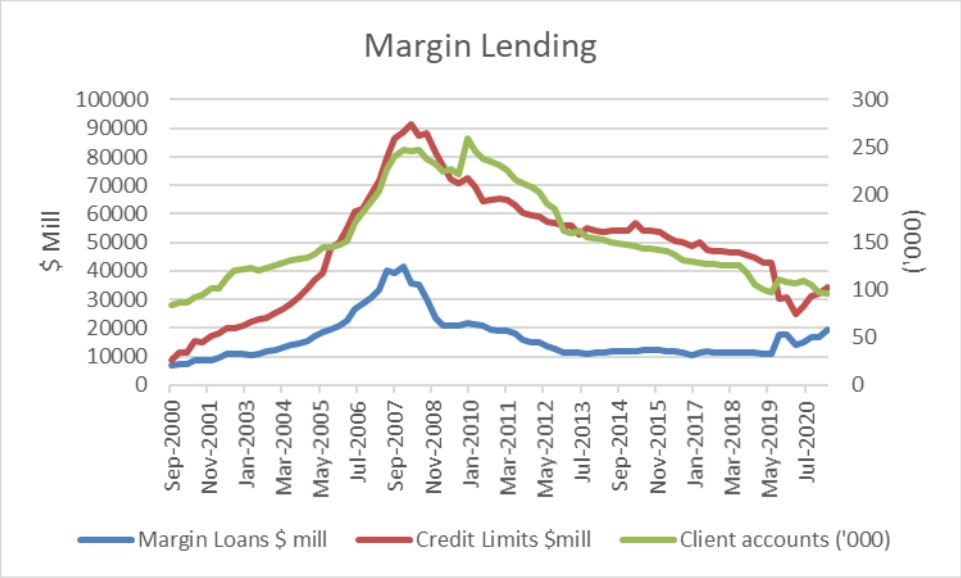



**FIGURE 1: MARGIN LENDING IN AUSTRALIA (SOURCE RBA)**

"Stormified" – A Case Study

Storm Financial became infamous after the GFC through its role as a financial planner in destroying wealth of its clients. It was one of the main subjects of a Parliamentary Inquiry into Financial Products and Services in Australia (Ripoll Report)

Storm's approach is roughly characterised by the balance sheet evolution of a typical (retired) client below: Step 1 involves remortgaging the house to generate cash which in step 2 is combined with a margin loan to invest in equities.

Initially

| Assets | Liabilities |
|---|---|
| House $1m | New Worth $1m |

Step 1

| Assets | Liabilities |
|---|---|
| House $1m | New Worth $1m |
| Cash $0.8m | Mortgage $0.8m |

Step 2

| Assets | Liabilities |
|---|---|
| House $1m | New Worth $1m |
| Shares $1.4m | Mortgage $0.8m |
| | MarginLoan $0.6m |

Outcome (Stock market crash)

| Assets | Liabilities |
|---|---|
| | |

Calculate what happens to net worth when the value of shares falls to say $0.4m

# Appendix: Protected (Capital Guaranteed) Investment Products (Equity Loans)

These were a popular investment bank product where the Investor borrows amount L, for (say) 3 years which is invested in a specified share portfolio. Typically "interest only" repayments (in advance) until maturity so L is amount owed. Protection is provided against a fall in the market value of those shares via the loan involving a "no-recourse" or "limited-recourse" feature. The bank has security in the form of a mortgage on the share portfolio in the event of default by the borrower

- If the share portfolio value $S_T < L$ borrower can default and surrender shares to bank.
- If $S_T > L$, borrower repays loan, benefits from higher share value.

Some CPEPs may involve only partial protection. These are an allowable "geared" investment for self managed super funds.

**Hypothetical Protected Equity Loan Product: Cash flows**

| Date | 0 | 1 | 2 | 3 | |
|---|---|---|---|---|---|
| | | | | $S_3 < S_0$ Default on loan (Bank takes share portfolio) | $S_3 > S_0$ Repay loan |
| Loan principal | $+S_0$ | | | 0 | $-S_0$ |
| Interest | $-rS_0$ | $-rS_0$ | $-rS_0$ | | |
| Share Portfolio | $-S_0$ | | | 0 | $S_3$ |
| **Net cash flow** | $\mathbf{-rS_0}$ | $\mathbf{-rS_0}$ | $\mathbf{-rS_0}$ | **0** | $\mathbf{S_3 - S_0}$ |

Note: the date 3 payoff to the investor is a call option with strike $S_0$, Also equivalent to having stock, owing loan and buying put option to put stock to the lender to expunge the debt

**Table 2:**
**Hypothetical Partially-Protected Equity Loan Product: Cash flows**

| Date | 0 | 1 | 2 | 3 | |
|---|---|---|---|---|---|
| | | | | $S_3 < L$ Default on loan (Bank takes share portfolio) | $S_3 > L$ Repay loan |
| Loan principal | +L | | | 0 | -L |
| Interest | -rL | -rL | -rL | | |
| Share Portfolio | $-S_0$ | | | 0 | $S_3$ |
| **Net cash flow** | $\mathbf{-(S_0-L)-rL}$ | **-rL** | **-rL** | **0** | $\mathbf{S_3 - L}$ |

Note: the date 3 payoff to the investor is a call option with strike L, also equivalent to having stock, owing loan and buying put option to put stock to the lender to expunge the debt.

A "no-recourse" loan secured by the underlying asset is equivalent to the borrower buying an option to put the asset to the lender at a strike price equal to the amount owed. Enables leveraged positions without exposure of other wealth

Terms of the "no recourse" loan ("interest rate") incorporate both the pure interest rate on the funds lent and the value of the option provided. Option component compensates for "default" risk such that pure" interest rate should be risk free rate

**Replicating Protected Equity Loan Product: Cash flows**

| Date | 0 | 1<br>$S_1 < S_0$ Default on loan (Bank takes shares) | 1<br>$S_1 > S_0$ Repay loan |
|---|---|---|---|
| Loan principal | $+S_0$ | 0 | $-S_0$ |
| Interest | $-rS_0$ | | |
| Share Portfolio | $-S_0$ | 0 | $S_1$ |
| **Net cash flow** | **$-rS_0$** | **0** | **$S_1 - S_0$** |
| **REPLICATION** | | | |
| Buy Shares | $-S_0$ | $S_1$ | $S_1$ |
| Buy Put (deferred payment, strike $S_0$) | 0 | $(S_0-S_1) +P$ | P |
| Borrow & repay | $(S_0+P)(1-r)$ | $-(S_0+P)$ | $-(S_0+P)$ |
| **Net cash flow** | **$r(S_0+P) = r_qS_0$** | **0** | **$S_1 - S_0$** |

*Quoted rate ($r_q$) reflects risk free rate (r) plus put option cost (has tax implications – option purchase is a capital transaction)*

## Appendix: An Australian Case Study: Opes Prime

Opes Prime was engaged in margin lending activities – loans to clients secured against shares purchased, (many were major shareholders in small companies borrowing against existing holdings):

But: the transactions were done under a securities lending contract. This meant that ownership passed to Opes Prime (and they subsequently on-lent shares to ANZ, Merrill Lynch to raise funds – "rehypothecation"). See Figure 2.

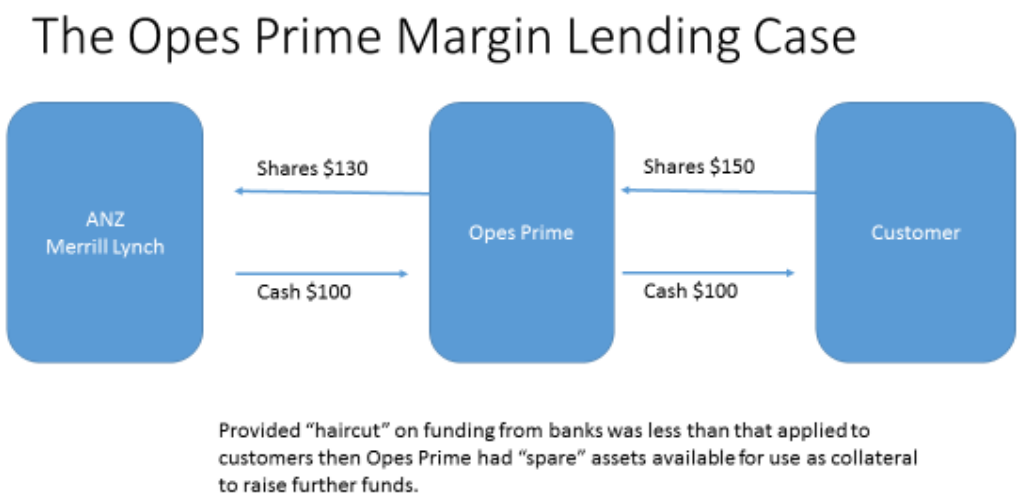



FIGURE 2: OPES PRIME

Accounting "irregularities" etc saw Opes Prime fail. (An overview is available here). The clients had lost title to shares, worth more than amounts owed to Opes Prime. Some compensation was ultimately provided by bank funders of Opes Prime, but not before there were a range of "unofficial" attempts at resolution. (The principals of Opes Prime received jail sentences for a range of

misdeeds).

## Opes Prime: Resolution issues

"Mr Gatto will fly to Singapore today with a business associate to pursue the Opes Prime money trail, but has declined to reveal who he will be seeing there or who he is representing.
Mr Gatto's private company, Arbitrations & Mediations — which he says makes "problems disappear" — has in the past been engaged to deal with feuds on Melbourne construction sites.
Yesterday, Mr Gatto told *The Age*: "These Opes Prime clients can take their chances and lose all their money to lawyers and to the receivers, or they can take their chances with me to extract a return on their behalf."

Gatto: The underbelly of market regulation

http://www.theage.com.au/articles/2008/04/07/1207420303583.html

# 10. Bank Lending and Credit Risk

"A debtor is someone who owes money;
A creditor is someone who thinks they will get it back"

## Contents

## 10.1 Introduction

Credit risk is, hardly surprisingly, generally regarded as the major type of risk faced by banks. After all, the main business of banking is making loans – which carries the risk that the borrower will default and the bank will incur a loss. (But credit risk can arise in other ways as explained in the next section).

For the bank, then, assessing the risk associated with any potential loan is important, and obtaining information to assist in that assessment is critical. Some important information sources, and techniques of credit assessment, are discussed in later sections. The bank is also subject to a range of regulations, most notably responsible lending obligations (RLOs), in making loan decisions which are also discussed later. Monitoring customers with outstanding loans, and having loan contract terms which enable the bank to act, to reduce the risk of non-repayment and loss to the bank, is also important.

Of course, the bank needs to consider the risk of its overall loan portfolio. There will be some degree of correlation between defaults on loans in its portfolio, with a higher correlation increasing the risk of larger loan losses occurring in some periods (even if the average level of loss over a long period is the same). This is generally considered in the context of the distinction between *expected loss* and *unexpected loss.* In any category of borrowers there is some probability that full repayment of a loan will not occur, and banks will assess the expected loss associated with that, and aim to cover it by setting of an interest rate on that category of loans which reflects the expected (or average) loss rate.

Better categorising of borrowers to get more precise and accurate estimates of expected loss for individual borrowers and setting interest rates reflecting that, is the holy grail of bank lending. More accurate pricing of loans, such that low-risk borrowers get lower interest rates, should lead to the bank attracting such borrowers and deterring higher risk borrowers. If competitor banks are less able to achieve such targeted pricing, low risk borrowers will effectively be subsidising high risk borrowers – which is arguably unfair, but will also lead to low risk borrowers migrating to other banks. Such risk-based pricing is becoming more common, but has not been a feature of many types of lending (particularly at the retail level) in years past. Determining the appropriate interest rate to charge for different levels of credit risk is an important element in bank lending which is discussed later under the topic of *loan pricing.* Also important in this regard is the setting of loan loss provisions which should absorb expected losses on the loan portfolio. These provisions will be

deducted in calculating the amount of equity capital which the bank has available to absorb unexpected losses.

The issue of *unexpected losses* is handled differently by the bank through modelling of the loss distribution of the portfolio and the calculation of adequate equity capital to absorb unexpected losses in any period. For example, if there is a 1 per cent chance that the unexpected loss in the next year on the loan portfolio is $100 million, then the bank will need equity capital (after provisions for expected losses) in excess of that amount to be 99 per cent that it will not become insolvent in the next year.

To calculate the probability distribution of unexpected losses on a loan portfolio, highly technical statistical techniques have been (and continue to be) developed by banks and consultants, some of which are briefly considered later. As well as enabling the amount of equity capital needed for the bank, the unexpected loss distribution also feeds indirectly into the pricing of different categories of loans. A category which requires a larger equity capital essentially involves a funding mix involving more equity and less deposits/debt. Bankers generally regard equity as being a more expensive form of funding, and thus the average cost of funding this category of loans is seen as higher. This gets reflected in loan pricing formula via a higher weighted average cost of funding.

## 10.2 Sources of Credit Risk

Making loans is a defining characteristic of banks which leads to their taking on credit (default) risk. But banks take on credit risk in other ways.

One is via the provision of guarantees provided by the bank that customers will pay back a loan made to them by a third party. Another is a guarantee that the customer will make payment for goods to be provided to them by a third party – such as in an international trade transaction. The latter form of financing comes under the general heading of *letters of credit* and is an important feature of *trade financing* (discussed in Chapter 14).

Another source of default risk is through the granting of loan commitments, which give the customer the right to draw down funds (up to some agreed limit, at a time of the customer's choosing) in the form of a loan from the bank. These do not show up on the bank's balance sheet until drawn upon, and the unused limits are an *off-balance sheet (OBS)* exposure.

At the retail (personal) level, these were historically most common in the form of an *overdraft* facility (perhaps referred to as a *line of credit*). Nowadays individuals will generally have such access to credit via a credit card limit. This is often referred to as *revolving credit,* in the sense that the customer can draw against the limit, repay and then redraw again – whereas repayment of a

standard loan terminates the availability of that credit. Also, important OBS credit exposures as (non-revolving) loan commitments at the individual level are approvals for housing loans which have yet to be drawn upon (due to the time taken for settlement, or through "pre-approval" for individuals looking for a property to purchase).

Many banks provide "redraw" facilities on mortgage loans (enabling the customer to make payments greater than those scheduled, and drawdown those excess payments if desired at some future date). For such loan accounts the credit exposure is greater than the outstanding balance, since the customer has an implicit loan commitment. Other banks offer something similar by way of an "offset account" where funds deposited in that account are credited against the loan balance in calculation of principal outstanding on which interest must be paid.

Loan commitments are particularly important for business lending – providing businesses with the flexibility to draw funds in periods of cash shortages.

Kashyap, Rajan and Stein ( JF,2002) argue that loan commitments create a liquidity risk for banks, and build a model to explain why banks, who offer at-call deposits are most commonly the only types of financial institutions which provide loan commitments. Negative (or less than perfect positive) correlation between unexpected outflows of funds from deposit withdrawals and drawdown of loan commitments is fundamental to this result.

Banks also make investments in securities such as sovereign or corporate bonds or notes with varying degrees of default risk.

Via their transactions in financial markets, banks are also exposed to counterparty credit risk.

This could arise from derivative transactions where they have a positive NPV position as a result of market movements, but there is a risk that the counterparty may default on the payment. For this reason banks are required under IFRS 13 to make a *Credit Valuation Adjustment (CVA)* when accounting for the value of a particular position as discussed here. This would mean that the value recorded would be less than the amount assuming zero risk of default (such as the Black-Scholes value of an option), and reflects the "fair price" associated with exiting the position. Changes in the credit rating of a counterparty could lead to changes in the market value of a position, as occurred in the GFC, and under IFRS 13 these changes would be recognised in the P&L[1]. The Basel 3 standards impose a CVA capital charge for positions in the *trading book* of the bank.

[1] The EBA also refers to Funding Valuation adjustments used by some banks where they have an exposure to a counterparty who does not provide collateral, but in hedging that position they would be required to post collateral.

Many derivative positions, such as swaps have a zero NPV value at initiation, but subsequent market movements may lead to the position having a positive or negative value (with the former imply the possibility of default risk and loss of expected income). Calculation of *Expected Future Exposure (EFE)* is one technique for dealing with this, and was essentially incorporated early on in a simplified fashion in the Basel capital requirements for OBS credit risk by requiring capital for potential exposure. Basel 3 involves more sophisticated approaches.

There is also provision for *Debit Valuation Adjustment (DVA)* in which the accounting value of the bank's own liabilities would be reduced by recognising that default might occur, such that the market value would be less than the "risk free" value of the position.

A particular complication is what is called *wrong-way risk*, referring to a situation in which there is a positive correlation between the size of a (mark-to-market) credit exposure to a counterparty and the default risk of that position. For example, if the underlying price moves favourably for the bank's position in a derivative, the market value of that position would increase, but this could be offset by a reduction the counterparty's ability to honour their obligation. Wrong way risk was a concern for banks which had bought credit default swaps from the insurer AIG prior to its failure in the financial crisis.

Where there is not immediate settlement of transactions (delivery versus payment) then DVP is another potential form of credit risk. This could occur in inter-bank settlements, such as the famous Herstatt Bank failure in 1974, giving rise to the term *Herstatt Risk*. Cases such as that (and technological advances) have spurred the development of *real time gross settlements* and other mechanisms to prevent risk arising from DVP lags. In international finance, the cooperative development of the *CLS Bank (Continuous Linked Settlement)* has been important to reduce such counterparty risks. (This BIS article gives a simple explanation of CLS Bank activities). Since the GFC, international agencies have been promoting and mandating the use of *Central Clearing Counter Parties (CCPs*) for OTC derivatives to, among other things, reduce counterparty exposures. This recent BIS article provides an overview of recent developments re CCPs and their role in risk management.

Finally, banks may also take on credit risk via provision of credit enhancements such as the writing of credit default swaps.

## 10.3 Credit Risk Assessment and the Lending Process

Traditional approaches to assessing the credit risk of a potential borrower are often referred to as application of the 5C's by a loan officer. These are: Character; Capacity; Capital; Collateral; Conditions. See here for a brief description from one Australian lender. Judgement by the loan officer (and higher levels within the bank if the loan is of a size greater than the officer's delegations) would then see the loan be given an internal credit rating score. Depending on that appraisal, the loan would be rejected or approved (perhaps for an amount less than applied for) and an interest rate determined for the loan. While, in principle, interest rates charged could be linked closely to the credit score, such risk based pricing was not always common for certain categories of loans – particularly at the retail level – until recent decades. Peer to Peer (or Marketplace) lending platforms generally involve explicit risk-related pricing for retail borrowers, with this being one point of difference to standard bank retail lending.

Access to information about the borrower is clearly an important ingredient into loan quality assessment. As well as information supplied directly by the borrower (such as lists of assets, income statements, tax returns) or available to the bank from past dealings with the customer (transactions account behaviour, any past repayment experience etc) lenders will look to external sources of information.

## 10.4 Credit Bureaus

An important source of information at the retail level is information available from *Credit Bureaus* who obtain information from banks (and utilities) about individual's credit histories and provide that in response to queries from potential lenders. A common development has been for credit bureaus to apply statistical techniques to the data they collect to generate a *credit score* such as the *FICO* score in the USA. The main credit bureau in Australia is the US multinational Equifax which acquired *Veda* (previously known as *Baycorp Advantage*), in February 2016. Others include Experian and Illion (which is associated with consumer finance marketplace Credit Simple. The major banks provide credit data to Equifax, Experian and Illion.

*Dunn and Bradstreet* provides a similar type of service by providing credit quality information about businesses. At the larger corporate and institutional (and government) level, there is information available from the credit rating agencies (S&P, Moody's, Fitch) who provide credit ratings (letter grades) for those entities (and their specific debt securities) which have requested and paid for such ratings.

### Comprehensive Credit Reporting

Credit Bureaus can receive two types of data from their participating financial institutions. “White” data is positive information about credit-related activities of individuals, while “black” data is negative information. The latter category includes information about loan defaults or poor repayment history. It also includes numbers of loan applications, reflecting the view that more applications may be indicative of a stressed financial position. The white data includes such things as account information, credit limits, type of credit used, and loan repayment information. Finder provides a list of what is included.

Historically, Australian credit bureaus only received black data from banks and other participants, even though including white data would improve the information available for assessing loan applicants. One explanation for this can be found in the dominance of the major banks each with large market share and unwillingness or inability to collaborate. If any one bank were to provide white data on its customers, that would only benefit its competitors and potentially lead to a loss of market share. If all banks did so, however, competitive ability losses from sharing information would be offset by gains from access to greater information. The socially optimal outcome of greater information availability from “comprehensive credit reporting” (involving both black and white information) for loan assessment was thwarted by private incentives.

This was recognised by the AFSI (Murray Inquiry) and reflected in its November 204 Final Report in its Recommendation 20:

“Support industry efforts to expand credit data sharing under the new voluntary comprehensive credit reporting regime. If, over time, participation is inadequate, Government should consider legislating mandatory participation.”

On 2 November 2017, the Treasurer announced that the government would legislate for mandatory comprehensive credit reporting to come into effect by 1 July 2018.

This followed an earlier Budget announcement that if a 40 per cent reporting threshold was not reached by end 2017, such mandating would occur. But actual implementation was much delayed (privacy issues for borrowers in hardship circumstances, being one cause, together with the Covid crisis and amendments required by the Senate) and the legislation not passed until early 2021. Large ADIs were required to meet a 50 per cent reporting requirement by July 2021 and 100 per cent a year later. Those institutions not mandated to report will be able to access the expanded information available if they too elect to provide comprehensive reporting.

Credit Bureaus use the data they receive to calculate “credit scores” for individuals and provide these to participating institutions as a summary measure of the data they have received. A poor credit score can obviously lead to an individual being rejected for loans, so that it is important that

the underlying data is correct and the modelling used has strong foundations. On feature of the legislation is that individuals are able to obtain information on their credit score free of charge (see here for example), enabling them to check its veracity and identify ways in which they may be able to improve their score.

## 10.5 Bank Credit Assessment Methods

Most banks will have their own internal credit rating ladders for different groups of borrowers, and the approaches they use to allocate ratings to customers will differ depending upon the customer segment. Different information and credit assessment techniques will be used for retail, SME, corporate, government counterparties, and potentially within those groups depending upon the type of loan products being considered (such as credit card applications versus unsecured personal loans or home mortgages). And clearly the size of the loan involved will influence how many resources will be invested in the loan assessment process and the extent to which risks of misclassification of borrowers will be tolerated. For example, at the retail level where there are very large numbers of customers, a cost-benefit calculation might lead to reliance on some automated credit scoring model to reduce human resource costs in the appraisal process. Most banks will use various statistical models of credit risk assessment (discussed later).

Figure 1 illustrates the relative reliance on statistical models, expert judgement and external ratings for different categories of borrowers used by ANZ. Where there are large numbers of relatively homogenous borrowers (the retail portfolios) statistical models are generally used, although lending staff are required to review model outcomes in the context of the knowledge they have. Scores from the statistical models are calibrated to PDs. Modelling is also done for EAD and LGD.

| IRB Asset Class | Borrower type | Rating Approach |
|---|---|---|
| Corporate | Corporations, partnerships or proprietorships that do not fit into any other asset class | Mainly statistical models<br>Some use of expert models and policy processes |
| Sovereign | Central governments<br>Central banks<br>Certain multilateral development banks<br>Australian state governments | External rating and expert judgement |
| Bank | Banks<br>In Australia only, other ADIs incorporated in Australia | Statistically-based models<br>Review of all relevant and material information including external ratings |
| Residential Mortgages | Exposures secured by residential property | Statistical models |
| Qualifying Revolving Retail | Consumer credit cards <$100,000 limit | Statistical models |
| Other Retail | Small business lending<br>Other lending to consumers | Statistical models |
| Specialised Lending | Income Producing Real Estate<br>Project finance<br>Object finance | Expert models/Supervisory Slotting[31] |

**FIGURE 1 ANZ CREDIT RATING APPROACHES (SOURCE ANZ2019-SEPTEMBER PILLAR 3 DISCLOSURE)**

## Mortgage Brokers and Credit Assessment

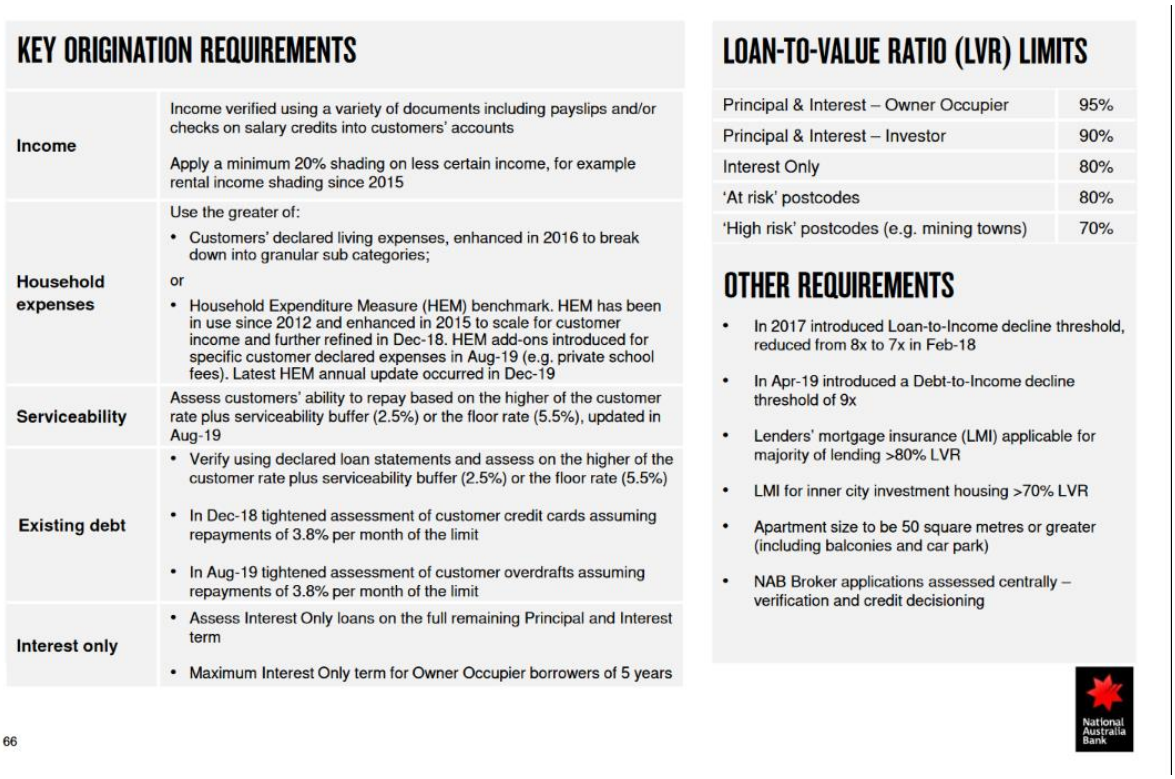
One significant development in recent decades in Australia has been the growth of "mortgage brokers" who intermediate between potential mortgage borrowers and bank (or other) lenders. (Often they will be linked to an "aggregator" who provides a software platform and other services enabling them to interface their activities with those of lenders on that platform). Their activities enable lenders to expose their offerings to a larger customer base than available via branch networks or websites etc., provide borrowers with greater choice among lenders, provide information and advice to customers, and undertake some part of the credit assessment and application process. Generally mortgage brokers have received remuneration from lenders in the order of 50 basis points upfront commission and 15 basis points trail commission p.a. (based on outstanding loan balance). A government review of mortgage broker remuneration arrangements occurred in 2017, but this was overtaken by the Royal Commission's recommendation to require customers (rather than lenders) to pay for the services of mortgage brokers – which after a major lobbying effort by the industry was rejected by the Government.

The Royal Commission also focused on best interest duties of mortgage brokers and ASIC was in mid 2020 undertaking a consultation in implementing those recommendations.

## 10.6 Responsible Lending Obligations (RLOs)

Under Australian legislation (the National Credit Code) entities engaged in lending (or related advice) will need to hold a Credit Licence and possibly an Australian Financial Services Licence (AFSL).[2] The NCC imposes upon lenders, through responsible lending provisions, a requirement to ensure the suitability of the credit product offered to a retail customer (in contrast to the borrower being responsible for determining the suitability for themselves).

An illustration of Housing Lending Practices of one major Australian Bank (NAB), which indicates the role of responsible lending requirements (and prudent lending) is shown in Figure 1 (sourced from the banks April 2020 Investor Briefing). APRA's perspective on prudential mortgage lending and its supervisory approach is explained in this 2016 speech.



**KEY ORIGINATION REQUIREMENTS**

| | |
|---|---|
| **Income** | Income verified using a variety of documents including payslips and/or checks on salary credits into customers' accounts<br>Apply a minimum 20% shading on less certain income, for example rental income shading since 2015 |
| **Household expenses** | Use the greater of:<br>• Customers' declared living expenses, enhanced in 2016 to break down into granular sub categories;<br>or<br>• Household Expenditure Measure (HEM) benchmark. HEM has been in use since 2012 and enhanced in 2015 to scale for customer income and further refined in Dec-18. HEM add-ons introduced for specific customer declared expenses in Aug-19 (e.g. private school fees). Latest HEM annual update occurred in Dec-19 |
| **Serviceability** | Assess customers' ability to repay based on the higher of the customer rate plus serviceability buffer (2.5%) or the floor rate (5.5%), updated in Aug-19 |
| **Existing debt** | • Verify using declared loan statements and assess on the higher of the customer rate plus serviceability buffer (2.5%) or the floor rate (5.5%)<br>• In Dec-18 tightened assessment of customer credit cards assuming repayments of 3.8% per month of the limit<br>• In Aug-19 tightened assessment of customer overdrafts assuming repayments of 3.8% per month of the limit |
| **Interest only** | • Assess Interest Only loans on the full remaining Principal and Interest term<br>• Maximum Interest Only term for Owner Occupier borrowers of 5 years |

**LOAN-TO-VALUE RATIO (LVR) LIMITS**

| | |
|---|---|
| Principal & Interest – Owner Occupier | 95% |
| Principal & Interest – Investor | 90% |
| Interest Only | 80% |
| 'At risk' postcodes | 80% |
| 'High risk' postcodes (e.g. mining towns) | 70% |

**OTHER REQUIREMENTS**

- In 2017 introduced Loan-to-Income decline threshold, reduced from 8x to 7x in Feb-18
- In Apr-19 introduced a Debt-to-Income decline threshold of 9x
- Lenders' mortgage insurance (LMI) applicable for majority of lending >80% LVR
- LMI for inner city investment housing >70% LVR
- Apartment size to be 50 square metres or greater (including balconies and car park)
- NAB Broker applications assessed centrally – verification and credit decisioning

National Australia Bank

66

Figure 2: Household Lending Practices at NAB (Source: NAB)

The Responsible Lending Obligations were introduced in 2010, and require essentially that the lender is able to demonstrate that it has assessed the ability of a retail borrower to meet repayment obligations out of their income, without relying on liquidation of any collateral (eg a residence). Those obligations also should be assessed at a higher interest rate than currently applies, and the ability to repay should take into account other expenditure commitments of the borrower. The

[2] Australian legislation does not treat credit as a financial product.

requirements do not apply to SME lending even if secured against the borrower's home. ASIC provides guidance in RG209.

Assessing ability to repay is not uncontroversial. ASIC took Westpac to court in 2019 regarding its reliance on the HEM (Household Expenditure Measure) produced by the Melbourne Institute, arguing that this did not meet the requirements by failing to take into account the borrower's actual expenditure. This led to the "Wagyu and Shiraz" judgement, rejecting ASIC's arguments, with the judge noting that if a borrower was having difficulty meeting repayments given their current lifestyle, they could always cut back on consumption of fine wine and meat. In July 2020, ASIC announced that it was not going to appeal that judgement.

In 2021, the Federal Government introduced legislation to remove the RLO requirement except in the case of small amount credit contracts and consumer leases. There was much opposition to this from consumer advocates, and the legislation had not passed the Senate as at June 2021.

## Loan Defaults and Debt Collection

If a borrower cannot meet repayment obligations, banks will typically examine alternative ways of facilitating ability to repay and/or recovering funds owing. They also will have loan contract terms which aim to avoid moral hazard by imposing penalties for late payments.

One option to assist borrowers is to extend the term of the loan, spreading principal repayments over a longer period and thus reducing the periodic repayment amounts. However, particularly for relatively new mortgages, most of the repayments are interest, such that reducing the principal component may have relatively limited effect. Allowing loan repayment holidays is another option, and this has been a major response of Australian banks to the Covid19 crisis. Interest still accrues on the loan, such that the principal outstanding increases until repayments are resumed. If repayments resume at the same rate, the term of the loan is thus extended.

Once the bank or other lender has decided that recovery of amounts owing (after seizing loan collateral – via appointment of *receivers* in the case of business borrowers) is not going to happen via negotiation with the borrower, they may appoint debt collectors. Debt collectors can put individuals into compulsory bankruptcy (details and data at AFSA) if the amount owing is $5K or more, although that threshold was been increased temporarily to $20K for 6 months from March 2020 due to the Covid19 crisis.[3] Major debt-collection agencies are ASX-listed companies Credit Corp, Collection House, and Pioneer Credit. Others include Baycorp, CCC Financial Solutions and Panthera Finance.

The Australian Banking Association provides guidelines for debt collection arrangements for banks.

[3] There has been ongoing pressure to increase the threshold

## 10.7 Bank Credit Risk Management Organisation

While loan approvals will be delegated within a bank to the relevant level (depending on size, complexity, customer relationships etc) banks need to have in place management systems which ensure that overall credit risk is managed appropriately. Table 1 provides an overview of one bank's approach, and Figure 3 provides an outline of the management structure for oversight and control of credit risk at that bank.

**TABLE 1: CBA CREDIT RISK MANAGEMENT**

| Description | Governing Policies and | Key Limits, Standards and Measurement Approaches |
|---|---|---|
| Credit risk is the potential for loss arising from the failure of a customer or counterparty to meet their contractual obligations to the Group. At a portfolio level, credit risk includes concentration risk arising from interdependencies between customers, and concentrations of exposures to geographical regions, industry sectors and products/portfolio types. | • Group Credit Risk Principles, Frameworks and Governance (incl. Risk Appetite, principles, and frameworks; and Credit Risk governance); and<br>• Credit Risk Policies (incl. Origination, Decisioning, Verification / Fulfilment, and Whole of Life Servicing).<br><br>Key Management Committee:<br>Executive Risk Committee | The following key credit risk policies set credit portfolio concentration limits and standards:<br>*Large Credit Exposure Policy;*<br>*Country Risk Exposure Policy;*<br>*Industry Sector Concentration Policy;* and *Exposure to consumer credit products* are managed within limits and standards set in the Group Level RAS, BU Level RAS and Credit Portfolio & Product Standards.<br>The measurement of credit risk is primarily based on an APRA accredited Advanced Internal Ratings Based (AIRB) approach (albeit some exposures are subject to the standardised approach). The approach uses judgemental assessment of individuals or management, supported by analytical tools (including scorecards) to estimate expected and unexpected loss within the credit portfolio. |

*Source: CBA Pillar 3 Regulatory Disclosure, September 2016, p14*

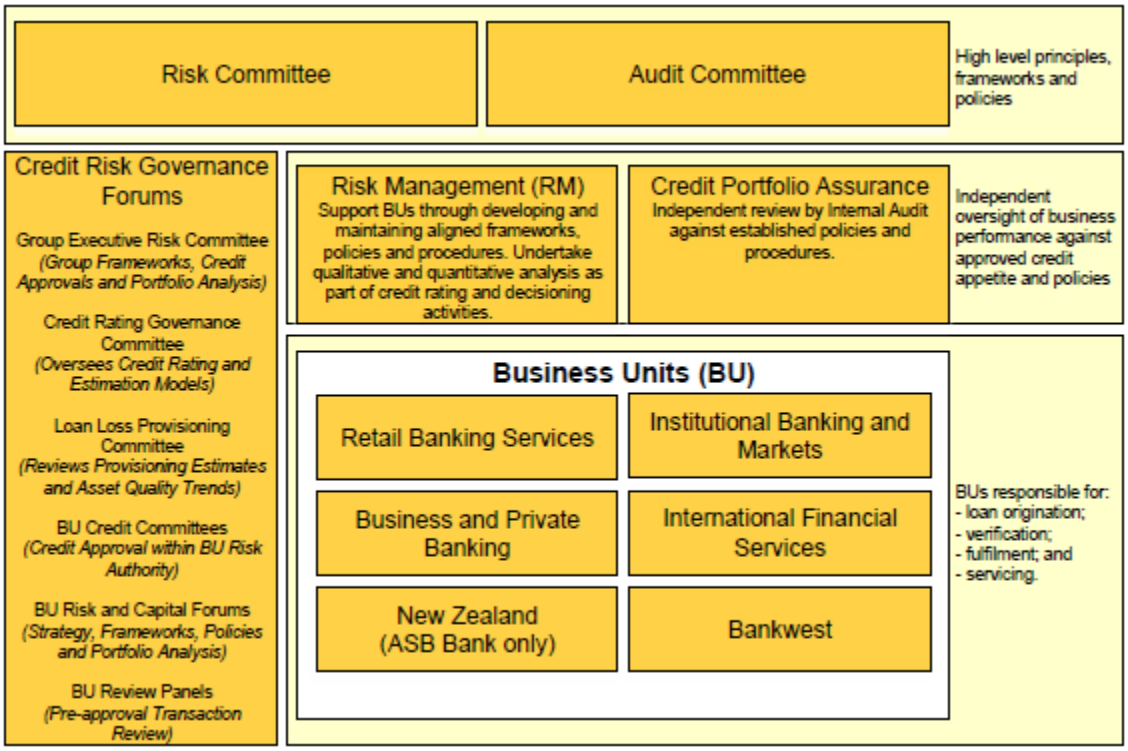



FIGURE 3: CBA CREDIT RISK MANAGEMENT FRAMEWORK

*Source: CBA Pillar 3 Regulatory Disclosure, September 2016, p17*

## 10.8 Loan Pricing and Loan Terms

The pricing of loans (interest rate charged) should reflect the risk of loss from default by the borrower, while the design of loan terms (maturity, repayment schedules, collateral (security) provided, third party guarantees etc) can be structured to attempt to reduce such risk of loss.

As discussed by Edelberg (JME, 2006) in practice, risk based pricing was not particularly common amongst banks prior to the 21st century, particularly in dealing with retail clients. A recent study of the impact of risk-based pricing on lending in a particular market (auto finance in the USA) is provided by Einav et al. They find that use of automated credit scoring appeared to increase profits by about $1,000 per loan, partly via screening of higher risk borrowers and partly by price differentiation between high and low risk borrowers.

The importance of risk based pricing can be seen by supposing there are two types of potential borrowers, high risk (H) and low risk (R) and that lender A is unable to distinguish between them but lender B can do so and charges different interest rates reflecting risk. It can be expected that high risk borrowers will be attracted to lender A, while low risk borrowers will be attracted to lender B. Lender A will experience higher default rates and need to increase the interest rate charged – further deterring good borrowers.

Banks who adopt some form of risk-based loan pricing will determine a contractual interest rate such that, allowing for expected loss associated with that type of loan, the expected return will be sufficient to cover the cost of funding, operating costs, and any required risk premium.

Expected loss obviously depends on the type of loan, collateral provided, the specific borrower characteristics etc. The Figure below (from the NAB March 2020 Investor Briefing) gives an idea of the average historical loss rates on major loan types.

**ESTIMATING LONG RUN LOAN LOSS RATE**

| NAB Australian geography net write off rates as a % of GLAs 1985 - 2019[2] | Long run average |
|---|---|
| Home lending[3] | 0.03% |
| Personal lending[3] | 1.51% |
| Commercial[3] | 0.54% |
| Australian average (1985-2019) | 0.34% |
| **Group average[4] based on 2020 business mix** | **0.26%** |
| **Group average[4] based on 2020 business mix excluding 1991-1993 and 2008-2010** | **0.19%** |

## Deriving a risk-based loan interest rate

At the simplest level, consider a one year loan, with principal and interest to be repaid as a lump sum at the end of the year. The contractual repayment will be L(1+r) where L is the loan size and r is the quoted interest rate. However, the borrower might default and the lender only be able to recoup some part (or none) of the outstanding amount. The *Expected Loss* (EL) on the loan can be written as:

EL = PD x LGD x EAD

where PD is probability of default, LGD is loss given default and EAD is exposure at default.

For example, consider a $100 one year loan (L =100), with quoted rate r = 8%, PD = 0.1, EAD = L(1+r) = $108, and LGD = $40 (such that the recovery = $68 = $(108-40)).[4] Then, the expected gross return in one year is $104 = ($108x0.9 + $68x0.1), and the EL= $4. The expected rate of return on the loan is 4%.

The bank would need to determine whether this expected return is adequate given its cost of funding, operating costs, and risk. Such an approach finds expression in the Risk Adjusted Return on Capital (RAROC) approach to performance assessment.

But the prior question is to determine how to price a loan – what interest rate to charge. To address this, think of it in terms of the usual project evaluation (capital budgeting) framework. But in this case, rather than being given a set of expected cash flows to value – what is required is to find a quoted interest rate and resulting expected cash flows which make the loan have NPV=0. This could be done using the formula below for simple loan structures. Equivalently, for more complicated, multi-period loans, one could model the cash flows expected from setting a particular contractual interest rate (and other loan terms) and ask whether the NPV calculated at the assumed WACC (cost of funds) is positive or not. The breakeven loan rate could then be determined via an iteration process.

The risk-based pricing formula can be expressed simplistically for a one-period loan as:

**r* = OC + EL +WACC**

where OC is operating costs per $1 of loan, EL is expected loss on the $1 loan, and WACC is the weighted average cost of capital, and r* is the required loan interest rate quoted. To derive this note that the expected net cash flows (including principal repayment) are 1+r*-OC-EL, and for the $1 loan to have zero NPV, r* needs to be chosen such that the discounted expected net cash inflows equal the initial cash outflow of the $1 loan:

(1+r*-OC-EL)/(1+WACC) = 1.

Some simple algebra gives the equation above.

Obviously, the practice is more complicated than this. First, the cash flows considered were before company tax, In that case where interest expense is tax deductible, the WACC becomes $wr_e/(1-t) + (1-w)r_d$ where $r_e$ and $r_d$ are equity and deposit (debt) costs, w and (1-w) their respective weights in bank funding, and t is the corporate tax rate.[5] And because deposits also involve significant

[4] The LGD would usually be expressed as a percentage of the EAD (ie 40/108 in this example).

5 The traditional capital budgeting approach discounts "unlevered" after tax expected cash flows (1+ c(1-t)), where 1 is return of capital and c is taxable earnings to give: NPV = [1+c(1-t)]/[1+(w.re + (1-w).rd(1-t)]. Setting NPV=0 and rearranging shows that using the pre-tax WACC of $wr_e/(1-t) + (1-w)r_d$ to determine pre tax cash

operating costs for banks, those costs need to either be incorporated in OC or added to deposit interest costs. Ideally, the bank will have an Activity Based Costing (ABC) system such that it can identify which operating costs are related to the loan and which are related to deposits etc. (This will be one reason why interest rates paid on deposits are less than wholesale market funding of the same tenor which involves minimal operating costs).

A second complication is that loan cash flows are rarely one-off, end of year, as used in this example. Default could happen at any time during the life of the loan, when repayments already made have affected the exposure at default, and the amount recovered might depend upon factors such as the state of the business cycle.[6] This makes the analysis more complicated, but similar in principle. Generally, banks will estimate a PD for a one year horizon (and combine that with conditional estimates of default in subsequent years), assume a LGD ratio (which may vary over time, and estimate the time path of EAD. Spreadsheet (or more sophisticated) modelling can be used to derive a zero NPV loan rate.

One important feature of the approach typically adopted by banks is that the assumed funding mix varies between loan products, while the cost of equity is assumed the same for all products. (The cost of the debt/deposit component will differ depending upon the timing of the cash flows involved in the loan – reflecting the term structure of interest rates – with this being conveyed to business units for use in pricing decisions via the internal *Funds Transfer Pricing* system). This is quite different from the approach advocated in corporate finance texts where a "pure play" approach to capital budgeting is advocated. In that approach, the same capital structure is assumed across all projects while the cost of equity should be assessed separately for each project based on its systematic risk (eg CAPM beta). And, of course, the capital structure of banks (very high leverage – treated deposits as debt) is quite different to that of corporates.

This different approach has been analysed by researchers such as Froot and Stein (JACF, 1998). They make the point that the value of a project with a given set of expected cash flows is normally assumed in corporate finance to be the same for any entity, since it is only the systematic (and not idiosyncratic) risk which is relevant for valuation. But for financial institutions, this is not generally assumed to be the case, because the size of equity capital component cost can vary between institutions as a result of their capital allocation policies. This means that the valuation can differ between institutions because of the interrelationship of the product risk with the existing capital

flow (1+c) such that NPV = 0 gives equivalent result. (Note however, that this equality of approach is only correct for NPV=0 situations).

[6] The possibility that LGD (and also PD) might be more correlated with the business cycle for some loans rather than others, raises the issue of whether systematic risk is relevant to loan pricing and thus whether different costs of capital should be used to reflect this.

structure of the institution. Their argument relates primarily to the fact that bank investment projects (loans) are illiquid with risks not able to be costlessly hedged via external transactions.

Another practical difference is that larger banks will operate an FTP system in which the business unit making a loan of, say, $100 will be allocated $100 of non-equity funding from the central treasury at its specified transfer pricing interest rate for loans of that tenor and interest rate resetting characteristics. The bank will also apply a capital charge to the loan, reflecting (in principle) the equity capital notionally allocated to that loan multiplied by the difference between the required return on equity and the FTP rate. This mimics using the WACC as the cost of funding the loan as described above (as some simple algebra can demonstrate). Figure 4 illustrates this alternative (but equivalent) break down of loan pricing, and also includes a separate mark-up component reflecting perhaps market power of the bank in that loan market.

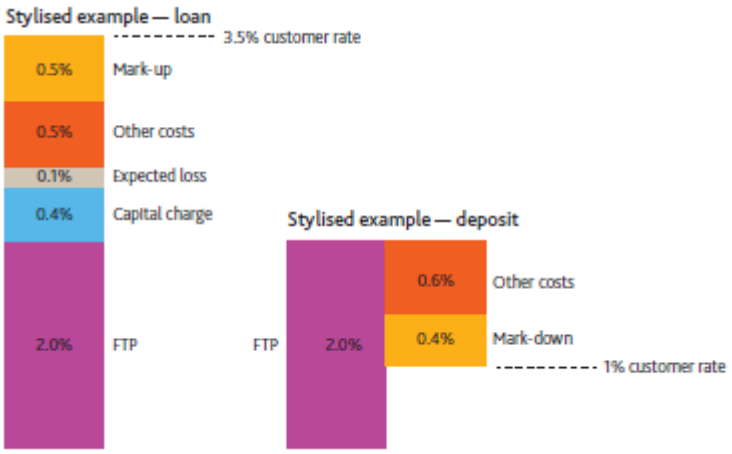



FIGURE 4 STYLISED EXAMPLE OF LOAN AND DEPOSIT PRICING (SOURCE BANK OF ENGLAND, 2015)

Figure 5 shows illustrates some of the reasons why the interest rate charged might differ for different loans. These include: different cost of funding (such as arising from different maturity); differences in credit risk; differences in operational costs; differences in the economic (or regulatory) capital required for that particular type of loan.

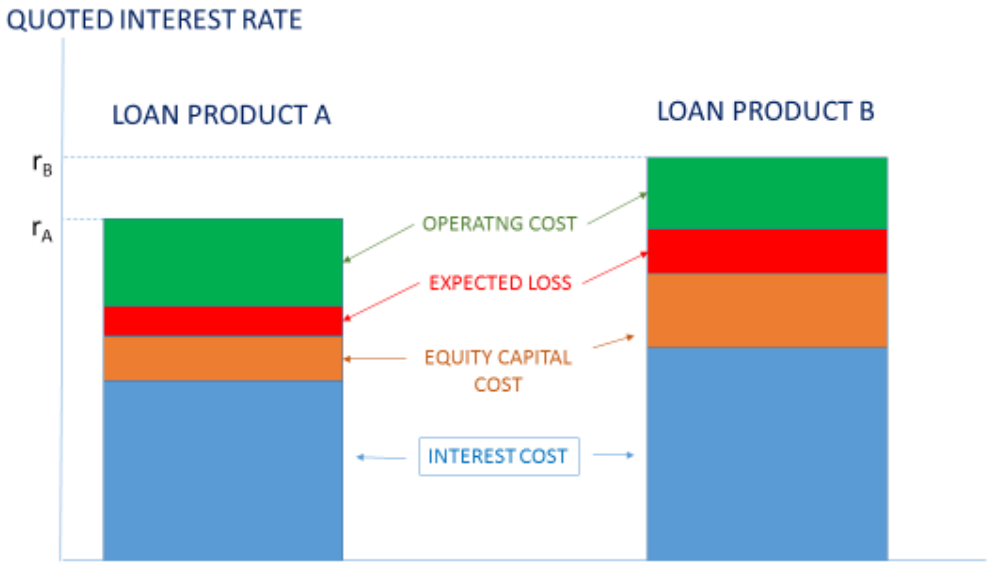



FIGURE 5: LOAN PRODUCT PRICING DETERMINANTS

Some simple relationships follow from this simple analysis. Rates charged on longer term loans should be higher, *cet par*, since the probability of the loan not having defaulted will decline with time. (The cost of funding longer term loans may also be higher). Loans with collateral provided will have lower LGD (and potentially lower PD given that loss of collateral associated with defaulting) so that the higher is collateral value relative to loan amount, the lower will be the interest rate. Interest rates charged on interest only loans should be higher than those on principal and interest loans since EAD will decline for the latter.

## Pricing Off Balance Sheet Items

Suppose a Bank is considering providing a $100 principal amount (one year) guarantee for customer and will set a fee charged = $f per $1 of principal. It estimates that the risk associated with the guarantee requires $8 of economic capital.

The bank has a required return on capital of 16% and the expected loss per $1 of principal guaranteed d = 0.001 (or $0.10 for the $100 guarantee). The risk free interest rate is 5% p.a.

What fee should it charge for the guarantee? Hint: note that the guarantee involves no up front cash flows – hence the bank can invest the economic capital in risk free assets. The fee of f basis points will generate $ f.100 in fees, a return of $r_f$ on the $8 of capital invested in the risk free asset, but a potential expected loss of d.100. This, as percentage of the $8 of equity needs to equal 0.16 and involves solving for f to achieve that outcome. In this case that generates a figure of f = 00.98 or 98 basis points as shown below.

Expected return on capital: f set to achieve re=0.16
=[ f.100 + rf 8 - d.100 ] / 8 = [ f.100 + 0.4 - 0.1]/8 = 0.16

100f + 0.3 = 1.28; f = 0.98/100 = 0.0098 i.e. 98 basis points

## 10.9 Assessing Performance of Loan Business Units

There are a range of alternative ways of thinking about loan pricing and the value added from a loan decision. One approach is to think of a Risk Adjusted Return on Capital (RAROC) hurdle rate as the return on equity capital allocated to the loan which needs to be achieved. Thus, one could adapt the WACC approach to convert it into a return on equity calculation such that:

Expected RAROC = [Promised revenues – operating costs – interest funding costs – expected loss]/Allocated Equity Capital

The loan would need to have an Expected RAROC above the required return on equity to add value.

A RAROC approach could be used as a measure of performance of a business unit such as one making loans. The actual RAROC (using *actual revenues* in place of *expected revenues minus expected loss*) could be calculated and compared with the required return on equity. While that could be done easily *ex post* for a single loan, application to a business unit's performance over (say) a year would be more complicated and need to recognise the multi-year nature of loans, and changes in provisions made etc. There is also a fundamental problem in using a rate of return measure of performance. A business unit might turn down loan opportunities even if they promise a rate of return above the required rate, if they would reduce the average return on the loan portfolio. A simple rate of return performance measure does not take into account the volume of business on which that rate of return was achieved.

An alternative approach to assessing performance is to use a concept such as Economic Value Added (EVA). Expressed simply, EVA is calculated as:

$$EVA = (ROE - r).BV$$

where ROE is the accounting return on accounting value of equity, r is the required return on (the market value of) equity and BV is the book value amount of equity involved in the activity. This approach has its theoretical foundations in the Return on Investment (or Residual Income) valuation approach (which can be derived from a dividend discount (cash flow) valuation as shown in the Chapter 4 Appendix ) which expresses current market value ($MV_0$) as:

$$MV_0 = BV_0 + PV(\text{expected future abnormal earnings})$$

where abnormal earnings in any future period T are given by $(ROE_T - r).BV_{T-1}$ (and PV stands for present value). The difference between market and book value of equity is thus the present value of all future EVA's.

EVA could also be calculated as NOPAT – WACC*(Debt + BV(E)).

CBA uses a concept apparently similar to EVA described as Profit after Capital Charge (PACC) "as a key measure of risk adjusted profitability. It takes into account the profit achieved, the risk to capital that was taken to achieve it, and other adjustments". (2020 Half Year Results Presentation, p61)

## 10.10 Credit Risk Modelling[7]

There are ongoing developments in the field of credit risk modelling as researchers and lenders attempt to find better methods of distinguishing between higher and lower risk borrowers, and aligning interest rates charged with risk assessment. These developments relate to both assessment of individual loan risk as well as modelling of the risk of particular loan portfolios.

Of course, models are no more than that, and can easily be flawed. So an important issue for banks is to ensure that their models are as accurate and reliable as possible. The internal structure of a model methodology could be flawed, the data used as inputs could be faulty, management may have a poor understanding of models bought from external vendors (or developed internally by others). Many large banks will try to deal with these issues by having a Chief Model Risk Officer (or Head of Model Risk) as discussed in this KPMG article on model risk management. One development has been increasing use of machine learning/algorithmic approaches/artificial intelligence/neural networks, drawing on increasingly large and detailed databases, for credit risk estimation which are discussed and compared in this S&P article. One important issue with reliance on such approaches is the issue of human understanding of the workings of complex algorithms, and responsibility for the decisions which result from their use.

Credit risk arises primarily from lending activities, but trading book activities, investments, inter-bank transaction, guarantees are also important

For assessing credit exposure, most banks will calculate expected Loss (EL) as:

EL = PD x LGD x EAD

where: PD is probability of default over a specified horizon (1 year or lifetime of credit facility); LGD is loss given default taking into account likely amount and timing (and thus discounting) of

[7] There are a range of documents on credit risk modelling and management from the Basel Committee such as these 2006 2010, 2010, 2015 documents and this 2015 one from the Joint Forum.

recoveries, and may be calculated under the assumption of an economic downturn; and EAD is exposure at default. For most exposures a 1 year horizon for EL will be used, but lifetime EL will be used for those which are already impaired (eg repayments 90+ days overdue) or some sub-investment grade exposures.

For banks using the IRB approach for credit risk, a regulatory expected loss figure is calculated using the banks' estimates of PD, LGD and EAD, (on a *through the cycle (TtC)* rather than *point in* time (PiT) basis)[8] and these figures are inserted into regulatory formula to calculate Risk Weighted Assets due to credit risk. A TtC estimate will not take into account current macroeconomic conditions, whereas a PiT estimate will.

Figures on these various parameters, including the extent to which actual losses (and PDs and EADs) differ from those expected can be found in the Pillar 3 Capital and Risk disclosures of the banks.

As earlier discussion suggests, there are three main elements of credit risk modelling: estimation of PD; estimation of LGD, and estimation of EAD. The objective is to use information derived from samples of past borrowers to identify important determinants of PD, LGD and EAD, and use these to predict likely values of these variables for future borrowers.

Arguably, modelling of LGD has proven the least robust. Recoveries can take significant periods of time after a default occurs, can depend on the relationship between borrower and lender, efforts expended in attempting recovery etc.[9] Moreover, since most cases involve either full recovery or zero recovery, but with others in between, drawing reliable statistical inferences from such distributions can be difficult.

But there are also complications for statistical modelling of PD since for most loan classes, the probability of default is very low. Drawing on past data to identify relevant characteristics which determine PD leads to an unbalanced sample in which most observations do not default, creating concerns about the precision of estimates from the statistical models applied.

EAD modelling can also be quite complex, since it depends upon the repayment pattern of the borrower, or the drawdown rate in the case of loan commitments. As in the case of the other

[8] NAB's 2017 Pillar 3 report (p29) defines these as "PiT, which estimates the likelihood of default in the next 12 months taking account of the current economic conditions. PiT PDs are used for management of the portfolio and the collective provision calculation. TtC, which estimates the likelihood of default through a full credit cycle. TtC PDs are used for regulatory and economic capital calculation".

[9] There is also an interesting issue of what discount rate should be used in converting a future LGD into its present value equivalent.

parameters, there is a question of what time horizon to use – with an annual horizon being relatively common.

Most emphasis has been on PD modelling and there are a variety of approaches, generally broken down into two categories.[10] *Structural models* attempt to estimate PD from an economic (structural) model of the borrower – and the Merton model (discussed below) and subsequent variants thereon is the most well known. (A specific structural model underpins the Basel approach to determination of required capital). The alternative approach is referred to as the *reduced form* approach in which the PD is expressed as some function of variables thought relevant to the default event happening. The Altman Z-Score and Ohlson H-Score are early examples of this approach. From a sample of (in these cases) companies, a discrete dependent variable (default/non default within some time period) regression (such as a Logit or Probit) is run using relevant company characteristics as explanators. The resulting coefficients then provide weights to apply to those same characteristics for other companies (or out of sample) to predict the likelihood of default. An alternative approach is to use some form of *hazard model* in which the dependent variable is the likelihood of the company failing before various dates.[11]

Another possibility is to draw estimates of PD from the transition matrices available from the major Credit Rating Agencies (Moodys, S&P, Fitch). These matrices show the probability, based on past experience, that a firm currently with a rating of, for example, A will be in a different (or the same) ratings grade (eg AA, AA-, A+, A, A-, BBB+, etc) in a year's time. Because the matrices also include a grade corresponding to default, an estimate of the one-year PD can be derived for any firm once its rating is known.

Of course, many firms are not rated by the agencies, but larger banks will have developed a "mapping" of their own internal ratings into those of the agencies, such that the transition probabilities can be applied to unrated firms. (The CBA mapping of their internal ratings into those of S&P and Moody's can be found here (p27)). One complication is that the transition matrices are based on companies which have publicly issued (and rated) debt, and there may be fundamental differences between those types of companies and those which rely on bank loans. And, while the historical transition matrix probabilities perform quite well as predictors of future ratings changes at an overall level, there have been many notable examples of failures of companies with high ratings up until that point.

[10] http://www.bis.org/publ/bcbs49.pdf gives a now somewhat dated, but still useful, overview of the issues. See also this Bank of England 2015 article.

[11] Campbell et al (JF, 2008) provide an overview of a number of reduced form approaches.

Another issue for bank use of ratings agency information is that this PD information is an average of "through the cycle" experience, not dependent on the current "point in time" which is of more relevance to a bank considering a loan.

Of course, one problem with any of these approaches is that the process of a company defaulting is not an event independent of the bank's activities. It may respond to a borrower in difficulty by changing loan repayment terms which affects the likelihood of default. Most studies have tended to focus on default events for companies with bonds on issue where this may be less of a problem. A further problem is that actual default is only one feature of default risk. A bank may find the mark to market value of its exposures to borrowers affected by changes in the credit rating of the borrowers.

## The Merton Model

In 1974, Merton developed the very influential structural model for assessing corporate credit risk based on option pricing. It involves a stylised model of the borrower and the obligation. While empirical tests of the model have implied problems of calibration[12], this has led to adjustments to such simple models and development of more complex variants. One example, among a number of vendor credit risk models, is Moody's KMV model. The Basel Committee's Internal Ratings Based approach to capital requirements is based on credit risk modelling for loan portfolios derived from Merton's original approach (and discussed in Chapter17).

Merton assumes the firm has one discount bond on issue maturing at T with face value F. V is the value of the firm's assets which follows a standard GBM process assumed in many option pricing models. Equity (E) is a call option on the firm's assets, and μ is the asset value growth rate. Using standard option pricing theory, the value of equity is given by the usual Black Scholes formula where the underlying is the firm asset value (V) and the strike price is the debt face value (F). The volatility of the asset value of the firm ($\sigma_V$) is related to the volatility of its equity via the leverage factor.

$$E = V\mathcal{N}(d_1) - e^{-rT}F\mathcal{N}(d_2),$$

$$d_1 = \frac{\ln(V/F) + (r + 0.5\sigma_V^2)T}{\sigma_V\sqrt{T}}$$

$$d_2 = d_1 - \sigma_V\sqrt{T}$$

$$\sigma_E = \left(\frac{V}{E}\right)\frac{\partial E}{\partial V}\sigma_V$$

[12] See, for example, Bharath and Shumway (RFS, 2008).

$$\sigma_E = \left(\frac{V}{E}\right)\mathcal{N}(d_1)\sigma_V$$

In these formulae, r is the risk free rate and $\mathcal{N}(.)$ stands for the cumulative normal distribution value of the argument in the brackets. The *risk neutral* probability of default (the probability, under an assumption of a risk neutral world, that the equity value will be less than the debt obligation at time T) is given by the $\mathcal{N}(d_2)$ value. The implied actual probability of default (PD) can be estimated by substituting an assumed asset value growth rate for the risk free rate in the formula for $d_2$, and the argument of that function (as popularised by the consulting firm KMV) has become known as the distance to default (DD)

$$\pi_{\text{KMV}} = \mathcal{N}(-(\frac{\ln(V/F) + (\mu - 0.5\sigma_V^2)T}{\sigma_V\sqrt{T}})) = \mathcal{N}(-DD)$$

$$DD = \frac{\ln(V/F) + (\mu - 0.5\sigma_V^2)T}{\sigma_V\sqrt{T}}$$

There is a plethora of proprietary credit risk models aimed at calculating either probability of default or value at risk (or other risk measures) due to credit exposures both for individual assets and for loan portfolios. For portfolios, the models need to incorporate an allowance for correlations between the values of assets in the portfolio. These include: CreditMetrics; CreditRisk++; MercerOliverWyman model; McKinsey's Credit Portfolio view.

## CreditMetrics

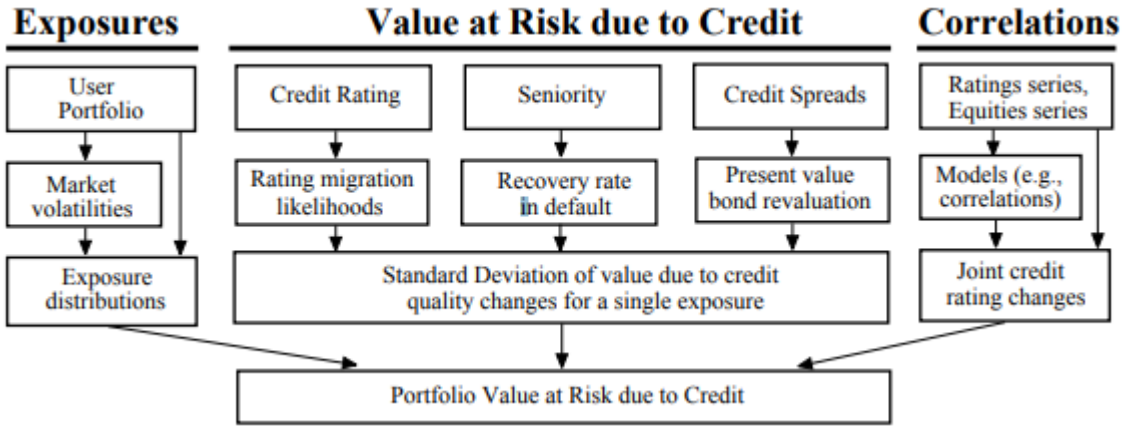



**FIGURE 6:CREDIT METRICS OVERVIEW: SOURCE - MSCI**

CreditMetrics enables a VAR approach. For example: Given a transition matrix of risk grades of loans/bonds (ie prob of going from one grade to another in 1 year)

- If grade = default, recovery reflects seniority
- If grades = solvent, use forecast market prices based on yield curve for that grade

Can estimate distribution of MTM returns based on changes in prices associated with transitions (but accounting issues!). For a portfolio, need to consider transition correlations of individual assets, but with 2 assets and 10 risk grades, have 100 possible combinations – and this grows exponentially with more assets. Hence, use some model to simplify correlation structure, and can derive expected loss on portfolio and VAR.

## 10.11 Credit Risk Mitigation

Lenders take actions both *ex ante* and *ex post* to reduce the risk of borrower default and loss given default. Banks will limit the amount of credit risk via limits on exposures to various counterparties or by geographical or industry segments. Banks will also seek appropriate collateral as security. Where many transactions occur with the same counterparties, *master netting agreements* (which operate when one party defaults) will be put in place. For derivative transactions, it is common to have a *credit support annex* (which specifies collateral arrangements) as part of the usual documentation.

### Collateral

One of the obvious actions is through the requirement of collateral, generally of at least the value of the loan provided, which should reduce both the PD and LGD. Of course, one of the issues arising is whether the borrower has clear title to the collateral provided, such that the lender can claim it should default occur.

Lending against real estate will typically be way of mortgage, giving the lender a first claim on the property should the borrower default. Property transfers involving such borrowing have historically involved a complicated paper based settlement process whereby transfer of funds between purchaser and vendor (involving bank cheques) occurs at the same time title is transferred to the purchaser and the lender's mortgage claim over the property established. Modern technology is enabling this to be done electronically, with PEXA providing the platform in Australia.

A major risk in property development lending is that while a loan may be secured against the property development, failure of the building firm involved before completion may mean the collateral value is significantly below the loan outstanding. Half-finished buildings or a hole in the ground may have little resale value.

In the case of personal property offered as collateral, a number of countries have established registers which show current ownership and outstanding claims on such properties. This protects:

- potential purchasers of goods such as motor vehicles (provided that they check) from purchasing an asset which might be repossessed by a lender with a claim against that asset;
- potential lenders from making loans where there is a superior claim in existence; and
- existing lenders - to the extent that it reduces the extent of owner-borrowers being able to dispose of assets without meeting repayment obligations.

In Australia, the Personal Properties Security Register (PPSR) performs such a role, and unless a claim is registered, the lender becomes an unsecured creditor.

Collateral can also take the form of financial securities, such as government bonds or shares. Repurchase agreements are short term loans provided against collateral such as government bonds or other debt/hybrid securities. Margin lending involves the securities purchased by an individual using the loan being available as collateral to the lender.

## Covenants

Many lenders will impose covenants on borrowers requiring them to meet certain conditions (as well as loan repayments) to avoid being declared in default. There are both "negative" and "positive" covenants. Positive covenants are that the borrower will do something. The negative covenants involve requirements that the borrower ensures that certain things do not happen. For a business borrower this may involve: limits on leverage; ensuring no senior (or equal ranking) claims are issued; having a minimum interest coverage ratio.

Covenants are one way in which a lender can monitor a borrower after the loan has been granted. The objective of such monitoring is to ensure that the borrower does not take actions which increase the possible loss on the loan. Prilmeieir (JFE, 2017) provides an analysis of how covenants are structured to generate information for the lender as a monitor, and how these evolve over time with the relationship between lender and borrower.

*Delegated Monitors*

Diamond (RES, 1984) – a simpler version available here - argues that one reason for the existence of banks (and for their making loans financed by short term deposits) is a role as "delegated monitors". Most loans involve larger amounts than depositors could individually finance, and a collection of depositors doing so leads to a "free-rider" problem regarding monitoring of the borrower. (This is independent of whether such individuals have sufficient expertise at either *ex ante* credit assessment or *ex post* monitoring skills). The bank lender undertakes the monitoring role on behalf of depositors (as indirect lenders). By issuing short term deposits, Diamond argues that the bank can credibly signal to borrowers that it will undertake such monitoring.

## On demand loans and non-monetary defaults

Many bank loan contracts will have conditions which allow for the bank to demand repayment of the loan at any time ahead of the specified repayment schedule, even if the borrower is meeting repayment obligations and other loan conditions. This enables a bank which is suffering a liquidity crisis to call in outstanding loans to meet deposit outflows. Doing so, of course, may lead to significant defaults (and reputational effects) and convert a liquidity problem into a solvency problem.

More generally, such a provision allows the bank to take action which might reduce potential losses on a loan (even though the borrower is meeting current commitments). For example, the loan may be secured against a commercial property from which the borrower obtains rental income. In a depressed economy, an expected further decline in commercial property prices and in economic activity may lead the bank to believe that calling in the loan, even if it leads to default, will involve lower losses than allowing the loan to continue (with a high probability of a future default when the collateral value will have fallen further).

In Australia, there were numerous cases of such "non-monetary default" actions following the financial crisis, particularly involving BankWest. (See Senate Inquiry). This issue was highlighted by the FSI Final Report in 2014, and the subsequent Carnell Report in 2016 recommended that such conditions not be permitted in loan terms for small businesses. The Royal Commission also made recommendations in this regard and the Australian Bankers' (2019) revised "Banking Code of Practice" contains limits on such conditions.

## Netting (Compensating Balances)

In the USA a common requirement of loans was that the borrower maintain some amount on deposit with the lender (compensating balances). While this, in principle, reduces the loss given default, it also serves to increase the effective interest rate on the loan if the deposit interest rate is below the loan interest rate.

In transactions between financial institutions, there will often be situations in which the two parties have exposures to each other. Netting conditions provide for amounts owed by a bank to a defaulting counterparty to no longer to be owed (if they are less than the amount defaulted on).

## Risk Transfer

A bank may originate a loan but transfer some part of the default risk (for a fee) to some other party. Credit default swaps are one example of this, but these instruments are generally only available when large borrowers are involved. Securitisation is another example at the loan portfolio level, where a package of loans originated by the bank is sold to investors with the bank retaining only some (or none) of the risk.

In the case of housing loans, banks will offer require a borrower to pay for Lenders Mortgage Insurance. This typically occurs for high loan to valuation (LVR) loans (80 per cent or above). This involves a specialised insurance company (eg Genworth in Australia) agreeing that in the event of the borrower defaulting, it will pay the borrower the resulting shortfall (after sale of the property involved). While the borrower makes the insurance payment, it is the lender who gets the benefit of the insurance.

Intending borrowers with high LVRs (above 80 per cent) can obtain estimates of the likely cost of mortgage insurance to them using calculators such as found here. At the end of March 2021, a person borrowing $850,000 under a 30 year mortgage for purchase of a $1 million house would have been charged a one-off premium of $12,155. (If the LVR was 90 per cent the premium was $22,320). One issue here is whether the borrower receives an refund of the premium paid if they pay out the mortgage sooner – such as if the house is sold to purchase another house. (And because of such events, the average actual life of a mortgage loan is around 5 or so years, rather than the 30 year contractual life). This will depend on the terms of the LMI policy agreed between the bank and the mortgage insurance company (and the Banking Code of Practice requires the lender to provide information about this when a loan is negotiated).

## 10.12 Loan Terms and Credit Rationing

A fundamental problem for lenders is imperfect information which is relevant from both an *ex ante* and an *ex post* perspective. *Ex ante*, there is the problem of assessing the risk characteristics of the borrower. As well as needing to assess the expected loss (EL) in order to determine the appropriate size, repayment arrangements, and price of a loan, it is also necessary to identify how the risk characteristics of the loan would contribute to the overall risk of the loan portfolio. *Ex post,* there is the problem of monitoring the loan, ensuring the borrower has appropriate incentives for repayment, and management of the loan arrangements when the borrower is in financial distress or default. These issues give rise to *Adverse Selection* and *Moral Hazard* as two key considerations.

One common characteristic of loan markets is *credit rationing*, where lenders are not willing to provide borrowers with a loan of the size demanded – even if borrowers are willing to pay a higher interest rate. This could result from interest rate ceilings due to regulation, but is also a feature of unregulated markets. A simple one-period example can illustrate why. If L is the amount to be lent at a contractual interest rate of r, the promised repayment is $L(1+r) = LR$. But if the probability of default (p) increases with promised repayment, the expected profit to the lender is $E(\pi) = (1-p(LR)).(LR) + p(LR).X – (1+c)L$ where $X<LR$ is the amount recovered in default, c is the cost of funds.

(Let C=1+c, for notational convenience). Assume for simplicity that the probability of default increases linearly with repayment obligation, ie p=LR (for 0<LR<1, such that LR =1 is maximum repayment allowable) and X = 0 (zero recovery if default occurs). Then E(π) = (1-LR)(LR) – CL,

Assuming a risk neutral lender (who only cares about expected profit) maximizing with respect to L for given R gives the optimal loan size $\hat{L}$:

$$\frac{\partial E(\pi)}{\partial L} = R - 2LR^2 - C = 0$$

$$\hat{L} = \frac{R - C}{2R^2} = \frac{1}{2R} - \frac{C}{2R^2}$$

Then differentiate with respect to R to see how $\hat{L}$ changes with R, to get

$$\frac{\partial \hat{L}}{\partial R} = -\frac{1}{2R^2} + \frac{C}{4R^3}$$

such that:

$$\frac{\partial \hat{L}}{\partial R} > (<)0 \; as \; C > (<)2R$$

Figure 7 shows the resulting relationship between loan size and contractual interest rate, which is backward bending. This specific case reflects the very simplifying assumptions made (including risk neutrality) but generally, as long as expected loss (EL) increases (relative to loan size) with repayment obligation a result such as shown below will occur. Higher contractual rates, after some loan size is reached increase the probability of default sufficiently that the expected return on the loan declines unless the loan size is reduced to offset that effect.

Credit Rationing has, at various times and in various countries, been attributed to the existence of regulatory imposition of maximum ("ceiling") loan interest rates. This has often been done to "protect borrowers". For example, in Australia there is currently a maximum interest rate prescribed for Small Amount Credit Contracts (such as payday loans). What are the likely consequences of such interest rate ceilings?

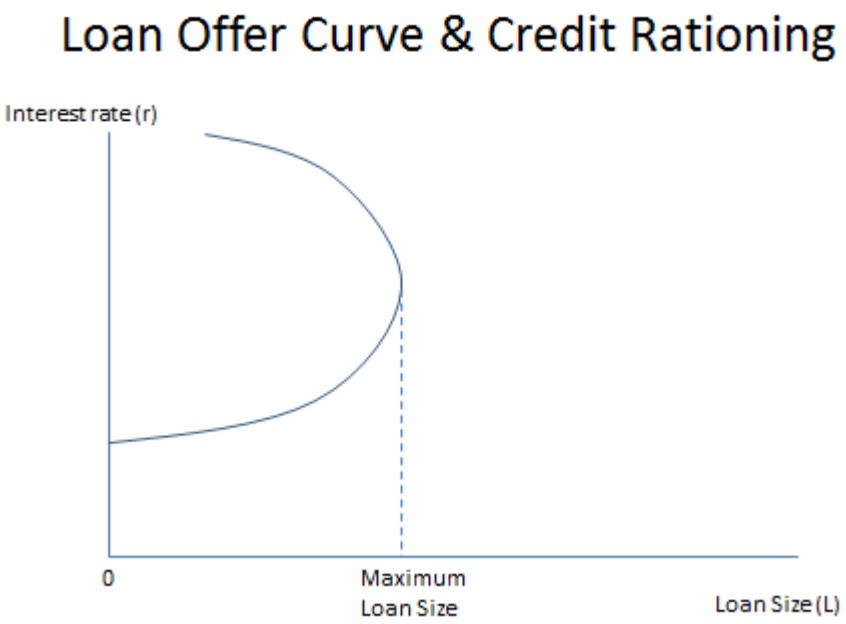



FIGURE 7: LOAN OFFER CURVE

*Credit rationing due to adverse selection and moral hazard.* The simple loan offer curve model derived above focuses on one borrower and assumes that the lender has information about default risk of that borrower. In practice, information is imperfect and a problem for lenders is to separate borrowers into different risk classes and price loans appropriately. There have been a number of papers which have used information asymmetry to show that credit rationing may emerge as a feature of loan contracts aimed at reducing problems arising from adverse selection and moral hazard. Stiglitz and Weiss (AER, 1981) is the most well-known one, but there is a long literature, including a recent contribution by Ambrose et al (JF, 2016) examining similar issues arising in the sub-prime mortgage market in the USA prior to the GFC.

Stiglitz and Weiss argue that for a bank dealing with a range of different, but indistinguishable borrowers, as the interest rate increases the composition of borrowers changes towards more risky borrowers. This is an *adverse selection* effect. To illustrate, assume two borrower types A and B with projects where expected returns are equal, $P^aX^a = P^bX^b$, but where $X^a < X^b$ is return if successful (with probabilities $P^a > P^b$ ) or 0 otherwise, such that A is the safer borrower. The loan size is $1 at interest

rate of r (so promised repayment is 1+r, and investment required is 1+e such that risk neutral borrowers will require net return on their equity e of $e(1+r_e)$.

Borrower i's expected net return is $P^i(X^i - (1+r)) = P^iX^i - P^i(1+r)$ and will thus apply for a loan if: $P^iX^i - P^i(1+r) > e(1+r_e)$.

As shown in Figure 8, at r=0, $P^AX^A-P^A < P^BX^B-P^B$, but as r increases, it has less effect on the net return for the risky borrower B (because $P^B < P^A$ and $P^aX^a = P^bX^b$) so there will be some value r* at which net return for A falls below required return but remains above it for B. The lender then has a change in composition of borrower applicants to the more risky group. The expected return to the bank from its loan portfolio will thus drop at r* (assuming it makes loans of \$1 to all applicants).

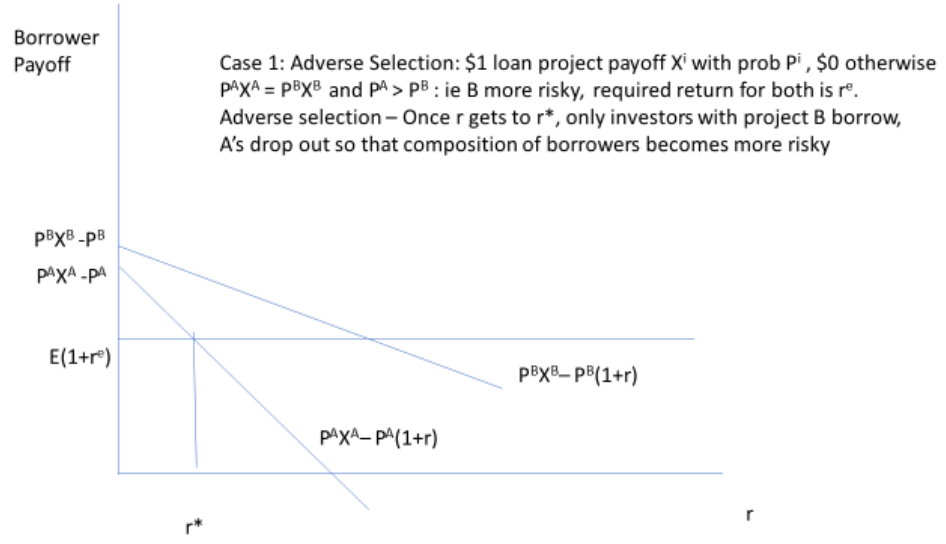



**FIGURE 8 ADVERSE SELECTION EFFECT**

### *Moral Hazard*

The moral hazard effect of charging a higher interest rate can be seen by assuming that Figure 9 applies and refers to one borrower who has a choice between the two projects A and B. (It is no longer assumed that $P^aX^a = P^bX^b$, and instead that $P^AX^A-P^A > P^BX^B-P^B$. It is apparent that as the interest rate increases, the borrower has an incentive to shift to the more risky project B. Because the

lender's return for project i is $P^i$ (1+r) where $P^i$ is probability of a successful project, it is clear that if the borrower shifts from project A to B (where $P^B < P^A$) the lender is worse off. (In this simple example, the lender gets zero if the project fails).

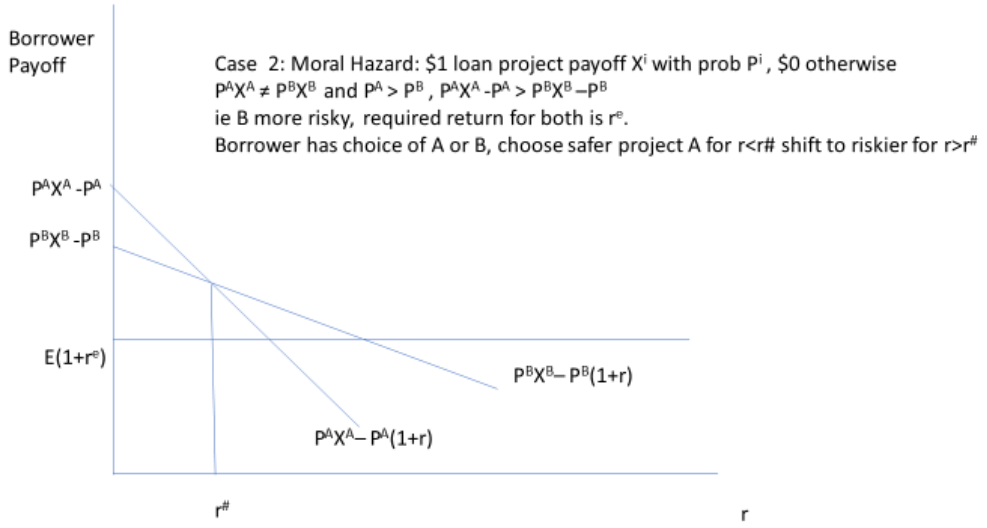



FIGURE 9: CREDIT RATIONING - MORAL HAZARD EFFECT

Both the adverse selection and moral hazard effects illustrate that banks may not benefit from charging higher interest rates, and lead to the important question of whether banks are able to set loan contract terms which cause borrowers to self-select into different contracts – each of which is optimal from the bank's perspective for that type of borrower. (Of course, banks will use other information to try and identify borrower types as well). As a simple example, consider a case where there are honest borrowers who will repay if able to, and dishonest borrowers with no intention of repaying. *Ex ante* the bank cannot identify which are honest and which dishonest. Suppose the bank offers two loan contracts where one is for a large amount at a high interest rate, and the other is a smaller amount at a lower interest rate. If borrowers are unaware of the signalling implied by their choice, dishonest borrowers will opt for the larger loan (with higher interest rate) since they have no intention of repaying. The bank would reject such borrowers. This would be a (trivial) example of a *separating equilibrium* in which different individuals get offered different loan terms reflecting their implied repayment characteristics. In a *pooling equilibrium*, all borrowers get offered the same loan terms, because it is not possible to design terms to achieve a self-selection outcome. Which outcome prevails will depend *inter alia* on the distribution of characteristics of the borrower population as well as the nature of competition between lenders.

Needless to say, the Rothschild-Stiglitz perspective has not gone unchallenged. In a number of articles, De Meza and Webb demonstrate that by changing some model assumptions an outcome of asymmetric information can be "over-lending" to poor quality firms rather than credit rationing of good quality firms. (See Bonnet et al (AE 2016) for an overview of this literature).

McCarthy et al (AJM 2017) examine credit rationing of Australian SMEs using a large-scale survey in 2010 and 2011. They find credit is more likely to be rationed for firms which are smaller, non-export-oriented, non-agricultural, not product-innovative, and with female CEOs. They also find mismatches of what firms and banks see as important in applying for and assessing loan applications.

# 11. Modern Financial Instruments: Securitisation

## Contents

## 11.1 Introduction

Securitisation has become an important feature of modern banking. In the USA it received a massive setback following the GFC when problems with the structure of complex securitisations and inadequate assessment of underlying loans became apparent and lead to major losses for many participants. In Australia, the GFC resulted in a lack of liquidity in the capital markets although the quality and performance of the underlying collateral continued to be strong. It has gradually recovered from that setback, and is likely to continue in importance. Securitisation involves putting packages of loans (or other assets) into a special purpose vehicle (SPV) which funds its purchase of those assets by issuing securities backed by those loans to investors. Hence it is appropriate to start with discussion of the concept of SPVs.

## 11.2 Special Purpose Vehicles

Special Purpose Vehicles (SPVs) are a legal entity which is "bankruptcy remote" from the sponsor(s) and undertakes certain specified activities. While the sponsors will benefit from profits generated from the SPV, they benefit from the limited liability associated with their investment (such as a transfer of assets into the SPV). Where the sponsor is an authorised deposit taking institution ("ADI") (such as a licensed bank), there may be regulatory capital advantages by transferring the assets off balance sheet into the SPV. In Australia, the typical form (particularly for securitisation) is a trust vehicle, in other jurisdictions it may be a form of a company or limited partnerships – the relevant legislation determines the possible and desirable forms. The trust structure allows various types of units to be issued to investors with the originator holding some units entitling it to excess income after other obligations are met.

The "bankruptcy remote" nature of the SPV can be achieved by documentation specifying undertakings by creditors not to wind up the SPV and limiting recourse of the SPV's creditors to assets of the SPV (and not the sponsor). While legally, sponsors have no obligations (beyond those contracted) to provide support to an SPV which is in financial difficulty, they may feel a reputational reason for injecting further funds or providing some other form of support.

Gorton and Souleles (2007) argue that SPVs enable a separation of control rights to business decisions and financing decisions. The SPV cannot make business decisions and management control over its specified, limited, range of activities, resides with the sponsoring firm(s). It can raise finance from third parties for the venture, where the legal liability for repayment lies with the SPV, and not with its sponsor (unless some forms of guarantees are given). If, instead, the activities were conducted in the sponsoring firm, failure of the venture and inability to meet payments to external creditors from the proceeds of the venture would expose the sponsor's other assets to that loss. They note that the cost of debt finance via an SPV could conceivably be cheaper than debt raised by the sponsoring firm for two reasons. One is that because the SPV cannot (in theory) face bankruptcy, expected bankruptcy costs are zero and factored into debt pricing. Another is that implicit expected support for an ailing SPV by a sponsoring firm may enable regulatory arbitrage. They find that SPVs used to securitise credit card receivables which are associated with riskier sponsors need to pay higher yields to investors, and that there is more use of securitisation by riskier sponsors.

To the extent that accounting rules enable SPVs to be off-balance-sheet, and not consolidated with the sponsoring firm's accounts, using an SPV can enable the sponsor to hide the amount of debt financing its overall activities (including the SPV) and its leverage. Enron was a major example of this type of behaviour and its exposure and failure in 2001 helped lead to a change in accounting rules. Generally, for a securitisation SPV to be treated as off-balance-sheet, the transfer of loan assets into the SPV will need to be seen as a "clean sale" (or "true sale") with no recourse to the lender, and the sponsor will need to have only a limited stake in the SPV. These requirements find reflection in APRA's distinction between "funding only" and "risk transfer" securitisations for their treatment in capital requirements for Australian ADIs.

SPVs may be used for property development involving a developer and an investor as sponsors with the former contributing construction and management skills etc and the latter providing cash. In those cases, the SPV will have a limited life, being would up at the completion of the development and net assets (cash from property sales) in the SPV being distributed to the sponsors as per the original agreement. In Australia, if set up as a trust vehicle there may be tax benefits if the ATO can be convinced that the proceeds are a long-term capital gain (and thus getting the 50 per cent CGT concession) rather than business income.

SPVs are an important vehicle used in Public Private Partnerships (PPPs) where the consortium (of construction firms, other contractors, equity investors and debt providers) will create an SPV to enter the PPP contract with the government. The SPV will have specific contracts and agreements with members of the consortium for provision of services and assets and financial arrangements.

## 11.3 Conduits and SIVs

Conduits and SIVs (Structured Investment Vehicles) are similar to SPVs except that they are not necessarily bankruptcy remote. ABCP structures used prior to the GFC involved the creation of an "SIV" which bought financial assets from its sponsor (or others) and financed this by issues of commercial paper (CP) backed by those assets. (SIVs are not generally used in Australian securitisation).[1] These processes generally involve maturity transformation since the CP is short term whereas the assets are longer term. Since investors in the CP would be concerned about the ability of the conduit to refinance and thus repay existing CP holders when due, there will need to be some form of liquidity enhancement provided by the sponsoring bank. There may also be a capital guarantee provided by the sponsor (which may also ensure a higher credit rating for the CP which is required by some investors). Acharya et al (2013) provide more information. They also refer to the use of extendible commercial paper which was an approach used by RAMS (see appendix) aimed (unsuccessfully) at avoiding the liquidity risk associated with maturity transformation.

## 11.4 Securitisation and Traditional Banking

The difference between traditional banking, balance sheet, lending and (off-balance sheet) securitisation is seen by comparing Figure 1 and Figure 2 which provide a (highly) simplified depiction of the processes involved. In traditional banking, the loan is originated at a bank branch (or more recently often by a mortgage broker) and funds provided to the borrower by the bank who holds the loan as an asset on the balance sheet which is funded by deposits and equity (or other borrowings).

[1] "Conduits" are similar – and in Australia generally found primarily in use in banking group internal structures where longer term assets are transferred into a special vehicle which is funded by shorter term financing from the bank.

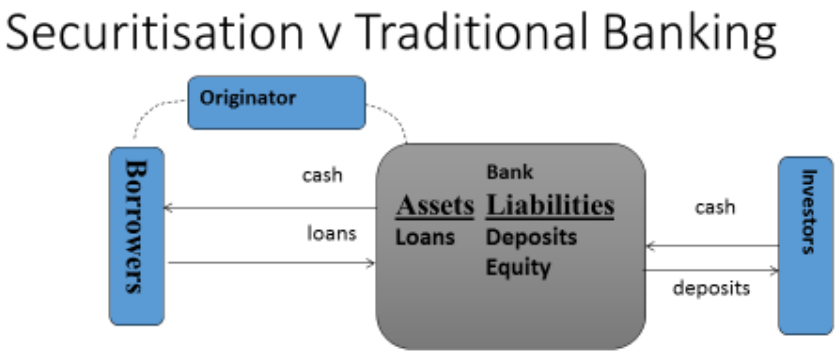



FIGURE 1: TRADITIONAL BALANCE SHEET LENDING

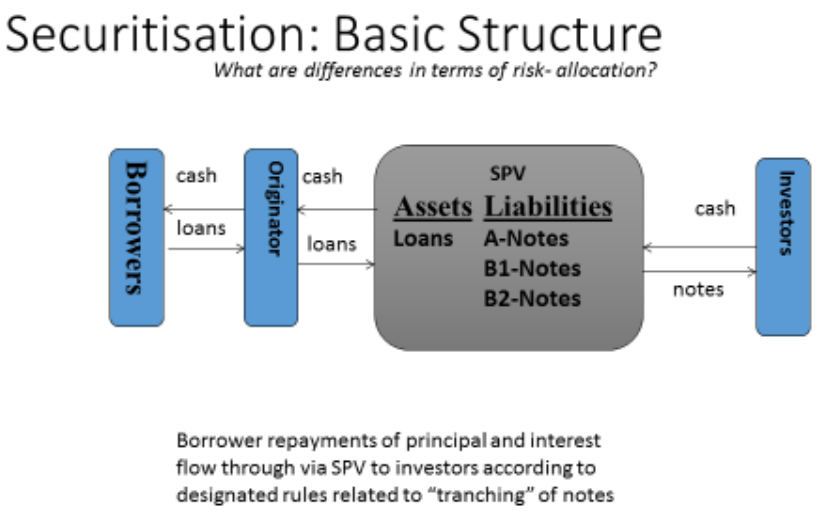



FIGURE 2: SECURITISATION BASIC STRUCTURE

In the case of securitisation, the origination process and initial funding depends on whether it is a bank or non-bank securitiser involved. If it is a bank, funds are provided as in traditional banking, but at some time the loan will be packaged together with other loans and transferred to an SPV which raises funds to buy the loans by issuing securities to investors. If the securitiser is a non-bank, the funds provided to the borrower will come from its use of "warehouse" funding. In this, the securitiser has obtained wholesale funding (from a bank or an investment fund) for an SPV which acts as a warehouse funder/provider, using those funds to acquire loans until the warehouse is "full" or has reached its limit (ie all funds have been used). At that time the loans are transferred to

another SPV which purchases them by issuing asset-backed securities to wholesale/sophisticated investors in the capital markets.[2]

The main differences between on-balance-sheet lending and securitisation are fairly clear.[3] Under securitisation, the default risk on the loans is transferred to investors (and in some cases to specialist insurers who, for a fee, take on the default risk of loans held by the SPV). Under securitisation, there is generally no maturity transformation – unlike banking where deposits are of much shorter maturity than loans. (However, some securitisations such as Asset Backed Commercial Paper (ABCP) may involve the SPV/Conduit financing the loans by issuing short term paper which is rolled-over when it matures). Perhaps less clear is the impact on incentives – on balance sheet financing means that banks are exposed to any deficiencies in their own loan assessment and subsequent borrower monitoring processes. While the structure of securitisations aims to ensure that investors do not need to be concerned with reduced bank incentives for performing these activities well, the originate to distribute (OTD) model was roundly criticised after the GFC for precisely these failings, particularly in the USA.

One significant feature of securitisation involving mortgages is that these types of loans are subject to "prepayment risk" since the borrower has an option (perhaps involving some cost to exercise) to repay the loan before contractually obligated. This is one reason for securitisation involving "tranches" of securities in which all loan principal repayments flow (subject to some qualifications) to the highest ranking outstanding tranche, until it is paid off. (All tranches receive a specified interest rate on the outstanding principal balance of that tranche, where the interest rate will generally be higher for the lower tranches).

Higher tranches also involve less credit risk, since defaults on the pool of underlying loans (if not offset by insurance from a third party insurer) first reduce the principal amount of the lowest tranche of securities, and only impact upon the principal of higher ranking tranches when lower ranking tranches have been wiped out. The ratings agencies (S&P, Moodys, Fitch) provide ratings for the various tranches, and the structuring of tranches is designed with potential resulting ratings effects in mind.

While securitisation of residential mortgages, creating Residental Mortgage Backed Securities (RMBS) has been the most common form in Australia, securitisation of Commercial Mortgages, Auto Loans, Credit Card, SME (or other) receivables, etc are also common. In general, the term Asset

[2] In Australia, legislation allows for a securitiser not to hold an AFSL as long as the securities are not purchased by retail investors. In principle, there is no reason that retail investors could not participate, although administrative costs and retail investor protection requirements likely explain why wholesale investors are preferred.

[3] For the legal framework surrounding securitization see here.

Backed Securities (ABS) is used to describe the overall market. CDOs (CLOs), where CDO (CLO) stands for Collateralised Debt (Loan) Obligations are SPV type entities which purchase, respectively, portfolios of securities which are tranches of ABS or commercial and industrial loans and issue their own tranched securities to finance those purchases. Before the GFC, a significant growth in (what are now termed) "resecuritisations" occurred, whereby various tranches of different ABS were pooled as the assets in an SPV and financed by the issue of tranches of securities by that SPV (such as in a CDO). Further layering of such activities could occur which led to the descriptive terms "CDO squared" or "CLO squared".

The size and composition of the Global Market for Securitisation can be seen from looking at the number of structured finance securitisation programs rated by Moody's Investor Services. At 2017, there were almost 12,000 deals rated, about 50 per cent of which were RMBS, 20 per cent were CLOs, 12 per cent ABS, and 8 per cent CMBS. Of these around 75 per cent were in the Americas, 15 per cent in EMEA and the remainder in Asia. The number of covered bond programs rated was much less at 334, mostly in EMEA.[4]

## 11.5 Types of Securitisation

There are two main types of securitisations.

### "Traditional" Securitisation

One, sometimes referred to as "traditional" is the type developed in the USA[5] in which a pool of loans is made bankruptcy remote from the originator (bank) via a sale to a SPV and claims issued by the SPV against that specific pool of loans. The investors effectively have ownership (via the SPV) of pool of loans and receive cash flows from the loans (often reflecting a "pass-through" arrangement) according to the terms of the securities they have bought. The time pattern of payments of principal and interest on the securities issued will reflect that of repayments on the stock of loans in the pool, with pre-payments of loans giving rise to uncertain maturity of the securities. There is thus a number of "tranches" of securities issued against the asset pool with lower ranking tranches not receiving principal repayments (generally)[6] until higher ones have been paid out and having greater exposure to loss due to defaults on the underlying loans. The pool of assets declines over time due to such pre-payments or defaults until some point at which a "clean-up" call option is exercised by the creator of the SPV to repurchase the remaining loans and pay out the remaining security holders.

[4] Source: Moody's Credit View – Structured Finance, brochure 2017

[5] Even though European securitisation using a different, covered bond, structure long predated the US development of securitisation.

[6] At some point, as the pool of assets declines, the allocation of repayments of principal might switch to one in which lower ranked tranches participate in proportion to size of the tranches.

"Traditional" securitisation developed in the USA in the 1970s and has become a major element of banking and capital markets activity around the world, although suffering severe setbacks to its use following the GFC when confidence in the underlying model was shaken.[7] As well as there being major problems with asset quality of underlying mortgages in securitisations, complex structures, and problems from risks arising in "resecuritisations", the credibility of the OTD (Originate to Distribute) model was severely questioned. While the Australian securitisation market suffered a downturn, this reflected primarily wider market liquidity issues, rather than concerns about underlying asset quality (including legal obligations upon borrowers to repay – unlike the "no-recourse" arrangements common in the USA).

The US securitisation market is relatively complex, in part due to the significant role of the government sponsored entities (GSEs) *Fannie Mae, Freddie Mac,* and others who purchase loans from banks and other originators and create mortgage backed securities (MBS) using those loans.

The most common type of securitisation involves residential mortgages (RMBS). It is unusual to see a RMBS issued with less than AUD 300 million of mortgages in the pool, and larger issues can exceed AUD 3,000 million. Figure 3 shows the terms of the Apollo Series 2017-1 Trust securitisation by Suncorp Bank in February 2017.[8] Among non-bank issuers, Pepper Group has been significant, including as the issuer of RMBS involving non-conforming loans. In general, securitisations by non-ADI issuers have grown relative to, and now exceed, those of ADIs

## Self-securitisations

In Australia, there has been growth in "self securitisations" by Australian banks. These involve the same steps as in a traditional securitisation, but where the bank retains ownership of all the tranches of securities involved, rather than selling them into the market. The rationale behind this is that such securities are available to be used as collateral in repurchase agreements with the RBA under the terms of the Committed Liquidity Facility (CLF) should the bank need access to liquidity. Because CLF facilities can be used (up to a prescribed limit) to satisfy the LCR requirement, this means that banks can avoid, to some degree, having to hold government securities to meet that requirement. The RBA explains how it values (as at end 2014) such securities here.

[7] Gorton and Metrick (2012) note that the asset backed securities market became larger than the corporate bond market in 2002, and that non-mortgage securitisation (student loans, credit card receivables, auto loans etc) exceeded the corporate bond market by 2005 – but then fell markedly in the financial crisis.

[8] More information can be found here. The advance rate corresponds to the proportion of the total of the tranches, and the initial credit enhancement is the total size of tranches subordinate to the specified tranche.

| Note Class (Pass Through) | Issuance Amount (A$) | Expected Ratings (S&P\Fitch) | Advance Rate | Initial Credit Enhancement | S&P\Fitch Required CE (at Issue Date) | 1M BBSW + Margin | Modelled WAL (Years)[1] | Final Maturity Date |
|---|---|---|---|---|---|---|---|---|
| A | 1,150,000,000 | AAA(sf)\AAAsf | 92.00% | 8.00% | 4.88%\4.90%[2] | 1.13% | 3.3 | Sep-2048 |
| AB | 48,125,000 | AAA(sf)\AAAsf | 3.85% | 4.15%[3] | 3.78%\3.90% | 1.90% | 5.8 | Sep-2048 |
| B | 21,250,000 | AA(sf)\ -- | 1.70% | 2.45%[3] | 2.23%\-- | 2.35% | 5.8 | Sep-2048 |
| C | 15,625,000 | A(sf) \ -- | 1.25% | 1.20%[3] | 1.16%\-- | 3.15% | 5.8 | Sep-2048 |
| D | 6,875,000 | BBB(sf)\ -- | 0.55% | 0.65%[3] | 0.63%\-- | 4.00% | 5.8 | Sep-2048 |
| E | 8,125,000 | -- | 0.65% | -- | -- | 6.00% | 5.8 | Sep-2048 |
| Total | 1,250,000,000 | | | | | | | |

[1] The modelled Weighted Average Life ("**WAL**") at Issue Date assumes a portfolio constant prepayment rate ("**CPR**") of 21%, no defaults, no arrears, no principal draws, the Subordination Conditions are satisfied at the first possible date and that the Notes are repaid on the first possible Call Option Date. No Further Advances are permitted by the Trust.

**FIGURE 3: APOLLO SERIES 2017-1 TRUST SECURITISATION (SUNCORP BANK)**

## Covered Bonds

The other is the *Covered Bond* model common in Europe (for over 200 years) in which the SPV holding the pool of loans remains on the bank's balance sheet, securities are issued with specified maturity dates, and new loans are added to the pool as existing ones are paid-off to ensure that the promised cash flows on the securities issued can be met. The EMF/ECBC provides information on the covered bond market in Europe and globally. (In Australia, legislation requires that the assets in the cover pool must be at least 103 per cent of the face value of outstanding covered bonds and that the assets allowed for inclusion must comply with a maximum loan to valuation ratio of, effectively, 80 or 60 per cent for residential or commercial mortgages). Unlike traditional RMBS (where a "pass-through" structure means that only the cash flows from the underlying assets are used to meet obligations to bond holders, in a covered bond structure the sponsoring bank is responsible for meeting the cash flows with the cover pool of assets acting as collateral. If the bank fails, the covered bond holders have first claim on the assets in the cover pool and if they are not sufficient to meet the amount owed, the bond holders become unsecured creditors of the bank for the remaining amount.[9]

Covered bonds in Australia were allowed following a December 2010 announcement by then Treasurer Wayne Swan. APRA and others were concerned that deposit safety would fall because covered bond holders, rather than depositors, will have first claim on the bank's assets held in the

[9] A requirement to liquidate the SPV in the event of the sponsoring bank failing, and unable to meet promised repayments, could lead to a forced sale of the underlying mortgage assets at a loss, and thus a "soft bullet' structure (allowing for an extension of maturity if the sponsor fails) or use of a pass-through structure mitigate this potential problem.

cover pool. Partly reflecting that concern, a limit on the size of covered bonds outstanding relative to the bank's Australian assets was put in place. But it is important to realise that if some of the banks assets are funded by covered bonds, there is also correspondingly less deposit funding of the bank's assets. So, depositors are no less protected unless the cover pool includes the best quality assets of the bank with depositors (or the FCS) then exposed to larger losses should the bank fail. (And even though covered bond holders have a claim on other bank assets if the cover pool is inadequate, they only rank as unsecured creditors, and thus behind depositors).

Information about covered bond issuance is available on the ASF website. The RBA's Benjamin Watson has an article in the RBA Bulletin (September 2017) providing recent information. Covered Bond issuance (mostly by the major banks) grew rapidly after 2011 such that the amount on issue approached 75 per cent of other asset backed securities in 2017. The average tenor at issuance is around 7 years, the majority of issues have been denominated in USD or EU, and the AUD (hedged) promised return at issuance has varied but has recently been around 100 basis points above equivalent maturity government bonds.

## 11.6 Economic Arguments for Securitisation

A number of different reasons are often advanced for why securitisation occurs. But ultimately securitisation can only compete with traditional bank balance sheet lending if securitisers are able to provide loan funding on comparable loan interest rates and loan conditions. Put slightly differently the overall cost of capital when using securitisation must be no more than when using on-balance sheet funding. Elul (2005) provides an overview of explanations for why asset-backed securities exist.

One is the potential for a bank to "recycle" funds and earn income from originating further mortgages. Thus, for example, a bank which has limited deposit funding but identifies a large demand for loans and has expertise in the origination process could focus on generating fee income from mortgage origination for subsequent securitisation. (It may also generate fee income from the servicing of the mortgages – collecting repayments etc, although this may also be provided by a third party).

A second is that securitisation may remove liquidity risk (which would otherwise arise from funding long term loans with short term deposits) from the bank balance sheet. Instead, investors in the tranches of the securitisation take on liquidity risk in the form of the uncertainty of the timing of returns of their capital associated with pre-payments of mortgages. Moreover, because long term loans are funded now by marketable securities, holders of those securities have the option of generating liquidity by sale of the securities.

A third argument is that tranching enables the bank/securitiser to sell informationally-insensitive securities (senior tranches) to investors while retaining the informationally sensitive junior tranches itself. This reflects the proposition that when there is asymmetric information, a firm will find it advantageous to issue such securities (obtaining a higher price for the assets sold). Pooling of assets also reduces the idiosyncratic risk which reduces the information asymmetry.

There may be lessons here from the IPO underpricing literature – where underpricing arises from the existence of informed and uninformed investors and the need for a discount to compensate uninformed investors from receiving a larger share of poorer quality issues. By tranching, uninformed and informed investors can separate into different groups investing in different tranches with differing risk.

Regulation is a common explanation for securitisation. Banks, in the past, were to avoid capital requirements and other regulatory imposts which reduced the profitability of funding loans on balance sheet relative to securitisation. However, many securitisers are not banks subject to such regulation, and the major Australian banks were not active participants (probably reflecting low costs of deposit funding for their on-balance sheet funding due to implicit guarantees).

On the investor side, "prudent investor" requirements for institutional investors such as pension funds may create demand for high quality (senior tranche) securities. Gorton and Metrick (2012) also point to the increased demand for collateral associated with derivatives market growth, clearing and settlement activities (involving RTGS) and repo markets, and argue that the information-insensitive nature (of senior tranches) makes these suitable for this purpose.

Avoidance of bankruptcy costs is also relevant. Where an investor purchases bank debt, they may find themselves as a junior creditor with a claim on a bank's assets if the bank fails, factoring this risk into the return they demand. Holding ABS their position is not dependent on the solvency of the bank, removing the premium required for financial distress risk. (Even in the case of covered bonds, which remain on the bank balance sheet, the investor's position is secured against the collateral pool, and if that is inadequate, the investor becomes an unsecured creditor against the bank's assets).

It maybe that taxation is relevant due to capital structure decisions. If loans are held on a bank's balance sheet, funded partially by deposits or debt, there will be company tax payable on the profit accruing to equity, generating double taxation of dividends. However, the SPV through which the assets are held is tax neutral, interest income on loans is paid out to security holders and taxed once in their hands. However, since the securitiser (the bank) will generate profits from the securitisation

process (presumably more than from funding the loans on balance sheet), there will be some tax consequencs from that.

Gorton and Seuleles also pose the important question of why did securitisation arise when it did, and not before. Was it due to a decline in the profitability of on-balance sheet banking due to increased competition (reflecting deregulation) within banking and with other types of competitors such as MMMFs, or avoidance of other regulations (such as capital requirements), or growth of an investor market, or technology, or some financial innovation such as developments in design and structure of SPVs enabling funding at a cheaper rate than retaining them on balance sheet.

## 11.7 Prepayment Modelling and RMBS Pricing

An important feature of RMBS and other securitisations is the potential uncertainty over the timing of cash flows due to the option which borrowers have to make early repayments of principal. There are a range of ways to model prepayment behaviour

In the USA the Public Securities Association model developed in the 1980s was commonly used. It assumed that the prepayment rate = 0.2% p.a. for the first month, increasing by 0.2% per month for 30 months until a 6% rate was reached and remained at. This was based on historical experience. Differences arose in practice due to: (1) coupon effects; (2) age; (3) amortizing characteristics; (4) assumability; (5) size of pool; (6)conventional/nonconventional mortgages; (7) geographic location; (8) mortgagee characteristics.

Mortgage Termination Models: these model expected prepayment rates as function of age, collateral, coupon - market rates, etc. (based on historical data, regression etc) and derive a probability density function of prepayment rate for a specific mortgage pool. It is then possible to calculate expected cash flows

Option pricing : It is possible to conceive of a mortgage backed security (eg, GNMA) as being equivalent to the holder having a straight bond and having written a call option, giving the bond issuer the right to buy back the bond. Then:

P(GNMA) = P(BOND) - P(PREPAYMENT OPTION)

For example, one could assume the early repayments are only due to yield differences between the contractual loan fixed interest rate and current market rates, and use a model of the term structure and make assumptions regarding the resulting contractual cash flows to derive option value.

This is an area of substantial academic and industry research, since better prepayment modelling and forecasting leads to improved pricing estimates of the securities. Thomson-Reuters provides an

overview of how prepayment rates can be estimated, while they also provide a very brief explanation of how the prepayment aspect leads to RMBS having a non-convex price-interest rate relationship.

In Australia, RMBS typically refer to a borrower payment rate (BPR), which has in recent years been around 20-25 per cent, down from over 30 per cent in the early 2000's, as well as a conditional prepayment rate (CPR) which is principal payments in excess of the contractual amounts and which contributes most (all but around 2 percentage points) of the BPR. Perpetual Trustees publishes a Best Practice Note on deriving the CPR.

Also important is the design of tranche conditions to affect the impact of loan prepayments on the expected life of a tranche and the uncertainty about the life. Arcidiacono et al (2013) provide a discussion of a range of structures for Agency CMOs which affect these characteristics. (For example, lower tranches may forgo interest due for some period of time which is allocated to faster prepayments of principal of senior tranches. Of course, since those lower tranches then have some features of a zero coupon bond they must be issued at a price below their par value).

## A Simpl(istic) illustration of prepayment and valuation

The following discussion demonstrates in a very simple example the impact of prepayments on different tranches of securities issued against (for simplicity) one mortgage loan (or a portfolio of identical loans).

The timing of cash flows (interest I and principal P) on four year mortgage loans of $100 at 15% interest rate is uncertain because of possible mortgage prepayments. They are assumed to be either

- $I_1+P_1$, $I_2+P_2$ ,$I_3+P_3$, $I_4+P_4$, (eg $31.55 per year) - no prepayment

  or

- $I_1+P_1$, $I_2+P_2+P_3+ P_4$ ($31.55 in year 1 and $86.3 in year 2)

Suppose the mortgage originator issues two securities A and B for $50 each with claims on the loan cash flow involving "tranching" of cash flows (as in securitisation) as follows.

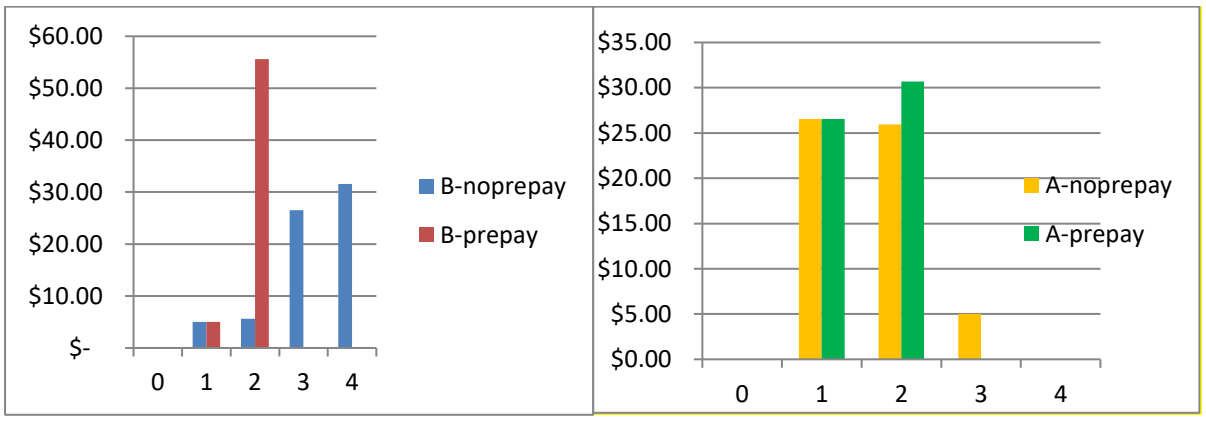
- A receives $P_1$, $P_2$ etc plus interest on share of outstanding principal (50, 50-$P_1$ etc) until $50 repaid,
- B receives rest of interest, and all principal payments after A is fully repaid.
  (note that the assumption that each security costs the same is unrealistic).

The spreadsheet below shows the calculation of the difference in cash flows between the two cases

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4 year mortgage, interest 10% p.a. | | | | | | | | | | | | | | |
| equi-probable: no prepay or full prepay at end year 2 | | | | | | | | | | | | | | |
| Security A: first claim on principal and interest on A's share of principal outstanding: | | | | | | Price of A | 50 | | | | | | | |
| Security B:last claim on principal and interest on B's share of principal outstanding: | | | | | | Price of B | 50 | | | | | | | |
| Prepayment risk not priced! | | | | | | | | | | | | | | |
| | | | | | | NoPrepay | | | | | | Prepay | | |
| | No Prepay Case | | | PrepayCase | | Security A | | Security B | | | | Security A | | Security B | |
| Year | Payment | Principal | Interest | Principal | Interest | Principal | Interest | Principal | Interest | | | Principal | Interest | Principal | Interest |
| 0 | -100 | | | | | | | | | | | | | | |
| 1 | $31.55 | $21.55 | $ 10.00 | $21.55 | $ 10.00 | $21.55 | $ 5.00 | 0 | $ 5.00 | | | $21.55 | $ 5.00 | 0 | $ 5.00 |
| 2 | $31.55 | $23.70 | $ 7.85 | $78.45 | $7.85 | $23.70 | $ 2.23 | 0 | $ 5.61 | | | $28.45 | $ 2.23 | $50.00 | $5.61 |
| 3 | $31.55 | $26.07 | $ 5.48 | | | $4.75 | $ 0.26 | $21.32 | $ 5.21 | | | | | | |
| 4 | $31.55 | $28.68 | $ 2.87 | | | | | $28.68 | $ 2.87 | | | | | | |
| | | $100.00 | | $100.00 | | $50.00 | | $50.00 | | | | $50.00 | | 50 | |

| | B-noprepa | B-prepay | A-noprepa | A-prepay |
|---|---|---|---|---|
| 0 | | | | |
| 1 | $ 5.00 | $ 5.00 | $26.55 | $26.55 |
| 2 | $ 5.61 | $ 55.61 | $25.93 | $30.69 |
| 3 | $ 26.54 | $ - | $5.01 | $0.00 |
| 4 | $ 31.55 | $ - | $0.00 | $0.00 |

As the figures below show, the event of prepayment has very little effect on the cash flows of the senior tranche (A), but involves a significant bringing forward of the cash flows of the junior tranche (B). Is this good news for the holder of B? No – consider the circumstances when such a prepayment event is likely to occur. If interest rates have fallen (such that the borrower could refinance the mortgage at less than 10%) the holder of B will now have to reinvest the cash flows at a lower interest rate than was expected.




Thus to the extent that declines in interest rates lead to higher than usual prepayment rates, the value of B will not necessarily increase as interest rates fall. The price-interest rate relationship can look as in Figure 4. Rather than the usual concave price-interest rate shape, there may be a convex part as interest rates approach low levels, reflecting the increasing risk of prepayment and loss of interest payments based on a higher interest rate.

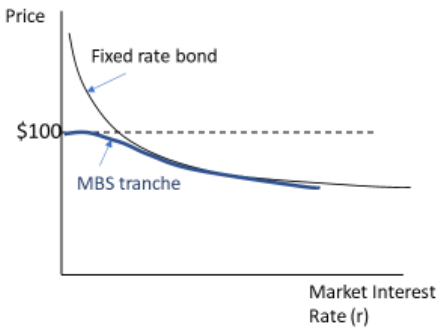



FIGURE 4: PREPAYMENT RISK AND RMBS INTEREST RATE SENSITIVITY

## 11.8 History of Australian Securitised Products

There was much discussion of the potential for securitisation in Australia from the late 1970s, but it took quite some time before securitisation commenced. Among the impediments discussed at the time, which illustrate the sorts of complex issues involved in developing new financial products, were:

- Stamp duty - on mortgage transfer (abolished in Victoria and NSW in 1984)
- Regulation of housing loan interest rates – finally abolished in 1986
- Non standardisation of mortgages - an RMBS pool can involve diversification across mortgage types, so that this can be overcome by the securitiser
- Less need with national banking markets, but growth of superannuation funds with investment funds may encourage banks to securitise
- inconsistent state legislation, objectives
- companies code treatment including prospectuses
- uncertainty regarding accounting treatment
- non exemption from withholding tax for unit trusts used as mortgage securitisation vehicles
- lack of trustee status
- variable interest rates and unpredictable cash flows
- lack of information on prepayment probabilities
- need for mortgage pool insurance (no longer generally needed nor used due to cost)
- credit enhancement/assessment methods absent - ratings, guarantees etc.
- lack of other financial markets suitable for hedging risks associated with creation of instrument
- adequate supply of other "bond" instruments

These impediments were gradually overcome and the securitisation market began to develop.

### Initial Issuers

The Australian securitisation market began slowly in the mid 1980s. Among the first securitisers were institutions established by, or involving, governments. These included :

- *NMMC (National Mortgage Market Corporation)* formed 1984, and owned by the Vic & SA governments and private financial institutions etc. It issued *Aussie Macs* (short dated promissory notes) in 1985 and also issued National Mortgage Bonds and Victorian Housing Bonds. (Now part of Bendigo and Adelaide Bank)

- FANMAC was formed in 1985 and name changed to FANMAC in 1987. The NSW Government owned 26%, and the remainder private. It issued Premier Trust Bonds starting in 1986 involving mortgages originated under the Department of Housing, State Home Loans Programme (Home Fund). State government guaranteed the mortgage loans to low income borrowers. (Ferris provides an overview of the massive problems associated with the scheme) Rebranded in 2001 as RESIMAC. RESIMAC is an ASX listed company after merger with HomeLoans in mid 2016.
- Other early entrants were: MGICA Securities Ltd; Security Pacific Securities Australia Ltd; State Bank of NSW; Macquarie Bank (with a BEST (Billings of Essential Services Trust) issuing promissory notes for fund receivables of the MMBW) and the PUMA Trust; Societe Generale; County NatWest.

## Australian ABS Growth and Size

Figure 5 shows the dramatic growth of the long term ABS market in Australia during the first part of the century up until the GFC. Although Australian securitisations were well collateralised with (generally) good quality mortgages having low default rates, the international GFC experience was contagious.

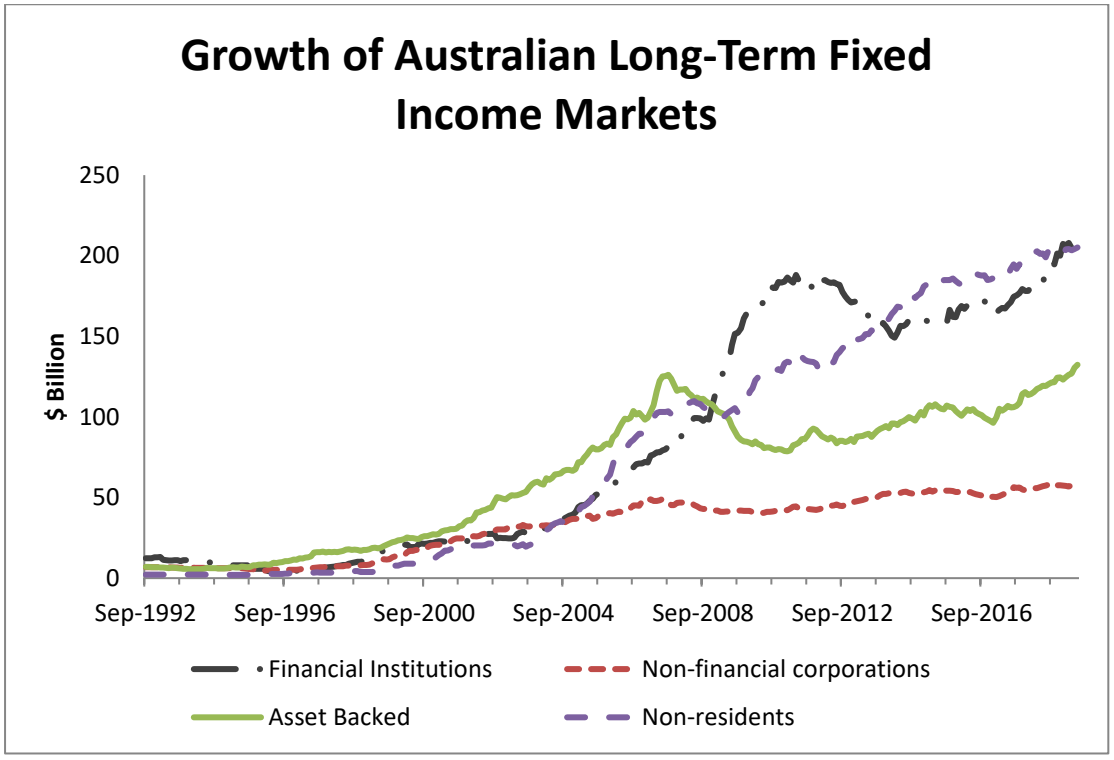



FIGURE 5: AUSTRALIAN ABS MARKET GROWTH (SOURCE: RBA TABLE D4)

The GFC had even greater effects on issues of Australian ABS into international markets as shown in Figure 6. Both figures are for the stock of ABS on issue and thus understate the decline in new issuance, which was clearly well below what was required to replace maturing issues.

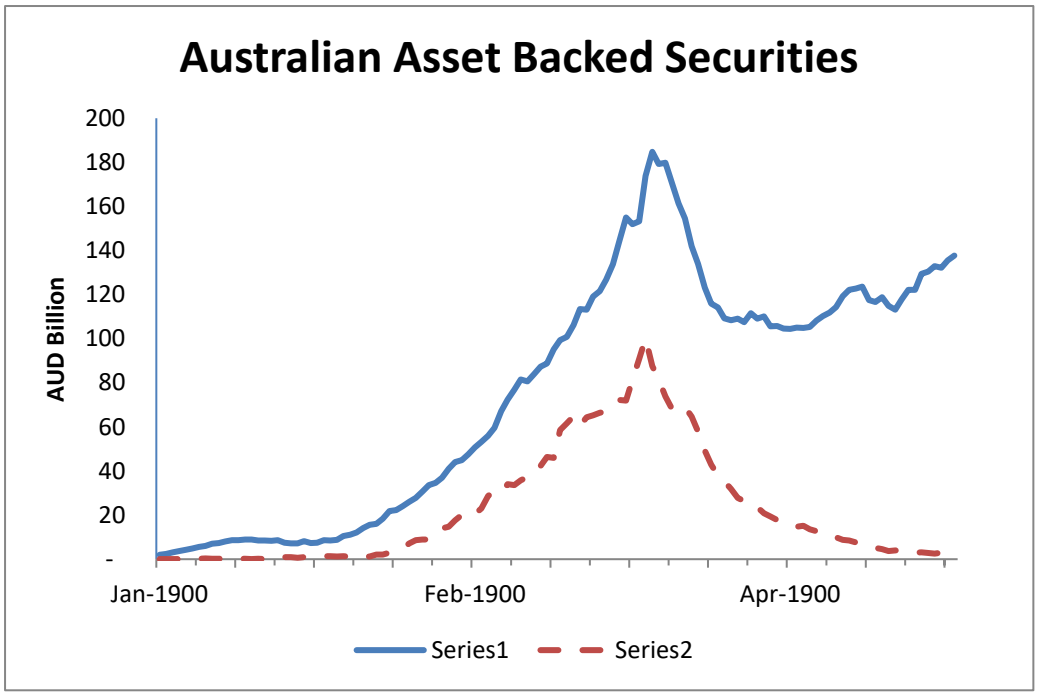



FIGURE 6: AUSTRALIAN ABS: DOMESTIC AND OFFSHORE (SOURCE: RBA TABLE B19)

One consequence of the virtual closure of the securitisation market at the time of the GFC was the decision by the Federal Government to allocate funds to the Australian Office of Financial Management to act as a cornerstone investor in new securitisations of (primarily) smaller securitisers to enable the survival of their business models.

The impact of the GFC on the Australian securitisation market is also apparent in Figure 7 which shows the margins (to 30 day BBSW) of residential mortgage back securities. (They refer to the margins on the senior AAA tranche and the revaluation margins are based on market prices for previously issued securities with a remaining weighted average life of around two years). From a margin of around 25 basis points just prior to the GFC, the margins required by investors jumped to over 150 basis points before returning to a level of around 100 basis points.

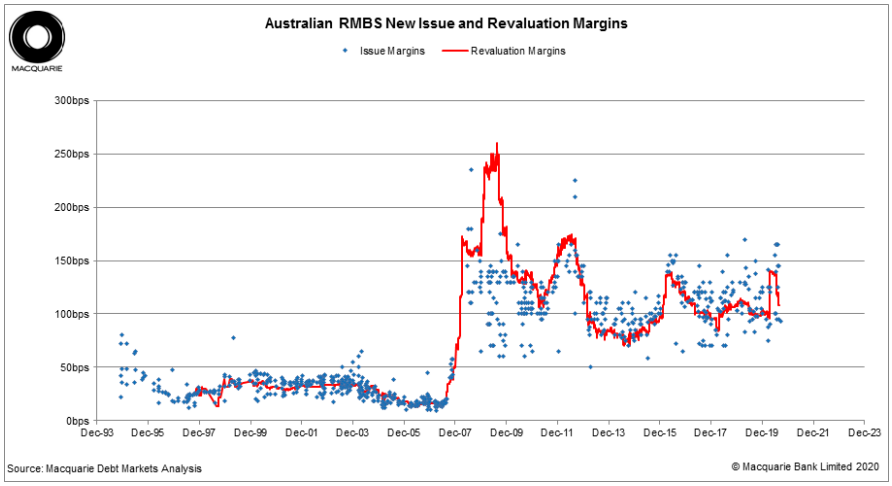



**FIGURE 7: RMBS INTEREST RATE SPREADS: SOURCE: ASF AND MACQUARIE BANK**

There is a secondary market in asset backed securities, and the market conventions are available from AFMA as part of the Credit Product Conventions. There is little publicly available information on the volume of secondary market transactions. Data from Austraclear provided on the AFMA website suggest relatively limited turnover with the turnover rate (turnover/stock on issue) in the order of 1.4 times p.a. This is comparable to that for corporate bonds (1.8) but much less than for bank debt securities (9.6), semi-government debt (11.2) and government debt (29.8).

An important consideration for investors in both the primary and secondary markets is the quality of the underlying loans, and the ASF has developed a framework on disclosure arrangements regarding the loan portfolio which meets relevant privacy considerations.

## Securitisation Design and Costs

In creating a new securitisation, a number of important considerations need to be taken into account. First, there is the accumulation of a sufficiently large stock of loans to make the issue of a scale which is both cost effective and attractive to investors. In Australia, there are few issues of a size less than $500 million. For non-bank originator/lenders, obtaining access to funding for a "warehouse" (an SPV into which loans are placed until sufficiently large in volume to securitise is necessary. For banks, loans can be held on balance sheet, funded by deposits and other borrowings until a decision is made to securitise a parcel of loans. The resulting "seasoning" (aging) of loans is one characteristic of a RMBS offer, where greater seasoning of loans is suggestive of lesser loan risk.

There is then the issue of determining the tranching structure for the issue. The ratings agencies play an important role here since they provide criteria for the credit support (percentage of issue size made up of lower rated tranches) required to achieve particular ratings. For a AAA rating for the senior tranch(es), credit support would need to be in the order of 10 per cent or more (ie at least 10

per cent of the issue in lower tranches). (The ASF estimated in 2016 that the fees (up-front and ongoing) for a rating for a 5 year transaction is in the order of $200,000). The average number of tranches has increased slightly since around 2014 and in 2018 was just over 6 (8) for bank (non-bank) securitisers. Senior tranches have an expected weighted average life in the order of 2.5 years, while for junior tranches it is more like 5 years. In the three years 2016-2018, senior tranches paid a spread of around 130 bp over the 1 month BBSW, with mezzanine tranches (around 10-15 per cent as large as senior) paying around a 230 bp spread and junior tranches (much smaller in size) paid a spread of close to 600 bp.

There are a large number of securitisers (around fifty) in the Australian RMBS market. Some will make several RMBS issues per year, others less than one per year. In the first half of 2021 there were only 12 issuers of 13 prime RMBS with a value of $11.4 billion. The same is true in the ABS market (where issues are mostly in the $300-500 million size range). Flexi and Pepper, for example, each made three issues in the 2019-2021 period, while most of the other 17 issuers made one issue only in that period. Recent overviews of the market can be found in:

- https://www.securitisation.com.au/market-statistics
- https://www.perpetual.com.au/insights/the-australian-securitisation-issuer-report-2019

The RBA has also set up a Securitisation portal on its website. This provides information on conditions required for securitisations to meet the requirements of eligibility for use as collateral in repurchase agreements with the RBA under the Committed Liquidity Facility (CLF). A spreadsheet list of eligible securities for the CLF (which is broader than ABS) is accessible from here.

Some of those securitisations eligible for use as collateral for the CLF are *Internal Securitisations.* This occurs when a bank creates an SPV using mortgages it has made and associated tranches of securities, but does not make them available to investors. In effect the bank has taken individual loans and included them in an internal pool the claims on which could be used as collateral for repos with the RBA.

As part of its broadening of repo arrangements at the time of the GFC to include RMBS and subsequently with the development of the CLF, the RBA has required securitisers to provide increased information on the quality and characteristics of the underlying pool of loans. The reason is to enable the bank to ensure that any loans it makes under repo arrangements involve high quality collateral. These requirements announced in 2012 also required that access to such underlying data should be readily available to researchers and analysts – but little progress has been made on that front (although data and analytics are available for professional investors via Perpetual Limited).

Market participants cite concerns about privacy associated with loan level data as a reason for unwillingness to disclose such information (which is reflected in ASF market guidelines).

## 11.9 The structure of Securitisation

There are several aspects to the structure of a securitisation. One is the form of the SPV and allocation of responsibilities etc. We examine that by reference to the *Puma Fund* established by Macquarie Bank. The nature of the various important arrangements involving allocations of cash flows and risk is well explained in Arsov, Kim and Stacey (Reserve Bank Bulletin, March 2015).

### An Australian Securitisation Example: The Puma Fund

The Puma Fund was established by Macquarie Bank and is an umbrella term which comprises a number of separate trust funds which can issue bonds created from the securitisation of authorised investments and approved mortgages. The first fund issued under the master trust (created in 1990) was in 1994 (*PUMA Masterfund P-1*) and the last "P series" was P-17 in April 2011.[10] (Other offerings were made as USD denominated issues with somewhat different legal arrangements). The AUD offer designated PUMA 2015-1 was made in February 2015.

**Participants and Fund Structure**

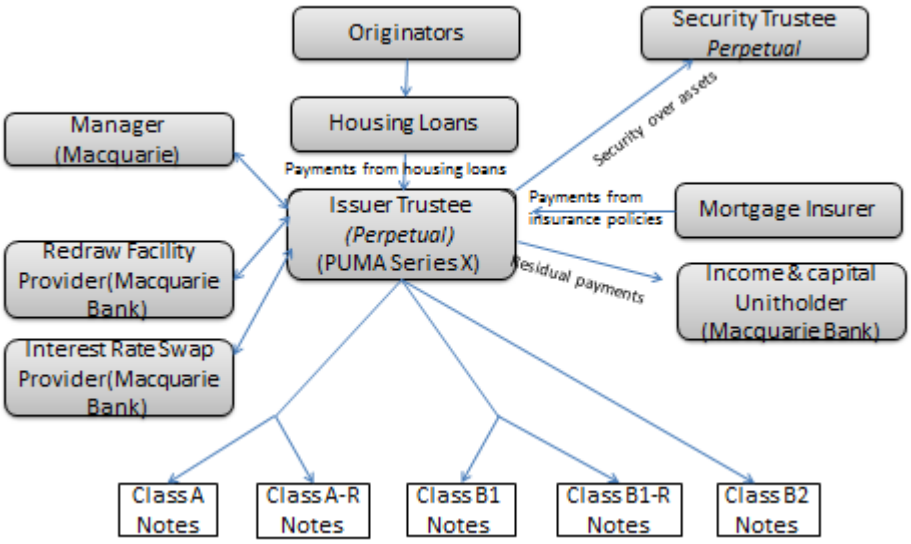



FIGURE 8: PUMA FUND STRUCTURE

### Characteristics of the Notes

There were three classes of notes (AUD denominated) issued by the Fund (Class A Notes (1,840 mill), Class B1 (120 mill), Class B2 40 mill), and refinancing notes Class A-R, Class B1-R) with S&P giving a

[10] In mid 2021 Macquarie announced it is marketing a 'funding only' AUD denominated RMBS transaction, PUMA 2021-2 RMBS, with an indicative volume of AUD $750m.

rating of AAA to class A and AA+ to class B1. The notes were floating rate at (differing) margins over 1 month bank bill rate. Macquarie Bank (via wholly owned SPVs) will retain at least 5 % interest in notes (essentially at least all of class B2). Principal payments accrue first to class A (and A-R), then Class B1 (and B1-R), then B2. A Call for redemption of any outstanding A and B1 would be made when mortgage loan principal outstanding falls to 10% of initial amount, with an initial maturity date for A and B1 expected to be February 2020. Losses on housing loans (in excess of available income amount) charged initially to B2 notes

Loans were underwritten by mortgage brokers and aggregators etc in the name of Perpetual as trustee, subject to the manager's credit policies etc. There were 6,367 housing loans with average LVR of 65.9% and average term to maturity of around 127 years, in the pool, which had a total size of $1,974 million. Around 72 per cent of the loans were owner-occupier, and a third of loans were interest only. Investors received more granular information on loan characteristics, including a breakdown by region.

The legal structure involved an SPV (the PUMA Masterfund) whose sole purpose s to acquire and hold the securitised mortgages. It is an 'umbrella' trust, which allows for the creation of any number of separate trusts (for other securitisations such as P- I to P-17) under the one trust deed. The different trusts are legally separate (and importantly - bankruptcy remote) entities established under the PUMA trust deed.

The Trustee of the PUMA Masterfund is Perpetual Trustees Australia Ltd and is the issuer of the PUMA bonds, using the proceeds of the bonds to purchase the pool of mortgages that forms the trust property. The Trustee is also responsible for maintaining the register of bondholders and payment of principal and interest to bondholders, as well as enforcing terms of credit enhancements (such as mortgage insurance) and hedge arrangements (which arrangements include the interest rate swap contracts described below).

The Fund Manager, a wholly owned subsidiary of Macquarie Bank Limited, appoints originators of loans (such as Aussie Home Loans), co-ordinates the fund raising process through the initial offering of the bonds, and creates and manages credit enhancement facilities. The Trustee delegates all of the day-to-day management and administration to the Manager.

The bondholders however do not have any specific rights to the trust property but their rights are protected by a first ranking floating charge over the assets of the trust in favour of the Security Trustee (Perpetual Trustee Company Ltd). Its duty is to ensure compliance of the Trustee with bondholder rights in the event of default by the Trustee.

The priority (or "waterfall") of payments under the bonds prior to an event of default and crystallisation of the security is as follows:

- Payment of the trustee's fees and expenses;
- Payments to interest rate swap counterparties;
- Coupon interest on senior bonds;
- Coupon interest on subordinated bonds;
- The manager's fees;
- Net income amounts;
- Principal to senior bondholders;
- Principal to subordinated bondholders;
- Deferred manager's fee (if any); and
- Surplus to the fund beneficiary.

Arsov, Kim and Stacey (Reserve Bank Bulletin, March 2015) provide information on a number of important features of securitisations including:

a. How a "self-securitisation" differs from a standard RMBS and why are they created.
b. What is meant by a "waterfall" in the context of RMBS
c. Complications created by mortgage prepayments and redraws.
d. How some RMBS notes have a high credit rating even if the mortgages involved are high risk
e. What is meant by a "clean-up" call and why it is incorporated into RMBS design
f. Why the weighted average life (WAL) of senior RMBS notes so low, and how the risk that the actual WAL could differ from the expected WAL might be reflected in RMBS pricing
g. Techniques used to ensure that the RMBS vehicle does not default on its obligations
h. How Australian securitisations deal with the fact that mortgages are generally variable rate (eg variable at the bank's discretion) whereas RMBS notes are linked to some indicator rate (or are fixed rate)
i. How a "yield strain" arises in an RMBS and how is it managed
j. How APRA approached the question of what tranches of an RMBS an originating ADI (bank) can/should hold
k. Complications created by use of a "bullet" structure rather than an amortising pass-through structure for RMBS
l. The role lenders mortgage insurance (LMI) plays in the design of RMBS
m. The relevance of master-trusts for securitisations
n. The impact of APS 120 on bank warehousing facilities

## 11.10 Securitisation and the Financial Crisis

Many have blamed securitisation as one of the causes of the Global Financial Crisis. There is little doubt that poor quality mortgage lending, often attributed to failings in the OTD (Originate to Distribute) model, and creation of complex asset backed securities whose risks were not appreciated were important elements of the crisis. There were thus a number of deficiencies in the practice of securitisation, which have led to subsequent regulatory changes, but the principle of securitisation

itself should not be held responsible for creating financial instability. As Shin notes the ability of the financial sector as a whole (banks and securitisers) to make mortgage loans to end-users depends on their ability to also obtain funds from other end-users in the form of equity, deposits, or capital market instruments. Whether the shadow-banking sector (securitisation) is more easily to expand lending via increasing leverage is a relevant consideration. Shin suggests that the increased supply of funds at lower risk premia to the financial sector induced greater supply of loans involving greater leverage and lower quality lending. (He models this by assuming that a perceived decline in value at risk (VaR) of bank balance sheets means they have excess economic capital (which is based on VaR) and in practice seek to restore their situation by increasing leverage). While non-bank investors in securitised products suffered losses due to the poor loan quality underpinning those products, banks also suffered significant losses due to exposures to securitisation vehicles (such as via liquidity facilities) and holdings of CDOs and RMBs as they "levered up' their balance sheets. Shin notes that a given level of overall financial system leverage can be consistent with virtually any level of leverage for individual financial sector participants because of inter-sectoral borrowing and lending. (When aggregated, there is a lot of netting). The nature of those inter-sectoral arrangements can give rise to systemic instability.

Gorton and Metrick (JFE, 2012) attribute a key role in the cause of the GFC to the use of repo financing for holdings of securitised assets by investment banks and others. They note that the introduction of the ABX indices in early 2007 providing the first public information on market valuations of the complex resecuritisations was associated with declines in market value and demands for increased collateral (via way of increased haircuts) for repo financing.

Acharya et al (2013) provide evidence of the problems arising from use of ABCP conduits, which banks established to arbitrage regulation, but while not really removing risk from their balance sheets. They conclude that banks suffered losses from support given to the conduits they had established to avoid regulation, raising the question of the appropriate choice between ensuring bank regulation can be strengthened to prevent such activities versus extending regulation to the shadow banking sector. Kacperczyk and Schnabl (JEP, 2010) examine the disruption to the US CP market during the GFC.

As well as the concerns about the incentive effects for due diligence on loan underwriting of the OTD model, another major concern raised by the GFC experience was the role of the credit rating agencies. Many pointed to the conflicts of interest associated with their provision of information regarding how to structure securitisations to maximise ratings for various tranches and being paid to also provide the ratings.

Generally, there have been many authors pointing to the changes in the nature of intermediation involving securitisation which creates interlinkages between participants in the financial sector and leads to different responses to shocks than in the case of on-balance sheet bank intermediation. Figure 9 and Figure 10 provide illustrations of those relationships which highlight the inter-linkages created between various participants in the financial system. (The source articles provide detail on the nature of the various links in the chains).

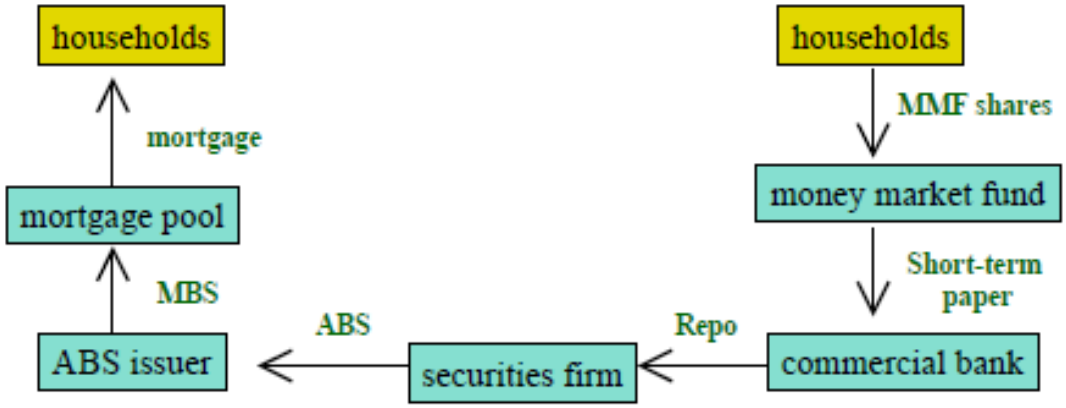



FIGURE 9: LONG INTERMEDIATION CHAIN (SOURCE: ADRIAN &SHIN, (ARE,2010)

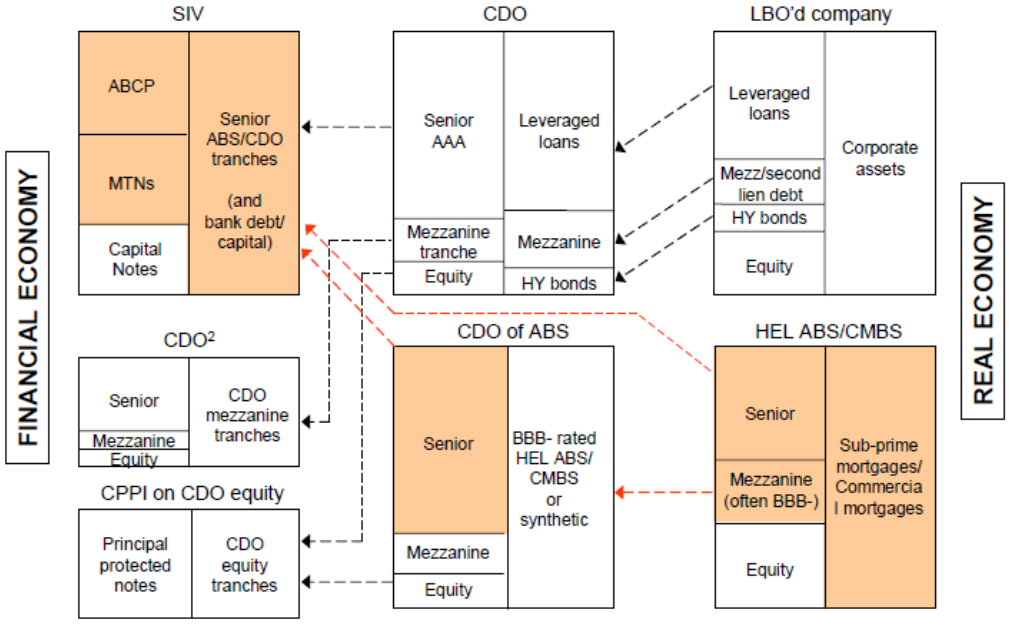



FIGURE 10 FINANCIAL CONTRACT DESIGN (SOURCE - HALDANE, BOE, 2009)

## 11.11 Regulation of Securitisation

There has been much attention paid to regulation of securitisation since the GFC, with a push (particularly in Europe for STS (Simple, transparent, standardised) securitisation structures.

However, much of the regulation of securitisation is essentially indirect via various requirements laid down by prudential regulators for bank capital and other regulatory requirements or via Central Bank conditions for acceptability of ABS in repurchase agreements. For non-bank securitisers, the main regulation is the need to comply with disclosure and other requirements associated with the issuance of securities. To date securitised products have only been sold to wholesale / sophisticated investors.

In Australia, after a long consultation process, APRA released in November 2016 its revised Prudential Standard APS 120 Securitisation to take effect in 2018. A final revised standard was released in May 2018, effective January 2018. The Standard makes a distinction between *funding only securitisations* and *capital relief securitisations* where the latter requires that there is effective risk transfer to other investors. The former (funding only) involves the bank maintaining the residual risk of the underlying mortgage pool through holding the most junior tranches of the securitisation. Securitisation of revolving credit facilities (eg credit cards), and ABCP securitisations (and self-securitisations), must be treated as a funding only securitisation.

Capital relief securitisations involve a number of conditions and requirements for eligibility and for calculating the capital requirement for the remaining exposure of the ADI. For example, no more than 20% of non-senior securities (or tranches thereof) can be held and remainder must be sold to third parties with no recourse for repurchase back to the ADI (other than a "clean up call". Because the ADI may provide other risk mitigation services to senior securities in the securitisation (such as by way of credit enhancements etc), there is also a limit on holdings or other positions which represent more than 20% of loss cover provided to senior securities. The SPV must issue securities which ensure that it is funded until the underlying pool matures (or the SPV is terminated via a "clean up call"). If the ADI retains some part of the securities, its capital requirement is based on the external ratings for that tranche or a specific supervisory formula (reflecting the underlying asset pool risk weighting, delinquency status, and position of the securities in the overall priority structure. Senior securities could have a risk weight of as low as 15% while non senior securities risk weights could be up to 140% (or the exposure could be required to be deducted from calculation of CET1 capital)[11].

Other features of APS 120 of note include:

- Contrary to most of the discussion after the GFC about desirable requirements, it does not require securitisers to have "skin in the game" (SITG). In practice a capital relief

[11] This would be equivalent to an implied risk weight of 100/k where k is the CET1/RWA minimum ratio. Thus if k = 0.1, the implied risk weight is 1,000.

securitisation could involve 100 per cent of the risk being shifted to third parties. SITG has been argued by many to be desirable to ensure that incentives for appropriate due diligence in the OTD model exist.

- Contrary to earlier suggestions in its discussion papers, APRA has not attempted to enforce "simpler securitisation" requirements, such as limiting the number of tranches and types of priority structures. The Basel Securitisation Standard incorporates allowance for "simple, transparent and comparable" (STC) securitisations (but this is not obligatory on member jurisdictions). Holdings of STC securitisations by banks (investors or originators) will have lower capital requirement than non-STC securitisations.
- APRA has approved the use of master trust structures which enable the same set of assets to underpin securitisation in different currencies

## 11.12 Australian Government Securitisation Interventions

The development of securitization in Australia was, with one important exception, led by the private sector with government involvement primarily by way of removing regulatory and tax impediments. The exception was the use of securitization by several State governments based on housing loans under low-income/affordable/welfare housing programs they operated. This is quite different to the USA where government sponsored enterprises (GSEs) such as Fannie Mae and Freddie Mac were critical to the development of securitization, through purchasing loans from mortgage originators and issuing RMBS based on those assets.

However, the Australian government has since intervened in the securitization market in a number of ways. First, in October 2008, the Treasurer directed the Australian Office of Financial Management (AOFM) to invest in residential mortgage-backed securities (RMBS) as a temporary measure in response to the Global Financial Crisis (GFC). Second, the government announced in November 2018 an Australian Business Securitisation Fund (ABSF) to be operated by the AOFM. Third, in March 2020, responding to the Covid-19 Pandemic, the government announced a Structured Finance Support Fund (SFSF) with $15 billion to be operated by the AOFM to support continued access to funding markets for small and medium enterprises (SMEs) impacted by the economic effects of the COVID-19 pandemic and to mitigate impacts on competition in consumer and business lending markets.

### AOFM and the GFC

Following the enabling legislation in June 2008, the AOFM proceeded to participate in 62 different securitisation issues, purchasing 99 separate tranches over the period November 2008 to September

2012. (Details are here). The AOFM investment scheme was limited to AAA securitizations by institutions who do not have a credit rating of at least AA and thus could not access cheap government guaranteed on-balance sheet funding under the wholesale funding guarantee put in place at that time. It thus provided something of an offset to the competitive balance effects of the guarantee scheme. None of the major banks participated as issuers, with all of the supported issues involving other domestic banks (including Macquarie), credit unions and building societies, and other securitisers including FirstMac, RESIMAC, Challenger, and Liberty Financial. (The major banks were involved as managers/arrangers of the issues for the securitisers).

In the initial stages, AOFM investments accounted for 75 per cent of the total value of the RMBS issues supported. There were virtually no other RMBS issues (neither domestic nor international) over that period. The coupon interest rate on these AOFM investments averaged approximately 133 basis points above the one month Bank Bill Swap (BBSW) rate, which was roughly the same margin over BBSW as for the small number of other AAA rated issues in 2008 (but well above earlier times).

Ultimately, the AOFM exited all of its RMBS investments either via the issuer exercising a clean-up call option, or via a sale of the investment under a series of auctions commencing in mid 2015 and finishing in 2018. (Details are here). The AOFM transactions appear to have been profitable for it, with clean prices in the auctions being all above face value and the implied trade margins well below the issue margin.[12] That reflects the general decline in margins occurring in the years after the GFC, rather than implying anything about investment performance of the AOFM (other than being able to invest in an undervalued asset and hold it until more normal market conditions returned).

So, was the scheme beneficial? The rate of new RMBS issues (all supported by the AOFM) was somewhat higher than in 2008, although well below previous levels. But private sector investment in those issues (at around $2 billion) was very small. Thus, the scheme didn't bring private sector investors back into the market for new issues. That possibly reflected the secondary market overhang of RMBS disgorged at high margins by the winding down of SIVs etc. New issues at high yields competitive with secondary market prices, can't be created profitably from new mortgages made at sufficiently low interest rates to attract borrowers.

It may be that the AOFM simply substituted for private sector investors who took up government (or government guaranteed ADI) debt instead (some part of which is funding AOFM purchases of RMBS).

[12] The "clean price" is the price not inclusive of accrued interest since the last coupon date. The "trade margin" is the spread over the current value of the indicator rate (generally BBSW30) implied by the sale price.

Bank housing lending increased compared to that of securitisers – which fell in the initial years after the GFC. The increasing dominance of the four major banks suggests no improvement in competition in the housing mortgage market. The AOFM scheme has, however, assisted some (but not all) mortgage originators dependent on securitization to maintain some level of lending over this period.

If anything, the major banks were able to increase the spread on mortgage interest rates over this period, given reduced competition from securitisers

Who benefitted most – borrowers, securitisers, or the large banks acting as lead managers/ arrangers of successful RMBS issues? Desperate mortgage originators wanting to participate and a ready investor (the AOFM) hopefully meant that fierce competition between potential lead managers for mandates has meant low fees! Smaller home lenders were able to continue some scale of activities which may otherwise have not been possible. Whether borrowers gained any benefit is hard to assess.

The winding down of AOFM involvement as market conditions returned toward normality, suggests that securitisation can provide a valuable competitor to major bank dominance of lending markets in "normal times". But in crisis periods, temporary government intervention may have merits. But structuring the nature of that intervention appropriately is important. It is not obvious what policy lessons were learnt from the GFC intervention to help guide the most recent government securitisation market interventions. Would, for example, some form of government guarantees over senior tranches of new securitisations have been preferable to direct investments by the AOFM?

## The Covid Crisis Response, the Australian Business Securitisation Fund (ABSF) and the Structured Finance Support Fund (SFSF)

Announced in November 2018, the ABSF had not really got underway when the Covid 19 Crisis struck. Originally publicised as a $2 billion fund to support lending by securitisers to SMEs. It had made one investment in April 2020, an investment of $250 in securities issued by a warehouse vehicle sponsored by Judo Bank which focuses on SME lending, before it was postponed. (There appears to be no readily available public information on the terms and conditions associated with this investment, even though the ABSF could involve a subsidy element aimed at promoting market growth). In January 2021, the AOFM announced a further call for applications for investment, and four of sixteen applications have been chosen for consideration for funding.

In March 2020, a Structured Finance Support Fund (SFSF) of $15 billion was announced. Large ADIs who have the ability to self-securitise were precluded from applying. (They also have benefitted from cheap funding via the RBA's Term Funding Facility – which has also meant that they have had no reason nor incentive to undertake new securitisations). It is not clear how this scheme differs in

potential practical operation from the ABSF, other than one stream of its activities having a special focus on establishing "arrangements to assist small lenders to provide forbearance for borrowers experiencing Covid-19 related hardship" (AOFM). By March 2021, $3.8 billion had been committed ($1.36 billion investment in public markets, $2.3 billion in investments in private warehouse facilities, and only $47 million on support under the forbearance arrangements). However, the AOFM's June 2021 update indicates that not all commitments have been taken up, and private investors have replaced the AOFM role in a number of warehouse facilities. Details of the investments made can be found here. While public market investments provide information on the likely yields on investments (such as the estimated traded margin)[13], there is no such information on the terms of the private investments.

# Appendix 1: Case Study: The ABACUS Deal

In 2010, Goldman Sachs agreed to pay $550 million to settle SEC charges that it misled investors in a synthetic CDO known as ABACUS 2007-AC1. The nature of the transactions involved is complex, and is best explained by a simple illustration based around the credit rating of a simple company rather than the portfolio of securities involved. But see here for a brief explanation of the deal

Example Illustration. Suppose Client A of an Investment Bank (IB) wants to bet on Company X failing, and thus wants to buy a Credit Default Swap (CDS) on X. He would pay a fee to the protection writer of such a CDS and would receive a payout if Company X did fail. However, there are no sellers of CDS on X in the market. So the IB needs to find some way to write such a CDS for A and to find some way of hedging (passing on to others) the resulting exposure. It thus creates an SPV which sells a credit linked note to clients B, with a high promised interest rate, but for which there is a loss of principal if X fails.

As shown in Figure 11 the SPV issues securities (the credit linked notes) to investor clients (B) for an amount $(G-P). It also sells a CDS (which has risk characteristics exactly matching those in the credit linked notes) to IB for a premium amount of $P. it invests the total proceeds of $G in Government Debt and the interest received is to be paid to investors (B) giving them an enhanced return on their invested amount of $(G-P). The SPV has hedged the risk associated with X failing (the investors would not receive their principal back, and the SPV can use the amount $G invested in government debt to make the required payment to IB under the terms of the CDS. IB has hedged its position by selling a CDS with the same properties of the one it has bought from the SPV to Client A.

[13] The traded margin is (approximately) derived from the internal rate of return from the expected flow of coupon and principal repayments from purchasing the security at its current market price. (If the security is trading at a clean price equal to (or above/below) its par value, the traded margin should equal (or be below/above) the coupon margin over BBSW.

In the actual ABACUS case, the investor (client A) wanted to make a bet on a decline in the value of a portfolio of RMBS chosen by IB to suit client A's preferences. So IB created exposures to such a portfolio synthetically (rather than buying the actual securities to be held by the SPV) enabling A to take the desired bet, with the other side of the bet being held by the investors B.

There are clearly some ethical questions which can be asked about the nature of the dealings between IB and its clients.

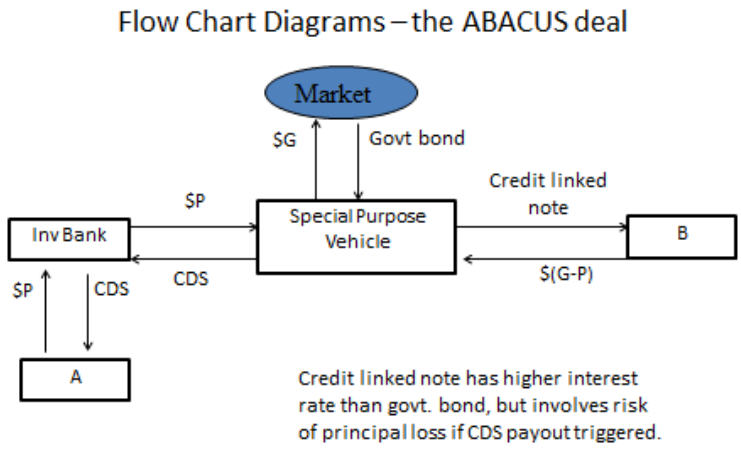



FIGURE 11: THE ABACUS DEAL

# Appendix 2 RAMS Case Study

RAMs was established in 1991, by John Kinghorn, as specialist provider of wholesale funding for loans. In 1995 it launched the "RAMS Home Loan" through its retail distribution network. The business model involved: providing home loans through its franchisees and through third party mortgage broker networks; funding these loans through Special Purpose Entities (SPEs) involving

- warehouse funding (using bank loans etc) – of home loans made but yet to be placed into the other SPEs
- RMBS – securitisations
- extendible commercial paper facilities

and with loans serviced (repayments collected etc) by a third party.

The profits of the business result from the difference between the home loan interest rates and their funding costs and other operational costs including commissions to brokers etc., and were received by the parent company as transfers of surpluses from the SPEs (who hold and fund the loan portfolios).

The company was floated in mid 2007 (prospectus issued 27 June and company listed on 27 July) raising $695 million at $2.50 per share via a sale of shares by the original founder. It failed following events in August 2007 when it was unable to roll over extendible commercial paper issue by an SPE and was forced to extend the maturity of that paper for 180 days on 15 August at a higher interest rate (LIBOR plus 25 bp compared to a margin of 13 bp before) and with no prospect of subsequent rollovers available. The share price dropped to below 50 cents by end September and subsequently to below 20 cents.

At the time of its crisis it was funding loans of approximately A$14 bill by approximately A$6 bill in extendible commercial paper, A$4 bill via warehouse funding, and A$4 bill in RMBS.

In January 2008, Westpac bought the brand and distribution business (and RAMS name) for $140 million which it has used for new lending activities. (So investors in the equity of RAMs lost almost $700 million within less than six months). The existing assets remained with the listed RHG company which was put into "run-off" mode and had to find $9 billion funding, some part of which was to be provided by Westpac as part of a syndicated loan facility. RHG managed to extend the maturity of its warehouse loans (most due before mid 2008) and obtain loans to repay the CP on issue (but at a higher spread).

Prospectus Information (27 June 2007)
Offer Price $2.50
Number of Shares available under the Offer 278.1 million
Gross proceeds of the Offer $695.3 million
Total number of Shares on issue following the Offer 353.8 million
Market capitalisation $884.6 million
Net Corporate debt $136.6 million
Enterprise value $1,021.2 million

Forecasts FY 2008

Net profit after tax ($) $58.6 million
Earnings per Share 16.6 cents
Price earnings ratio[6] 15.1 times
Dividend per Share (fully franked) 13.2 cents
Dividend yield (%)[7] 5.3 %

Prospectus Information (27 June 2007)

RAMS' Loan Book of $13.3 billion (as at 31 May 2007) is owned and funded by special purpose entities ('SPEs') which are managed, but not owned, by RAMS. This structure allows RAMS:
To conduct highly rated asset-backed funding transactions; and
To structure funding transactions where investors' recourse is to specific pools of housing loans, with only limited recourse to RAMS.
The three sources of funding accessed by RAMS through the SPEs are:
*Warehouses:*
RAMS has five warehouse facilities available with current total capacity of $4.65 billion;
*Residential Mortgage Backed Securities ('RMBS'):*

RAMS securitises loans through RMBS which have a maturity date of approximately 30 years, but which allow funds to be repaid to note holders prior to the maturity date; and
*Extendible Commercial Paper ('XCP'):*
RAMS achieves cost efficient funding through an XCP issuance program into the US debt markets.

RAMS primarily earns its revenue from the Loan Book in the following manner:
The SPEs earn regular revenue from the home loans originated by RAMS over the life of the loans;
A portion of this revenue is used to meet the funding costs and other fees and expenses of the SPEs; and
RAMS receives distributions of net income and origination fees from the SPEs.

RAMS operates through two distinct groups of entities:
The RAMS "Corporate" entities, being the entities responsible for the origination of new home loans, the servicing of the Loan Book and the management of the special purpose entities. The main operating entity is RAMS Home Loans Pty Limited; and
The RAMS SPEs, being the entities that hold the mortgages and issue the securities that fund those mortgages. The net income (primarily the net interest margin less SPE specific costs) earned by these entities is distributed to the Corporate entities. The SPEs are managed, but not owned, by RAMS.
Although under AIFRS the RAMS consolidated accounts include the gross income, expenses, assets and liabilities of the SPEs, the profits and cashflows available to RAMS' shareholders include only the net income earned in the SPEs. The net income is distributed to the Corporate entities, typically monthly, in line with the relevant SPE documentation.

DIAGRAM 2 THE RAMS BUSINESS MODEL


*Source: RAMS Prospectus*

# APPENDIX 3: Mortgage Strips: IO's and PO's

While not a form of securitisation, dividing claims on a mortgage cash flow into a claim on interest only (IO) and one on principal only (PO), shares some common features.

This was a popular form of innovation developed in the 1980s in the US where cash flows on mortgage pools were stripped into two separate claims. The IO was a claim on interest only and a PO a claim on principal only. Note that the stream of interest cash flows will be initially large and decline over time as the loan repayments gradually reduce the principal. With the regular loan repayment fixed, the principal repayments would gradually increase.

If the mortgages were fixed rate, and there was no risk of prepayment, the IO cash flow pattern would follow a concave pattern descending to zero at the loan maturity date. The PO cash flow pattern would follow a convex pattern increasing to a maximum when the last loan payment is due. If market interest rates increased, each of these fixed cash flow streams would fall in present value – with a much greater effect on the PO given its longer duration.

Suppose there is prepayment risk, such that a reduction in market rates prompts higher prepayments as borrowers shift to an alternative lender offering lower rates (although prepayment penalties are designed to inhibit this). Consider, for simplicity, the extreme case where the borrower repays in full when market rates fall. The holder of the IO will receive no further interest cash flows, while the PO holder will receive the outstanding principal at that time rather than gradually over the life of the loan. Thus the reduction in interest rates dramatically reduces the value of the IO, but increases the value of the PO (it is now the amount of principal which was outstanding rather than the present value of that amount.

Of course investors in such securities would (should!) be aware of such risks, and thus the prices that would be paid for IOs and POs in the market would reflect that risk. But nevertheless, the same result that the value of IOs would be significantly positively related to market interest rates, while that of POs would be significantly inversely related. Because the IO and PO add up to the underlying mortgage, the changes in value add up to the change in the value of the underlying mortgage.

Purchase of a PO could reduce the overall exposure of a mortgage servicing provider to a reduction in interest rates. Such a company gets a stream of income from fees (related to interest payments) for managing the collection of mortgage repayments. The increase in the value of the PO offsets the lower fee income.

In the US, some banks offer mortgage borrowers an option of paying higher up-front "points" (ie a fee) and having a lower loan interest rate. Agarwal et al (Journal of Financial Economics 123 (2017) 42–58) argue that for such banks, purchase of an IO might be a useful hedge.

Note: there are other types of IO's such as CMBS IO's discussed in this Prudential Fixed Income paper where (a) there is little prepayment risk and (b) a number of IO's are issued each linked to one of the tranches in the CMBS. Each tranche IO pays an income stream equal to the "excess interest" (the difference between the weighted average coupon of the loan pool (net of fees) backing all tranches and the coupon on that tranche), on a notional principal equal to the amount of that tranche outstanding. (Even junior tranches may have a low coupon, but are issued at a significant discount to par value).

# 12. Modern Financial Instruments and Banking

## Contents

## 12.1 Introduction

Modern banking involves much use of derivative financial instruments. One use is in hedging risks created by the bank's activities. Another use is in providing such products to clients – either directly or as some component of a more complex financial product desired by the client. Yet another use is the involvement of the bank, through its trading desk, in trading in markets for such instruments in the form of proprietary ("own-account") trading (in addition to hedging activities).

Many such products are traded in over-the-counter (OTC) markets, via screens and telephones, while some may be listed on formal exchanges.

Derivatives, as the name suggests, are securities derived from positions in other more basic securities such that their prices must be linked to the prices of those basic securities. There are well-known arbitrage formulas for derivative prices generally incorporating a risk free interest rate, and derived on the assumption that there is no default risk associated with the counterparty. In practice, that assumption is not correct, although where trading is via an organised exchange and positions resulting from a trade are novated to the Clearing House, the default risk is generally seen as very low. But for transactions done OTC there may be non-negligible default risk, Even though banks will have lists of approved counterparties to limit such risk, events subsequent to a trade may lead to the counterparty default risk increasing.

One development in recent years has been the push by international standard setters and national regulators for the use of Central Clearing Counterparties (CCPs) for OTC derivative markets. While trading is still done OTC, positions are novated to the CCP which reduces counterparty risk and the interconnections between financial institutions which could otherwise threaten financial stability. CCPs are discussed in Chapter 26.

Another relevant development is regulatory requirements for valuation adjustments (discussed in Chapter 4) for derivative positions where there is some risk of counterparty default. Such risk will reduce the value of a position relative to the standard derivative valuation formulas used.

"First generation" derivatives such a options, futures and swaps will not be discussed here – not because they are not relevant – but because there are many source of textbook information about them and their uses elsewhere. Before examining a range of "modern" financial products, we consider the role of "reference" or "indicator" or benchmark" interest rates (those terms often being used interchangeably), which are important for the design and valuation of many of those products.

## 12.2 Indicator/Benchmark/Reference Rates

Many financial contracts have interest rates which are linked to some other *indicator* or *reference* or *benchmark* rate. For example a 5 year loan might specify an interest rate which adjusts every 6 months to maintain a fixed margin over the 180 day BBSW rate at that date. If the reset dates are July 1 and January 1, and the margin is 120 basis points p.a., then if the BBSW180 is 3.45 on July 1, 202X, then the interest rate for the following six months will be 4.65 percent p.a. If on the following January 1, the BBSW180 is 4.00, the interest rate for the next six months will be 5.20 per cent p.a. Most interest rate derivative contracts (swaps, FRAs etc) are written involving a reference rate.

Alim and Connolly (RBA Bulletin 2018) provide an overview, noting that the benchmarks are credit related. Thus, one issue in their design is to limit the influence of changes in default risk on the benchmarks, and hence interest rates for highly rated, low credit risk, borrowers are generally used. That does not, however, remove the possibility that such benchmarks might change because of market-wide repricing of credit risk. Changes in benchmark rates relative to risk free rates (such as the OIS rates of equal tenor) are often looked at as indicators of repricing of credit risk.

One reason for the use of benchmark rates in loan contracts is to enable the interest rate in a long term contract to adjust over time in response to changes in market interest rates in a way which is, in some sense, "fair" to both parties. This is because the indicator rate is determined by market forces and not subject to influence by either party. That, at least, is the theory, although major controversies arose in recent years regarding attempts by bank traders to influence the indicator rate in ways that would benefit their bank. That has led to changes in the way in which reference rates such as LIBOR or BBSW are determined, and prompted attempts to develop other reference rates not subject to manipulation. Interest Rate Benchmark reform in Australia is discussed on this RBA webpage and international developments discussed at this Financial Stability Board webpage.

### The LIBOR Scandal

LIBOR (the London InterBank Offered Rate) was a reference rate calculated each day by the British Bankers Association, and based on the interest rates at which banks offered to lend money to other banks in the international wholesale market. The reference rate was calculated for loans in various major currencies and for specified tenors such as 1 month, 3 months, etc. The calculation involved taking data submitted from a panel of banks over a short time period (just prior to 11 am), deleting the extreme cases, and then taking the average (ie a "trimmed" mean). But a critical feature was that the calculation was based on self-reporting by the banks of the rate at which they claimed they would be able to borrow (unsecured) from other banks. In 2012 it was discovered that traders at a number of major banks had colluded, by inputting quotes aimed at affecting the average.

Large fines were imposed by regulators on the banks involved, and the British Financial Conduct Authority (FCA) transferred responsibility for determining LIBOR to the Intercontinental Exchange's (ICE) Benchmark Administration. Calculation of LIBOR rates for a number of currencies, including AUD and NZD was terminated. Stricter regulation of the LIBOR determination process has been put in place by the authorities and LIBOR is expected to no longer be available after 2021. In the US, the Secured Overnight Financing Rate (SOFR) is planned for introduction as a substitute in 2023, while SONIA (Sterling Overnight Interbank Average rate) is the British Pound equivalent. Some Australian banks have issued floating rate notes referencing SONIA

More generally the use of "IBORs" which are other similarly constructed benchmark rates in different markets, such as EURIBOR and TIBOR, is being discouraged by international standard setters and regulators. (Concerns also exist over the determination of benchmark FX rates). In 2014 the FSB published recommendations involving measures to

- "Strengthen IBORs in particular by anchoring them to a greater number of transactions, where possible;
- Improving the processes and controls around submissions;
- Identifying alternative near-risk free rates (RFRs); and,
- Encouraging derivative market participants to transition new contracts to an appropriate RFR, where suitable." FSB

Since then plans have been advanced to see the end of use of LIBOR by end 2021 and use of other benchmark rates.

One consequence of the termination of LIBOR rates is the need for financial institutions, which have many contracts linked to LIBOR, to manage the transition away from use of LIBOR. In general, contracts should have specified alternative contingency arrangements for such an event, such as moving to an alternative reference rate (ARR). But since any alternative reference rate will not be perfectly correlated with LIBOR, risks of gains or losses on the contracts exist when the switch of reference rates occurs. Moreover, particularly if an ARR is not specified, the possibility of conduct risk in dealing with customers with contracts currently specified with reference to LIBOR, has been a concern of ASIC.

## BBSW

The Bank Bill Swap rate has been an important indicator rate in Australia since the mid 1980s. Like LIBOR it has been calculated by using quotes from participating institutions for the cost of issuing short term paper at tenors of one to six months, just before 10 am. That paper is bank bills or negotiable certificates of deposit (NCDs). BBSW was calculated by the Australian Financial Markets Association (AFMA) until 2017 when responsibility was transferred to the ASX. The ASX generally calculates the

benchmark using an average of all primary and secondary market transactions and report the BBSW rates at 10.30 am.[1]

One concern with the previous calculation method was the limited number of transactions occurring during the time window used for calculation. Since 2017, actual transactions are used over a longer time period and for a larger number of participants. The authorities have encouraged banks to concentrate their bill issuance in this time window (with reluctance to do so being one of the problems under the earlier system).

There have also been legislative changes in 2018 empowering ASIC to oversee benchmark interest rates.

### BBSW Manipulation

Just as in the case of LIBOR there have been concerns over manipulation of BBSW rates by traders at major Australian Banks during 2010 to 2012. McConnell (The Conversation, 2017) provides a brief overview of how ANZ and NAB settled with ASIC prior to a court hearing. (CBA and NAB agreed to enforceable undertakings with ASIC over manipulation of the forex benchmark). Frost (AFR, 2019) reports that the court action cost ASIC $45 million and it received $125 million from pre-court settlements with ANZ, CBA and NAB. Westpac also was fined $3.3 million for BBSW manipulation.

In addition, a class action was initiated in 2016 in the USA against Australian banks over the BBSW manipulation. In March 2021, ANZ and CBA announced agreement to settle the class action – but without details of the cost.

### BBSW Problems

Unlike the case of LIBOR and some other rates, Australia has aimed to maintain the use of the BBSW as a benchmark rate which can operate alongside the risk free rate – the cash rate.

But there are some significant issues with the reliability of some of the BBSW rates – particularly that for one month tenor. Because of the LCR requirement, there is virtually no issuance of one month paper by Australian banks. The one month paper trading in the market is paper which was initially issued with a longer tenor and the passage of time has led to its remaining tenor approaching one month. There is an incentive for banks to repurchase such paper, since once its remaining tenor falls below one month the LCR requirement imposes costs on the bank.

Figure 1 is indicative of the consequences of such behavior. Banks buying back outstanding paper as it nears one month remaining maturity will push the price up (yield down), This is reflected in the

[11] While the ASX only provides information for the last 10 days on its website, longer term data can be obtained in the RBA Statistical Tables. Reuters and Bloomberg publish bid and ask values for BBSW assuming 5 basis points above and below the BBSW value.

relative decline in the spread (over the same tenor OIS rate) on one month paper compared to three month paper, after the LCR requirement was introduced in January 2015. Of course, that is not conclusive evidence, but the disproportionate role of banks relative to investors in purchasing one month paper shown in Table 3 in Alim and Connolly (RBA Bulletin 2018) is also relevant. The behavior of both spreads since the RBA target cash rate was reduced to 10 basis points in March 2020 warrants further analysis.

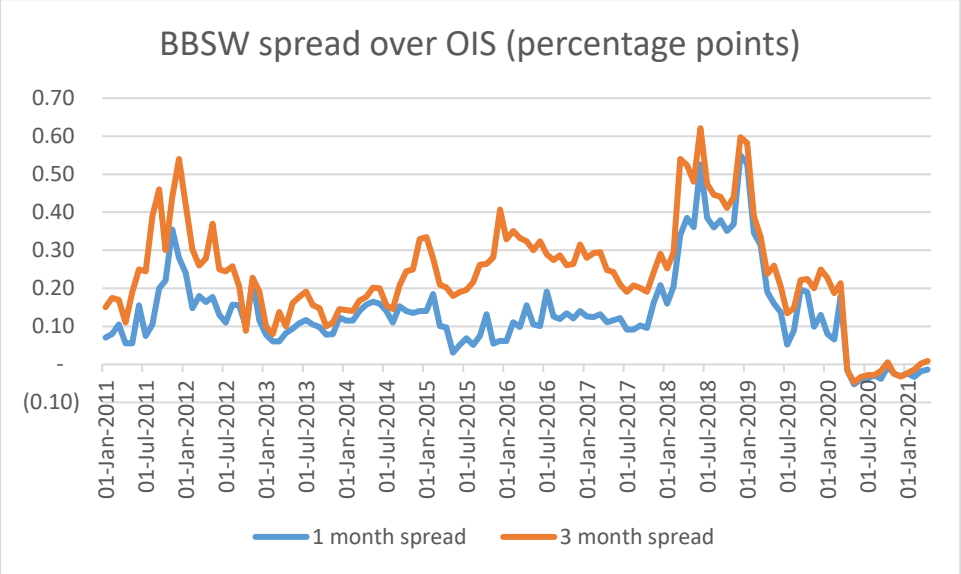



**FIGURE 1: BBSW SPREADS (SOURCE RBA STATISTICAL TABLE F01D)**

## The Cash Rate and AONIA

The cash rate is the interest rate at which banks lend exchange settlement balances to each other overnight, on an unsecured basis. It is thus, effectively a risk free rate. The RBA announces a target for the cash rate at its regular monthly meetings. More details are available in Chapter 19.

Financial market participants often use the term AONIA in referring to the cash rate, with the acronym originally standing for the AUD Overnight Index Average. AONIA can be calculated for a one (or longer) month period by compounding the daily rates, and has thus been suggested as a possible alternative to the one month BBSW as a benchmark rate. However, the one month AONIA can only be calculated at the end of the month using historical data, whereas the BBSW is a forward looking interest rate. AONIA does have the advantage of being a rate which incorporates no credit risk.

Use of AONIA as a reference rate in floating rate securities is still quite uncommon as of 2021, although SAFA (the South Australian Government Financing Authority) issued the first of its FRNs paying a coupon over the monthly AONIA in 2019.

## 12.3 Overnight Indexed Swaps (OIS)[2]

OIS are interest rate derivatives and the OIS Market in Australia dates from 1999. In December 2015 ASIC determined that it (together with other derivatives markets) should be subject to mandatory central clearing, and legislation to effect that was passed in May 2016. Thus banks and other participants transact "over the counter" (telephone, via brokers or electronic platforms) with positions novated to a CCP. Market conventions for trading are available on the AFMA website and the minimum dealing parcel size is $2 billion for 1 month maturity, and declines with maturity to $150 million for 12 months. Most OIS contracts are for less than six months maturity (Cole and Ji, 2018).

An OIS is a swap involving one payment at maturity (eg three months) which is the difference between a:

- Floating payment: based on the average of the overnight rate over the term of swap, and a
- Fixed payment: based on the relevant agreed fixed (OIS) rate at the inception of the swap.

Figure 2 illustrates.

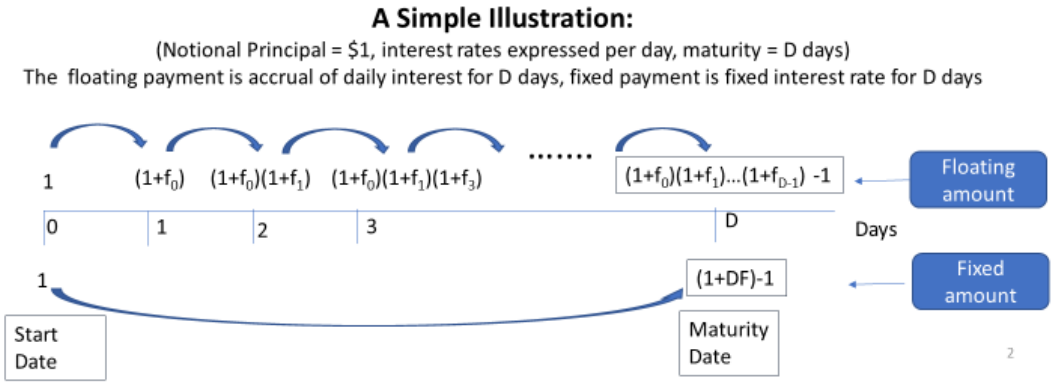



FIGURE 2: ILLUSTRATION OF AN OIS

The specific amounts are calculated as:

Fixed amount = $P.\frac{N.F}{36500}$ where P = notional amount, N= number of days, F = fixed rate (%)

$$\text{Floating amount} = P.\left[\left(1+\frac{c_1 D_1}{36500}\right)\left(1+\frac{c_2 D_2}{36500}\right)\ldots\left(1+\frac{c_N D_N}{36500}\right)-1\right]$$

[2] For more information see this 2002 RBA article

where $c_i$ = the AUD interbank overnight cash rate for the ith reset day of the OIS transaction as shown on Reuters RBA30, and $D_i$ = day count on i'th reset day (generally equals 1, different for weekends or holidays)

Example:
7 day OIS where: P = $1 mill; F = 2.8000; $c_1$=…=$c_4$ = 2.7500; $c_5$ = …$c_7$ = 3.0000

Fixed amount = $536.9863; Floating amount = $548.0739;

net payment = $11.08756 from floating to fixed payer (2 business days after maturity).

Several points regarding this calculation warrant mention. First the floating rate is the actual cash rate calculated by the RBA as a weighted average of transactions for overnight money and published each morning (and also referred to as AONIA). Thus, for example, if an OIS is agreed on a Tuesday, then $c_1$ will be the rate published on the Wednesday morning for transactions involving overnight money for the Tuesday night. Second, in practice, up until the RBA reduced its target cash rate to 25 bp in March 2020, the actual cash rate did not differ from the RBA's cash rate target. Since early April 2020 it has been lower than the target (initially around 13-14 bp versus the "target" of 25 bp, and then around 3 bp versus the "target" of 10 bp).

Figure 3 shows the recent behaviour of the OIS rate relative to other market rates, and this is discussed later.

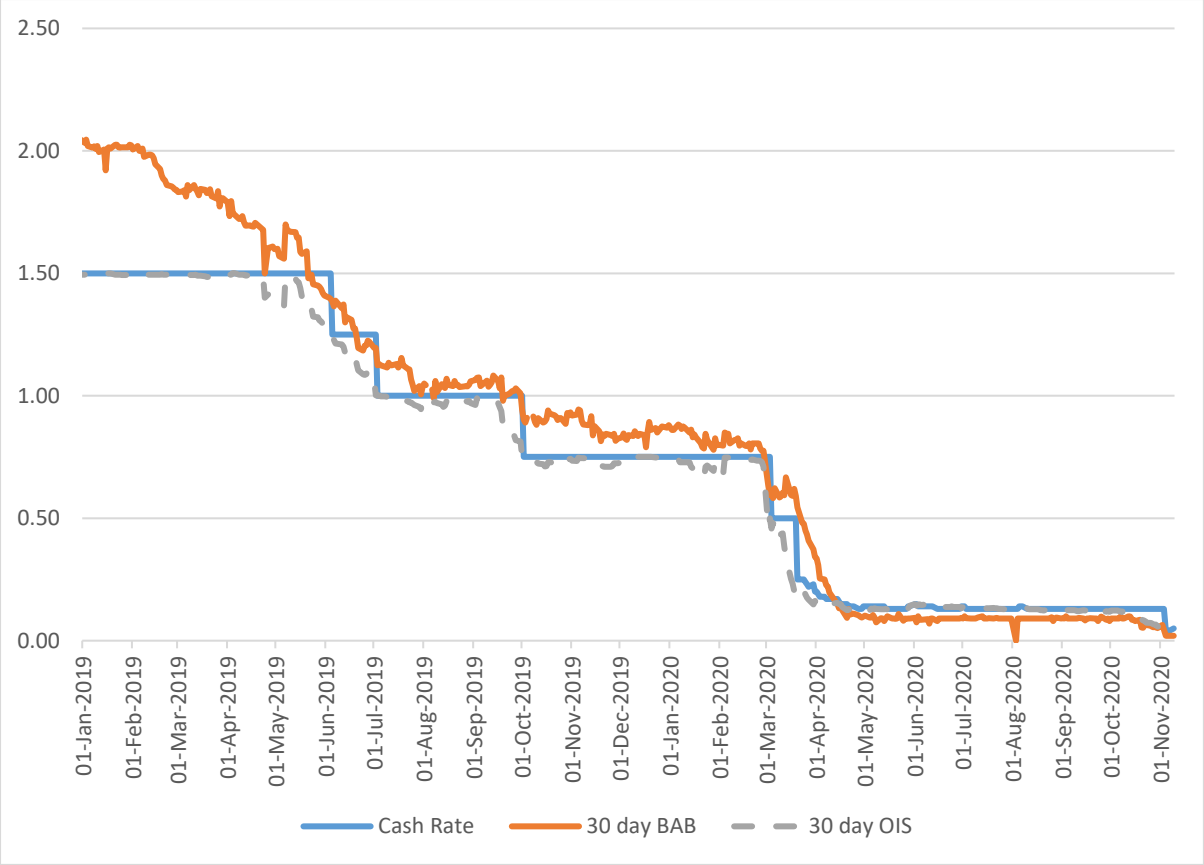



**FIGURE 3: 30 DAY OIS RATE BEHAVIOUR**

## OIS Uses

The OIS market has a number of uses for banks and others including:

- Interest rate risk management
  - For example, if a one year fixed rate asset is financed by overnight funds then entering a 1 year OIS as the fixed payer would hedge interest rate risk. In practice the banks will not hedge individual positions, but would use the OIS market as one way of adjusting their overall interest rate exposure position.
- Separating liquidity and interest rate risk management
  - Derivatives such as OIS enable separation of deposit maturity (repricing) and liquidity issues. For example it might be desired to raise 90 day term deposit funding for liquidity management/funding purposes. Using an OIS can change the net interest rate exposure to the overnight rate by entering OIS as floating payer. Again banks will not generally focus on individual transactions, but apply a portfolio approach

The OIS rate has also been a useful source of information about market expectations of future RBA cash rate decisions and also, in conjunction with other rates, provides information about market perceptions of short term credit risk of banks.

## Cash Rate Expectations

To the extent that the actual cash rate equals the RBA target cash rate, the OIS rate can signal market expectations of RBA intentions. If the OIS is above overnight cash rate this suggests the market expects the central bank to raise the cash rate during the term of OIS. As an example, assume:

- cash rate = 1.00%,
- CB changes in cash rate on policy reset date generally 25 basis points
- There are 15 days till next policy reset date
- OIS(30 days) = 1.125%,

This suggests the market expects the CB will raise the cash rate to 1.25%, reflecting an expectation over the next 15 days of the current rate of 1.00 and the 15 days thereafter at 1.25% giving an average of 1.125% over 30 days.[3]

Figure 3 illustrates how the OIS rate tracks very closely the cash rate, except in those periods which turn out to be just before a change in the cash rate. As the date when possible changes in the cash rate approaches, market expectations of a changed cash rate get reflected in the OIS rate. For example, it can be seen how the falls in the OIS lead the cash rate changes over the period shown as market expectations of reductions in the cash rate were validated by RBA decisions.

Changes to the RBA operating procedures during the Covid Crisis are likely to have reduced the use of the OIS rate as an indicator of market expectations about RBA future interest rate decisions. The actual interbank overnight (cash) rate rarely differed at all from official target cash rate up until the RBA reduced the cash rate to 25 basis points in March 2020. After that date, the rates in the overnight market have generally been significantly below the cash rate. Only if the margin between the actual and the target cash rate can be expected to remain constant is it likely that the OIS might give an indication of expectations (and the base for comparison would be the actual rather than the target cash rate).

## Assessing Bank credit risk

A common benchmark for assessing the general level of short term credit risk associated with the banking sector is to consider the difference between LIBOR (or interbank loan or bank accepted bill

[3] Note, this example uses a simple arithmetic average and thus is slightly different from the actual figure which involves a compounding of daily rates (and would be 1.1255 rather than 1.1250).

rates) and the OIS rate for the same maturity. The reason is that the OIS rate can be regarded as a risk-free rate. Like other swap contracts, there are no principal payments involved, but only a net settlement of interest amounts on the notional principal. In addition, at the start of the OIS contract it is not clear which of the two parties will be making or receiving payments – that depends on the future course of interest rates.

In contrast, loans between banks involve default risk – which becomes more relevant as the term of the loan increases. Because bank bill rates will also incorporate expectations of changes in the cash rate during the tenor of the bank bill, the difference between the OIS and bank bill rate for the same tenor should be attributable to default risk. Figure 3 illustrates for the case of the 30 day bank bill rate and the 30 day OIS. There is evidence of a premium in the bank bill rate, although this has tended to disappear since the Covid Crisis when interest rates have been near-zero. Unfortunately, bank liquidity regulation (specifically the LCR, discussed in Chapter 18) has distorted the behaviour of the 30 day bill market, such that the premium at that tenor no longer provides useful information on default risk. Longer tenor rates are less distorted by that regulation, but with interest rates near zero, it is difficult to derive any reliable results.

In the US, the equivalent credit risk measure is often referred to as the "TED spread" (3 month LIBOR – 3 month Treasury Bill rate). The name is an historical acronym from T standing for T-bills and ED for USD LIBOR futures.

On 27/2/2012 the ASX introduced a 3 month OIS futures contract, with (cash) settlement dates each quarter up to 12 months ahead, but delisted it on 9/9/2014. The contract value was defined as ($1mill x $r_1$ x (90/365)) where $r_1$ is futures OIS rate at time contract entered, and settlement value calculated using actual OIS rate at settlement date.

## OIS as a risk free rate

Donald Smith (JoD, 2013) argues that since the financial crisis, it has become common to use the OIS rate as a risk free discount rate rather than the LIBOR rate, such as when valuing a normal interest rate swap position. This reflects its more "risk free" nature compared to LIBOR, and with greater use of Central Clearing Counterparties and collateral requirements in swaps, a risk free discount rate is more appropriate than one which incorporates some counterparty risk (such as LIBOR). The issues involved can be seen by noting that, for example, a fixed-floating three year swap (with quarterly resets based on LIBOR) is equivalent (for the floating rate payer) to being long a 3 year fixed rate bond and short a 3 year floating rate bond. Valuation of an existing swap can be done by calculating the PV of each bond and using the fact that the floating rate bond can be valued as equivalent to a one period

bond with a coupon equal to the LIBOR rate at the last reset date and which has its market value reset to par at the coming reset date. (This assumes that the floating rate is a risk free rate). But if LIBOR is not a risk free rate, and not equal to the OIS rate, then the floating rate bond will not reset to par. Also, in calculating the PV of the fixed rate bond component, it is necessary to use a yield curve – which should be consistent with the credit risk of the counterparty. That was traditionally based on the LIBOR term structure, but if that rate has a credit risk element then if swaps have minimal counterparty risk due to CCPs or collateral, then a risk free rate term structure (such as derived from the OIS rate) should be used.

## 12.4 Credit Derivatives – Credit Default Swaps (CDS)

> "ANZ uses purchased credit derivatives to mitigate credit risk by lowering exposures to reference entities that generate high concentration risk exposures or to improve risk return performance. Only certain credit derivatives such as credit default swaps (CDS) are recognised for risk mitigation purposes in the determination of regulatory capital." (ANZ Bank, p51)

CDS involve a regular or one-off premium/fees paid in exchange for contingent pay off triggered by specified credit event (insolvency, credit rating change, etc such as listed below) of some third party (the reference entity) within the specified time frame (five years being common). The writer of the CDS (who pays out if default occurs) is the Protection Provider and the buyer (who pays the premium/fees) is the Protection Receiver. As well as being contracts on a specified "reference entity" such as a company or bank, there are also CDS baskets involving a specified index of reference entities.

There is a large academic and practitioner literature on CDS – a 2016 survey of the academic literature commissioned by ISDA is here, which finds *inter alia* that CDS spreads contain valuable information on credit risk and is a leading indicator, and that the CDS market is one through which shocks are transmitted. That ISDA paper also provides an overview of how the definitions of credit events contained in CDS has varied over time, and a discussion of the auction method of determining the market value of a defaulted bond underlying a CDS contract. David Lando (ARFE, 2020) provides a primer and recent overview of market developments.

Aggregate global data on CDS markets is collected by the BIS. In 2018 and 2019 the notional amounts of CDS outstanding averaged around USD 8 trillion with gross market value in the order of USD 200 billion. The shares of single name instruments and multi-name instruments (primarily index products) were roughly equal. The Depository Trust and Clearing Corporation (DTCC) is the main clearing and settlement agency for CDS and thus generates substantial data on CDS markets.

**Credit events**

**Bankruptcy:** relevant only for corporate entities.

**Obligation acceleration:** obligation becomes due and payable before its normal expiration date.

**Obligation default:** refers to a technical default, such as violation of a bond covenant.

**Failure to pay:** failure of the reference entity to make any due payments.

**Repudiation/Moratorium:** provides for compensation after specified actions of a government (e.g. delay in payment).

**Restructuring:** reduction and renegotiation of delinquent debts in order to improve or restore liquidity. In 2009, US contracts eliminated restructuring as a potential trigger event.

In principle CDS are simple in structure, but complex to price (both at origination when a premium has to be determined, and subsequently when the market value of an existing CDS position needs to be calculated). There are also important issues involved in ensuring contractual integrity. Figure 4 provides a general depiction of how a CDS works, while Figure 5 from Duffie,( FAJ,1999) shows the cash flows associated with a CDS written on a Floating Rate Note (FRN) issued by Company C on which default occurs at date t, before the maturity date of the CDS, and has market value at that date of Y(t). U is the annuity premium which is paid up until the default date (or the maturity date of the CDS if no default occurs). Upon the default event, the protection buyer receives the difference between the par value ($100) and market value of the FRN.

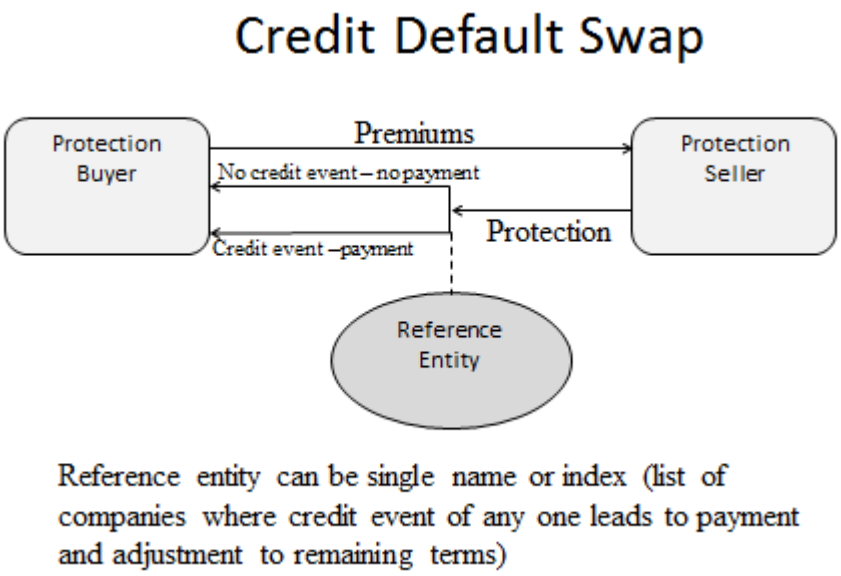
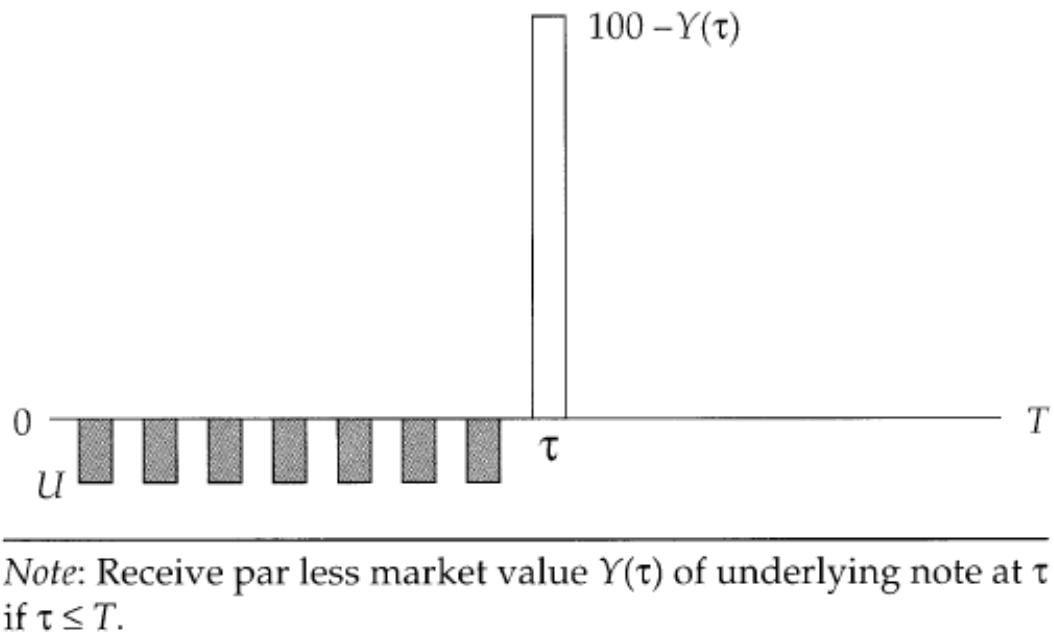



FIGURE 4: CREDIT DEFAULT SWAP




*Note*: Receive par less market value $Y(\tau)$ of underlying note at $\tau$ if $\tau \leq T$.

**FIGURE 5: CDS CASH FLOWS (SOURCE: DUFFIE, 1999)**

## CDS Settlement

CDS has an agreed life: if no credit event occurs it expires and settlement could be either:

- Physical – delivery of specified bond for face value
- Cash – difference between face and market value of bond

A problem for physical delivery is that there may be more CDS than bonds on issue of a particular reference entity. There has thus been established an auction protocol to determine the value of the defaulting bond – and cash settlement.

More information available about CDS market structure and institutional arrangements is available at ISDA and HIS Markit provides CDS prices and constructs indexes.

## CDS Premiums and Bond Credit Spreads

It is relatively straightforward to show via arbitrage that, in the absence of a number of market imperfections and with some very strong simplifying assumptions, the CDS premium (U) should be equal to the credit spread on a FRN issued by the reference entity (X) which is of same maturity as the CDS.

*Assume the premiums are paid in arrears (at the end of each quarter) and settlement of the CDS occurs at the end of the quarter in which the default event occurs*. Consider the arbitrage portfolio of going short the T period FRN issued by X ($FRN_X$) which pays coupon at date t of ($r_{f,t}$ + s) and long a risk free

FRN paying coupon of $r_{f,t}$. To go short, the $FRN_X$ must be borrowed and obliges the borrower/short-seller to pay the coupon amount to the security lender at the end of each quarter, and *assume that the entire coupon must be paid for the quarter in which X goes into default*. The net cash flow at the end of each quarter including the one in which a default occurs is s. When the default event occurs, close out the arbitrage portfolio at the subsequent ex-coupon date (implying receipt of the risk free FRN coupon and payment of the coupon on $FRN_X$ under the securities borrowing arrangement for net cash flow or $r_{ft}$). Buy X's FRN in the market for price Y(t) to close the short position, and sell the risk free FRN for \$100 for net receipt of 100 - Y(t). The net cash flows are the sequence [-s, -s, …,-s, -s +(100-Y(t)], while those of the CDS are [-U, -U, ….,-U, -U+(100- Y(t)]. To avoid arbitrage opportunities, U = s, ie the CDS premium equals the credit spread on the risky bond. (If default does not occur, the positions are closed out at the common maturity date of the CDS and FRN giving the same result).

Of course, this highly simplified example ignores many of the real world features of CDS contracts, and actual replication possibilities, and an important practical issue is the *CDS-bond basis* – the difference between a CDS premium and the yield spread (relative to the risk free rate) on an underlying risky bond. Various market features prevent perfect arbitrage between the CDS and bond markets, and there is a vast academic literature (reviewed by Lando) which investigates this.

To determine the appropriate CDS spread it is generally necessary to revert to more technical modelling (about which there is a voluminous literature). Augustin et al (2014) provide a survey of the nature of CDS markets and pricing approaches. ISDA provides a standardised model for CDS valuation.

## Global Market

ISDA provides information on the global credit derivatives market. The number of trades in 2018 and 2019 averaged around 60,000 per quarter, with a temporary spike to 102,000 in the first quarter of 2020. The notional value of trades was in the order of USD 2.5 trillion per quarter. Most trading is in the various indices rather than single name reference entities. For the major indices, the number of daily trades averages around 200 -300 with an average trade size (notional value) of around USD 20 - 50 million. Over 80 per cent of trades are cleared with a CCP. Around 70 per cent are traded via trading platforms known as Swap Execution Facilities (SEFs) – the others traded OTC.

## Australian Market and Trading Conventions

Australian market conventions for dealing in CDS (and other credit related products) are available from AFMA. For single name CDS trading, the standard notional size is \$5mill and for indices it is \$10 mill.

The determination of the cash flows associated with an agreed premium (as a number of basis points on the contract size) are complex. The premium is paid quarterly in arrears. As set out by AFMA:

> "Under Standard Australia and New Zealand Contract terms the Fixed Rate has been agreed to be quoted on a market standard basis as either 100bps or 500bps.
>
> The Dealt Rate is then applied to discount the Fixed Rate premiums and derive an upfront cash settlement on the transaction as determined under a standard model available at CDSW screen on Bloomberg, or at http://www.cdsmodel.com/."

Thus, if two parties agreed on a premium of 80bp, the seller of protection (who will receive a stream of payments of 100bp from the protection buyer) will make an upfront payment to the buyer equal in present value terms to the difference between payments 100 and 80 bp. Lando provides an explanation of why this convention was introduced and how it facilitates closing out a position. (Essentially because the 100 bp premiums of the long and short positions are offsetting there are no future cash flows and the close-out contract involves a contemporaneous payment or receipt of cash). CCPs facilitate the netting of the transactions and entities such as Tri-Optima and IHS Markit provide what are known as "compression services" which achieve the same effect for non-centrally cleared positions. In such services, partially offsetting gross positions with a counterparty are replaced by one net position which may have benefits for a bank if regulations incorporate levels of the bank's gross position.

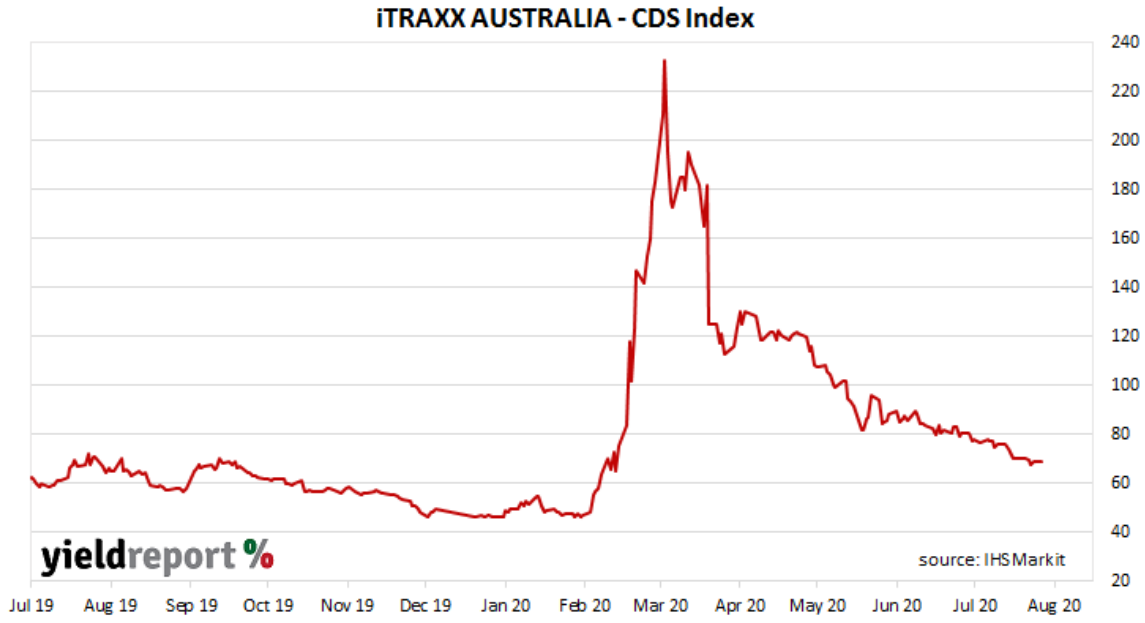
## CDS Indexes

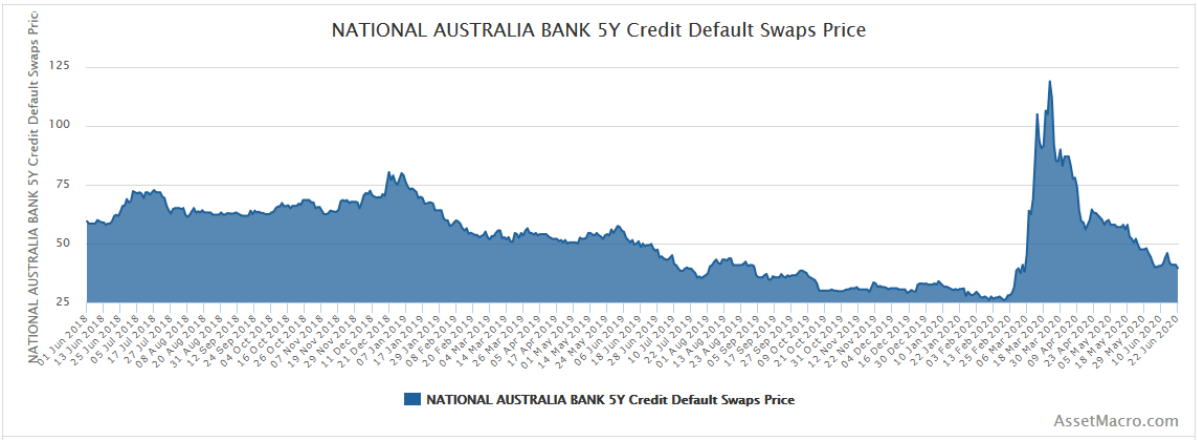
Much of the activity in CDS markets globally involves the trading of Index contracts, with features similar to the Australian iTraxx Australia index. This is an index based on the CDS's of 25 single name investment grade reference entities. The index is calculated as the equally weighted premiums (in bp) of 5 year CDS on the 25 reference entities. The ITraxx is an indicator of changes in the general level of credit spreads and positions can be taken to hedge or speculate on future movements in that level. A buyer of the index is essentially buying the equivalent of 25 individual CDS contracts on the reference entities (each with a notional amount of 4 per cent of the index notional principal). If subsequently there is an increase in market credit spreads and thus premia, the buyer of the contract would be able to sell the index at a higher premium and make a profit by closing out the position. The central clearing of CDS and the use of the standard premiums (as explained above) facilitate this. If one of the reference units experiences a default event, the buyer of the iTraxx will receive a payment and the notional amount and premia of that contract adjusted to covering the remaining 24 reference entities.

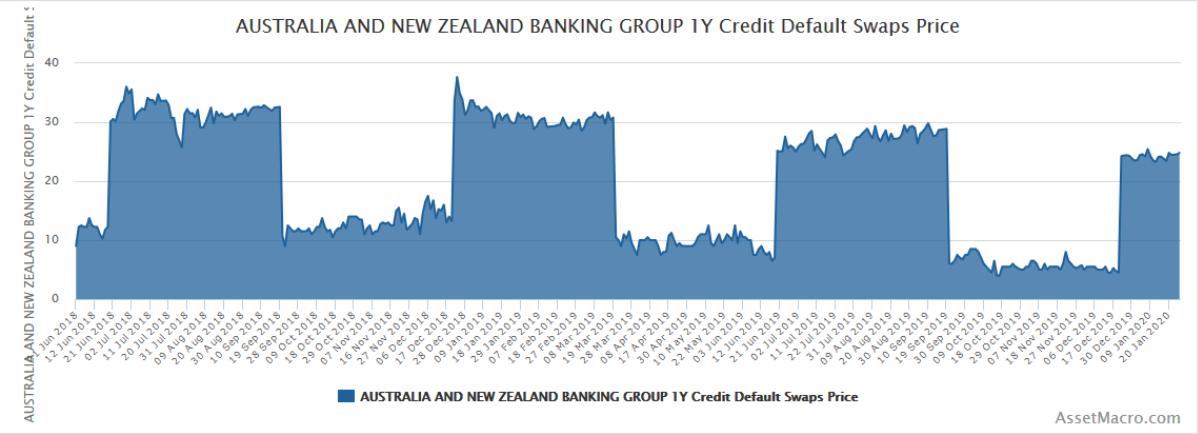
The main groups of international indexes are iTraxx and the CDX HY (covering higher yield firms) and the CDX IG (covering investment grade firms). The iTraxx Europe covers 125 firms, and there are similar

indexes for other markets such as Australia. The main CDX indexes are for North America and also for emerging markets. The Indexes are “rolled over” at regular intervals (eg every six months) with some constituent firms being replaced by others according to the specified rules.

Various derivatives on CDS Indexes have been developed. Akin to securitisation, “tranches” may be offered by investment banks and dealers in which the purchaser gets protection over some specified range of losses. Options are also available.






Information on the early development of the Australian CDS market as at 2011 can be found in this RBA article, which shows *inter alia*, how the close relationship for the major banks between CDS premia and bond spreads (to the swap rate) became less applicable in the years immediately after the GFC.

## Bank Uses of Credit Derivatives

- Hedging specific default risk – a bank with loans to XYZ corporation could hedge the credit risk by purchasing a CDS on XYZ. To the extent that the bank has superior knowledge about the credit risk of XYZ than the market it could benefit by purchasing "cheap" insurance.
- Hedging overall bank credit risk – purchase of a CDS index product when the bank is concerned about a possible general downturn in credit markets could hedge its overall credit risk. Note however that there will be a basis risk in that defaults by the reference entities underlying the index need not necessarily be closely correlated with those of customers in the bank's loan book.
- Diversifying loan portfolio credit risk – a bank which specialises in lending to particular geographic regions or industries could have a risk concentration issue. Selling single name or index CDS could generate premium income and give it a more generalised exposure. More relevant, however, might be a tailored bilateral total return swap with another bank (with different exposures) in which the banks agree to exchange total returns from specified loan portfolios.
- Freeing credit lines – a bank will typically have an internal limit on the level of credit exposure to any one customer. If exposures to a valued customer are approaching that limit, the bank's ability to make further loans in response to requests from the customer would be limited. By purchasing a CDS with that customer as the reference entity, the credit exposure is reduced – enabling the bank to meet the customer's loan request.
- Tailoring exposures – a bank wishing to increase or decrease its credit risk exposure to certain sectors of the economy can achieve that via transacting in CDS.

- Hedging risks from participation in syndicated loans – being a syndicate member for a loan to a particular corporate might be desired for some reason, but the resulting credit risk not wanted. Purchase of a CDS could hedge that credit risk.
- Managing capital – a major determinant of bank regulatory capital requirements is credit risk. Purchasing CDS may lead to a reduction in assessed credit risk for regulatory purposes. Note, however, purchasing a credit derivative does not "remove" credit risk – it changes the identity of the counter party to the CDS seller, and this would have regulatory advantages if the credit risk of the CDS seller is lower than the borrower whose loan is being hedged. Credit derivatives themselves have credit risk.
- Trading profit opportunities from participating in CDS markets – the bank's generation of private information about its customers may provide it with the opportunity for expected profits from buying or selling CDS on that customer if CDS market prices are misaligned with the bank's view of the actual credit risk.
- CDS markets also provide an additional Information source about corporate risk. CDS prices enable comparison of market vs internal bank credit pricing.

## Australian bank credit derivative use

In practice, Australian bank do not appear to make great use of credit derivatives for hedging of specific borrower risks.[4] ANZ Bank, for example, reported that at September 2019 that only around $1 billion of its $320 billion of corporate credit exposures were covered by credit derivatives. Westpac reported virtually no use of credit derivatives to hedge loan exposures. CBA reported that at December 2019 (December 2018), none (0.3 per cent) of its corporate credit exposures were covered by credit derivatives and only around 0.1 (1.1) per cent of its exposures to other banks (CCPs) covered. NAB reported that at March 2020 none of its credit exposures was covered by credit derivatives.

Information on trading activities in CDS is not easily come by.[5]

Regarding market risk arising from trading book activities, ANZ in the 6 months ending September 2019 reported a position of purchased $7 billion of CDS and sold $5 billion of CDS. It also reported that for that same period its average 99% 1 Day VaR for credit was $3.8 bill compared to $5.0 bill for Interest Rate and $3.4 bill for Foreign Exchange. For the 10 Day Stressed VaR, the figure for credit was slightly larger than for interest rate (and both well below FX). Westpac in its reporting of market risk did not separately identify credit risk (although it may be included in "other market risks". CBA does

[4] There is little public information on Australian bank use or activities in CDS. The Basel Pillar 3 regulatory disclosures do provide some information on use in credit mitigation in Table 10 and market risk in Table 11 of those reports.
[5] Some information can be gleaned from Table 14 in the regulatory disclosures.

not separately report components of overall market risk. The NAB's VaR figures were similar to ANZ (both in magnitude and relative size for different types of risk) but 10 day stressed VaR was above FX and well below interest rate.

Prior to the GFC, some of the Australian banks issued Credit-Linked-Notes which transferred some credit risk to purchasers of those notes. (The notes would offer a high rate of interest, but the investor's principal or interest rate would be reduced according to some schedule as defaults occurred on the reference assets). While the motivation behind issuance of these notes could be interpreted as hedging of bank credit risk, there was much concern at the time that the issuers were exploiting unsophisticated investors who, attracted by the high interest rates offered and not understanding the risks involved, were paying more than the notes were worth.

## 12.5 Repos (Repurchase Agreements)[6]

A Repo is the simultaneous sale and repurchase on agreed terms of a specified security for different settlement dates and which generates cash and an obligation to repay that cash on the settlement date. (A reverse repo is the same transaction viewed from the counterparty's perspective, ie a purchase and subsequent resale, involving an initial outflow of cash). Note: the security returned need not be the actual original one provided – just one identical to it.

Repos can be for a specified maturity or an "open" repo where the repo can be terminated at any time and terms are renegotiated each day.

The effect of a repo is that the seller of the security has borrowed funds on a secured basis for the term of the repo from the counterparty as is shown in Figure 6.

(Repos and Securities Lending are conceptually the same. The provider of cash in a repo is effectively being lent the underlying security. But motivation for securities lending is different, and the transaction may involve providing alternative securities, rather than cash, to the counterparty).

### An Example

ABC (the "borrower") enters a repo contract with XYZ Merchant Bank (the "lender") where, on 12/1/XX ABC

sells a $100 face value T Note with maturity date of 30/4/XX and current market value of $99.00 to XYZ in return for $98.50 immediate settlement.

agrees to repurchase a $100 T Note with same maturity from XYZ for settlement on 14/1/XX for $98.51.

The cash flows (absent default on the contract) are that ABC receives $98.50 on 12/1/XX and pays $98.51 on 14/1/XX, implying that there is an implicit interest rate in the contract of 1.852 per cent p.a.[7] Note that the initial sale at a price below market value is offset by the subsequent repurchase at less than market value.

[6] A very useful reference is ICMA (2019) Frequently Asked Questions on Repo

[7] The interest amount is $0.01 on principal amount of $98.50 for two days. Thus r = (365/2)*(0.01/98.50).

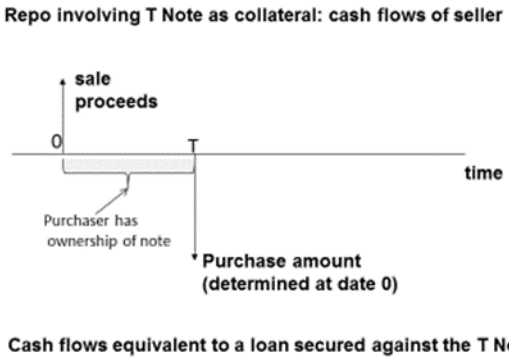



FIGURE 6: CASH FLOWS IN A REPO

## Repos: A Little History

Originated in U.S.A. in 1918 with Federal Reserve offer of resale agreements against Banker's Acceptances with dealers. Over time Central Banks in many countries began to use repos as their primary tool for open market operations. (See CGFS, 1999). The use of repos between private sector counterparties grew from the 1950s. The CGFS (2017) note that in 2016, repos outstanding involving government bonds were equal to 32 and 16 per cent respectively of government bonds on issue in the Euro area and the USA.

## Repo Characteristices

Traders in the market will normally quote repo terms using the implicit interest rate. (Market conventions and standard documentation are available on the AFMA website).

The "margin" involved in the repo is the difference between the collateral value and the loan amount. This provides the lender of cash with confidence that the second leg of the transaction will be completed (since the collateral value exceeds the repurchase amount). There will be "marking to market" such that if the underlying asset value changes the lender will require further margins to ensure the value of the asset is always in excess of the borrower's repayment obligation. This protects the lender against default risk, since should default occur they will be able to sell the collateral they hold. Consequently, the interest rate on the repo should be close to the risk-free rate for that maturity.

A "haircut" may be given to the value of underlying asset, such as an asset with a claimed value of $100 may treated as only worth $90, implying that less than $90 cash could be borrowed using the asset as collateral. This will occur when there is a lack of confidence that the market, or claimed, value is a good indicator ow what the collateral could be sold for. The terms "haircut" and "initial margin" are often used interchangeably.

In addition to margins, another form of protection for the lender is only accepting as collateral those securities which have low credit risk, to avoid the risk of loss from a situation in which the repo counterparty defaults and the issuer of the security also defaults.

In modern financial markets, repos can be done either on a bilateral basis or via a "tri-party" arrangement. In the latter, a large bank offers services of administration, collateral management etc as an intermediary between the two repo parties. In the USA, prior to the GFC much of the tri-party repo market involved those large banks providing daylight overdrafts to repo participants, since repo repayment would occur in the morning and rollovers (to obtain cash replacement) would occur in the afternoon.

## Uses (Economic Functions) of Repos[8]

Repos are an important form of short term collateralised borrowing. For a financial institution they provide a way of obtaining short term liquidity at low cost rather than having to sell securities outright or borrow on an unsecured basis. They can also be used (and were extensively by US Investment Banks (IB) and others prior to the GFC) to finance holdings of long term assets. The IB would, for example, purchase a long term security on day 1 and fund it by using that as the collateral in a short term (eg one day) repo, and rollover or replace that repo with another one day repo the next day – and so on.

For those with surplus funds to invest (including pension funds, corporate treasuries, money market funds), repos may also be an attractive short term secured investment. One particularly relevant feature in this regard is that in many jurisdictions claims under repo transactions are not affected by insolvency/bankruptcy of the borrowing entity. The lender has a claim on (ownership of) the collateral which is not affected by the bankruptcy process.

A repo is essentially the same as a "securities loan" in which one party "lends" securities to another in exchange for collateral (often in the form of cash). In the example above, XYZ could be interpreted as borrowing the T-Note from ABC and providing cash as collateral. But the motivation for a securities loan is different, and the margin would be applied in the reverse manner (XYZ providing more cash than the value of the securities transferred).

Repos/Securities Loans are a way of participants getting access to particular types of collateral which they may need. For those institutions providing funds and receiving the collateral in a repo, they are able to "re-use" the collateral. For example they could raise cash by selling it (or deliver it against a sale already made) or by repo'ing it, or they could use it to meet margin calls on other positions they hold. (Of course, they need to be able to get collateral back to provide when the original repo

[8] See http://www.bis.org/publ/cgfs59.pdf for more detail and an overview of recent developments in global repo markets.

matures). For those involved in market-making activities, repos provide a way of getting access to securities to enable meeting demand for those securities or funding holdings of securities.

Central Banks make extensive use of repos for their open market operations to manage system liquidity and influence interest rates. In general, Lender of Last Resort (LOLR) activities will involve repos with the Central Bank providing cash temporarily to an illiquid (but solvent) bank and receiving assets of greater value under the repo to protect the Central Bank against risk.

## Accounting for repos

Although the repo involves the sale of the security for a receipt of cash, accounting conventions treat the transaction as a form of collateralized borrowing (which it is). Thus if, say, a bank sells an asset under a repo in exchange for cash, the asset will remain on its balance sheet, and will have a new liability of a borrowing equal to the cash received. One consequence of repo financing is that some of the assets displayed on the bank's balance sheet will be "encumbered", not available for use since they are temporarily owned by the repo counterparty. Concerns over encumbrance of bank assets via this and other pledges of assets as collateral, and which are thus not available to meet the claims of depositors are commonplace. But whether they are justified is less clear.

### Case Study: Lehman's notorious Repo 105s

Lehman (and other US investment banks) were able to disguise the extent of their leverage arising from using short term Repos to fund holdings of longer term assets via an accounting anomaly which could be used if the collateral provided was more than 105 per cent of funds advanced.

*Example:*

$100 of bonds sold via a repo for cash of $90, repurchase price of $90 (0% interest rate for simplicity). Cash received used to pay down debt

With proper accounting: the repo'd bond is still an asset; the $90 cash received via repo is a borrowing; and leverage is unchanged.

Under "Repo 105" accounting: the repo'd bond is treated as sold and removed as asset; no associated borrowing is recorded, and leverage reduced. The forward contract with an asset value of 10 represents the right to repurchase the $100 of bonds at a price of $90.

| | **Asset** | **Liabilities** |
|---|---|---|
| *Initially* | Bonds 1,000 | Borrowings 950<br>Equity 50 |
| *"proper" accounting* | Bonds 1,000 | Borrowings 860<br>"collateralized" borrowings 90 |

| | | |
|---|---|---|
| | | equity 50 |
| *Repos 105 accounting* | Bonds 900 | Borrowings 860 |
| | Forward contract 10 | Equity 50 |

## Global Size of Repo Markets

CGFS Papers No 59 *Repo market functioning* provides data on the size of Repo markets at mid 2016. Data on the size and features of European repo markets from surveys is regularly published by the ICMA. (A difficulty in conducting surveys to obtain information on repo usage is the need to avoid double counting the one transaction if both parties are in the survey).

Globally amounts outstanding against government bonds were USD 8.8 trillion, with about 1/3 share involving Euro-area and US government bonds each, and Japanese and UK bonds the other major contributors. The Australian share amounted to USD 106 billion. Total global outstandings (using both government and private collateral were USD 12 trillion).

There was a significant drop in use of repos globally after the financial crisis which has not been recovered (although the Australian market suffered a relatively small fall and has since continued to grow).

The CGFS suggests that banks in some jurisdictions have been structuring repo transactions to avoid regulatory balance sheet constraints in the following way. "Netting" of offsetting repo and reverse-repo transactions with the same settlement date but involving different collateral do not affect recorded balance sheet size. They indicate that the volume of such matched positions has not declined.

## The Australian Repo Market[9],[10]

The Reserve Bank of Australia began undertaking repos with authorised money market dealers (a category of financial institutions that no longer exists) in August 1984, and subsequently allowed dealers to undertake repos with clients.

At the start of 2020 repo financing by Australian ADIs and RFCs was in the order of $200 billion (around 30% with other ADIs/RFCs, 35% with the RBA, 30% with foreigners). This was equivalent to around 4% of the total assets of ADIs and RFCs at that time (a little over $5,000 billion).

[9] Market conventions are available at AFMA. Margining guidelines are available here.
[10] For further information, see Wakeling and Wilson (RBA, 2010) and Becker et al (RBA, 2016).

## Central Bank Use of Repos

Repos are a major tool used by the RBA in managing system liquidity; RBA open market operations are primarily via repo transactions. (The RBA is buying securities in exchange for providing cash, and thus refers them as reverse-repos). The range of acceptable instruments and terms of repos substantially increased during GFC.[11]

Repos are useful for the Reserve Bank (and other central banks) because:

1. they can be used for open-market operations, rather than outright sales or purchases of securities. Because the cash flows will be reversed at the specified future date, the repos can be structured to mesh with known future system cash inflows and outflows resulting from patterns in government payments
2. they can be used in Lender of Last Resort (LOLR) transactions - where the central bank provides a loan against good collateral to a bank which is solvent but facing a liquidity problem. The interest rate on such a loan implied by the terms of the repo may be high, and the central bank protects itself against loss by applying a sufficiently large haircut/margin on the repo.
3. They can use any government security (and since 2007 designated private securities) as the basis of a repo transaction. (*Internal Securitisations* by banks create securities which can be repo'd at the RBA).

There is little public information on the interest rates on repos between members of the private sector, which are traded OTC. There is regular information provided by the RBA (Table A3) on the interest rates at which it conducts repos. Until a change in March 2020, the RBA would announce its daily dealing intentions (quantities and maturities) and the rates would be the outcome of an auction. Since then, the RBA has effectively allowed the quantity of its dealings to adjust such that the repo rates have been stable at 13-14 bp p.a.

Figure 7shows how the relationship between RBA repo rates and the OIS30 and BAB30 rates has changed over time. (The repo rates are those on repos between 28 and 32 days). Because the RBA applies a margin (of 1 or 2 bp) for its purchases of government securities (such that the value of the collateral exceeds the cash amount lent), it might be thought that the repo rates would reflect a risk free rate. However, until recently the repo rates have been more closely aligned with BAB30

[11] APRA collects data on use of repos by ADIs and RFCs under ARS-221 and this has been published since 2009 by the RBA as Statistical Table B3. Data on RBA repo transactions are available in Statistical Table A3.

rates than the OIS30 rate. That reflects competition in the repo market with banks willing to bid repo rates up to the cost of equivalent maturity funding as represented by the BAB30 rate.

Following March 2020 changes to RBA operating procedures, the relationship between these rates has changed. The repo rate has been stable at 18 bp, while the OIS rate has declined to 14 bp. The BAB30 rate is lower at around 10 bp, but this type of funding attracts an additional 6 bp cost to the banks arising from the Major Bank Levy (MBL) making the cost around 16 bp. While repo funding also incurs the MBL, the levy base is reduced by the amount of ESA funds the bank holds. Thus entering a repo and acquiring ESA funds would not incur the levy thus the net cost of acquiring ESA funds via RBA repo would be around 8 bp (18pb repo rate less 10bp interest paid on ESA balances). Of course, once those ESA funds were reduced by lending the effective cost of expanding the balance sheet would be 24 bp (the MBL plus the repo cost).

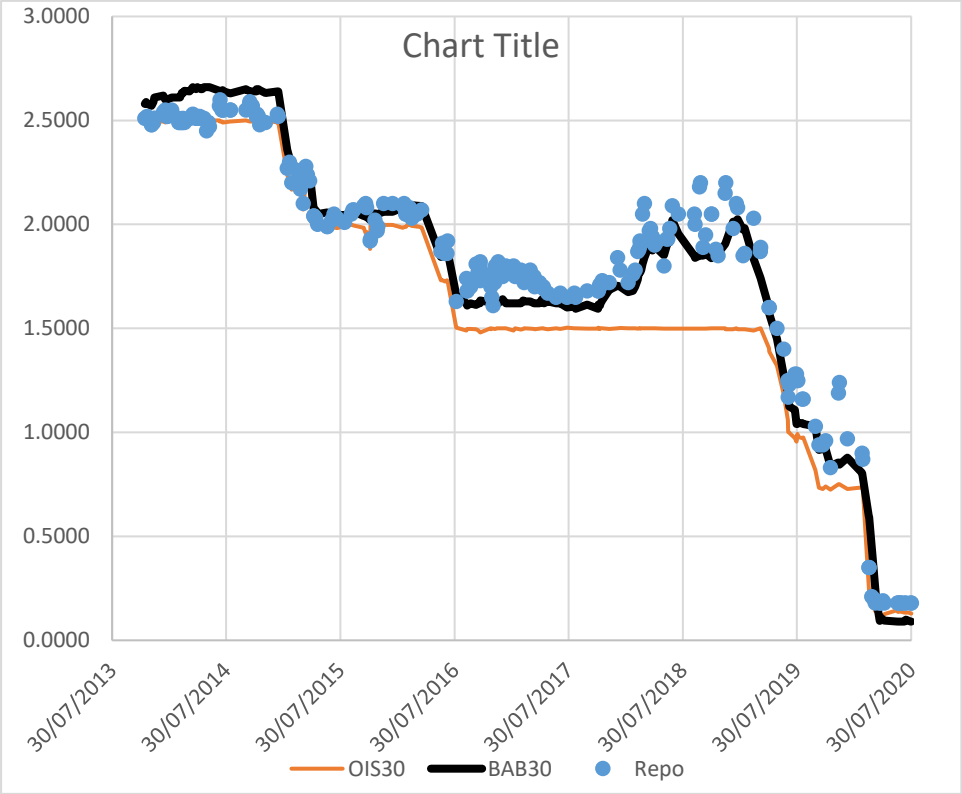



**FIGURE 7: REPO RATES**

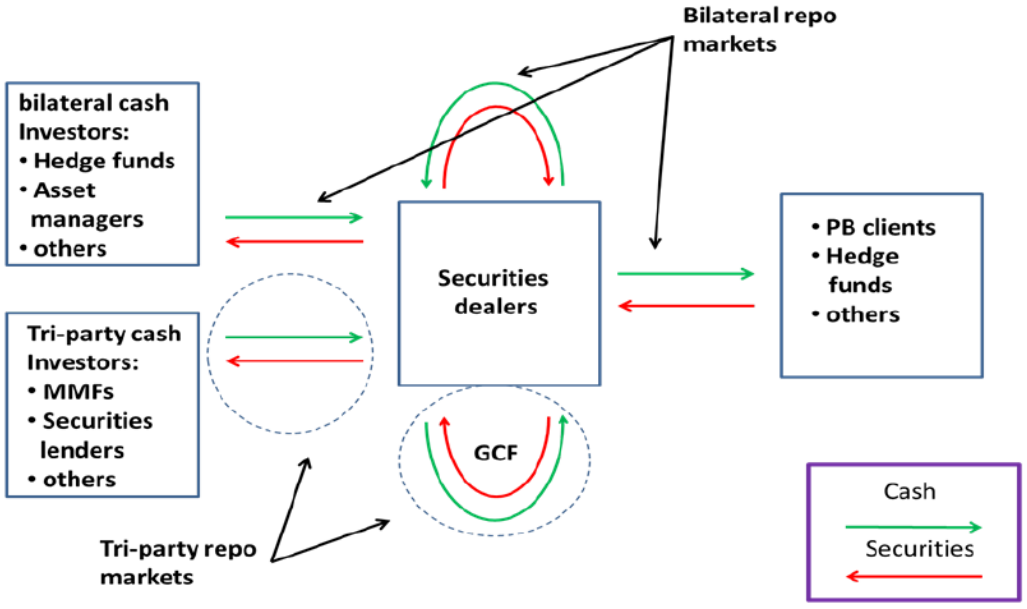
## Regulation of Repos

Where banks use repos as a form of financing two forms of regulation are relevant. One is capital requirements. The introduction of the Basel leverage ratio as a supplement to the risk-weighted capital approach has been argued to have reduced the demand for such financing by banks. Van Horen and Kotidis (2018) find evidence from UK data to support this argument.

The second relevant form of regulation is liquidity regulation. Under the liquidity coverage ratio (LCR), a 5 day repo would be treated as a potential cash outflow.

## The US Repo Market and the GFC

Figure 8 provides an outline of the US Repo market (prior to recent reforms to limit intra-day credit provided by the major government securities clearing banks (J P Morgan and Bank of New York Mellon) to securities dealers on tri-party repos. (In a tri-party repo, the clearing bank intermediary administers arrangements for investors (MMMF etc) and borrowers (securities firms), enabling them to avoid the need for back office functions, and provides intraday credit between rollovers to the securities dealers. (Repos are unwound in the morning and re-entered later in the day).




Source: Copeland, Duffie, Martin, and McLaughlin (forthcoming).
Note: MMFs are money market mutual funds and PB is prime brokerage. GCF is the General Collateral Financing repo market run by the Fixed Income Clearing Corporation; this repo market

FIGURE 8: US REPO MARKET (SOURCE, ADRIAN ET AL)

Gorton and Metrick (JFE, 2012) highlight the significance of the repo market both in terms of size and role in the GFC

> "The [US] Panic of 2007-2008 was a run on the sale and repurchase market (the "repo" market)".
>
> "U.S. repo market is likely to be roughly the same size (or larger) than the total assets in the U.S. banking system of $10 trillion"

It was a major source of US Investment bank funding prior to GFC. The investment banks would buy long term securities and fund them by a succession of overnight or short term repos (short term collateralised borrowing). The objective was to profit from the interest rate spread, but involved significant liquidity / rollover risk, and exposure to decline in LT securities price if sale required. The risk was the potential for increased collateral requirements / margin calls. The systemic risks were compounded by financing of purchases of complex securitised assets by repo financing – "securitised banking".

## Repos: Some Issues

Bank resolution arrangements - Because repos involve transfer of ownership of collateral, lenders avoid being caught up in bankruptcy of borrower. Repo funding reduces assets available for other claimants (depositors), a form of priority

## Repos and arbitrage

Becker et al (2016) provide two examples of how the repo market is used to exploit "mispricing" in financial markets. One relates to the foreign exchange swap basis, arising from willingness of Japanese investors to pay a premium to borrow AUD in exchange for JPY in an FX swap. Holders of AUD government securities can enter a repo to obtain AUD cash, swap the AUD cash for Yen cash, and then lend the Yen cash to obtain Yen securities. For a 3 month horizon (when the transactions are unwound) the premium earned over the 3 month BBSW was (in 2016) in the order of 70 bp.

The second use of repos described is to arbitrage bond futures prices. If the futures is overpriced, Figure 9illustrates the transactions.

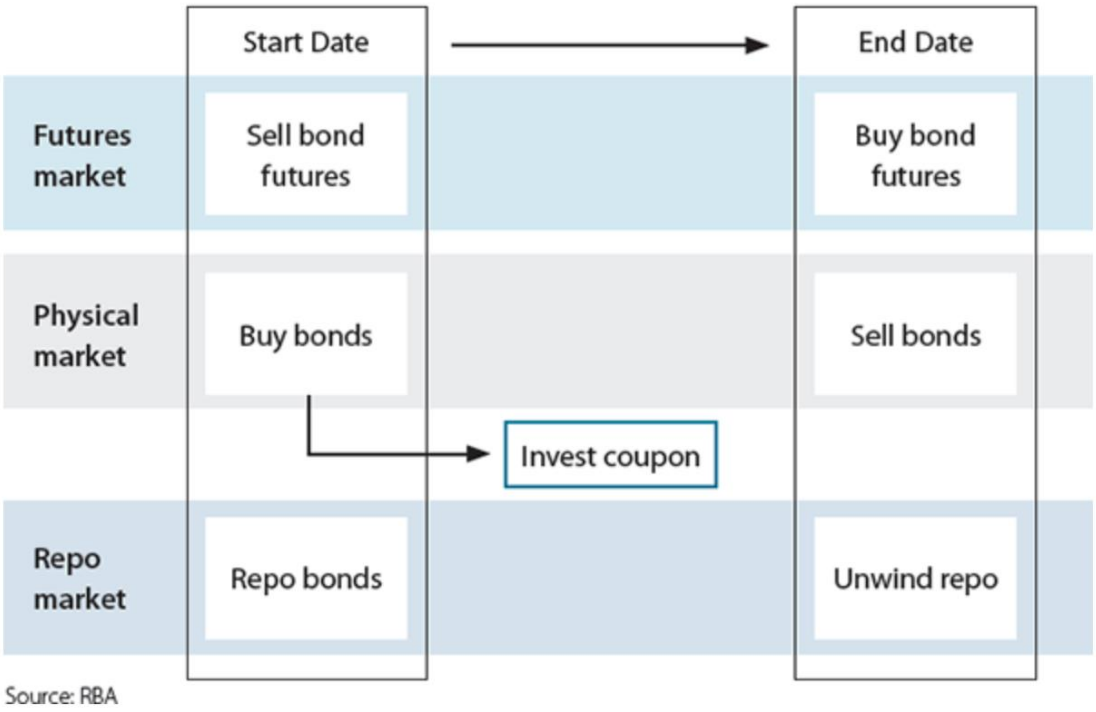



FIGURE 9: BOND FUTURES MARKET BASIS TRADE

Another use of repos for exploiting arbitrage opportunities is by using repos to create a forward contract which matches dates of a mispriced futures contract as shown in the figure below.

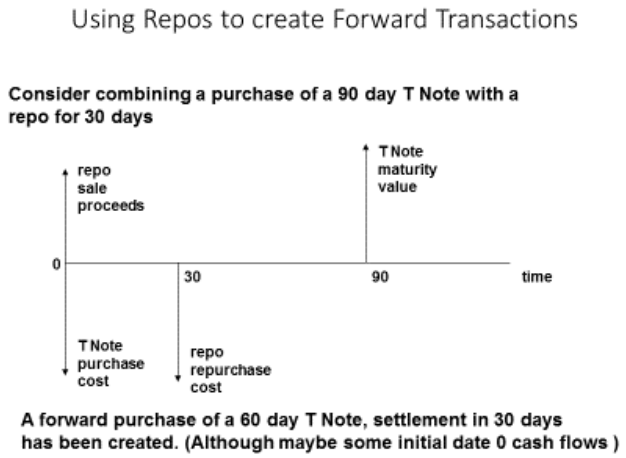



FIGURE 10: USING REPOS TO CREATE FORWARDS

## The "run on the repo" (Gorton & Metrick, 2012)

Prior to the financial crisis, there was substantial usage in the US of repo financing using securitised assets as collateral. For example, an investment bank would securitise mortgages and hold some part (lower tranches) on balance sheet using these as collateral for repo financing. This often involved CDOs, combining tranches of ABS. Over half of investment bank financing was via repos.

In January 2006 *Markit* and *CDS IndexCo* launched ABX indices, which were based on the value of a portfolio of specified (origination dated) ABS tranches. These were derived from credit default swap quotes. In their study Gorton & Metrick use implied credit spread from the index. Figure 11 from Gorton and Metric shows for the ABX index for the 2006-1 BBB tranche, ABX spreads on right-hand y-axis and LIBOR-OIS spreads on left-hand Y-axis. Both scales are in basis points

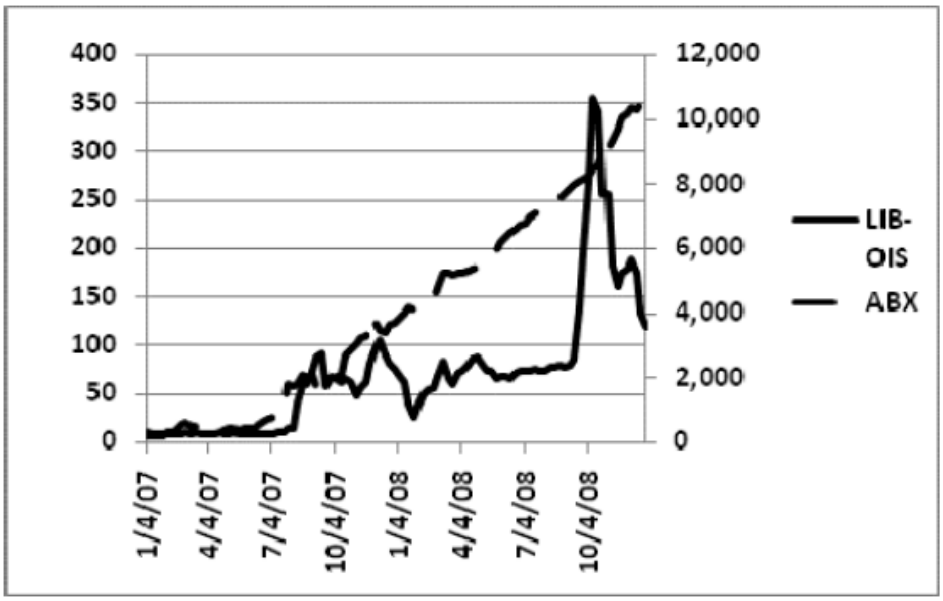



**FIGURE 11: ABX V LIBOR-OIS SPREAD (GORTON AND METRICK, FIGURE 8)**

As well as the massive increase in spreads on the ABX index (and the sharp spike in the LIBOR-OIS spread) Gorton & Metrick also provide information on the Repo Haircut Index (see Figure 12) which is the equally-weighted average haircut for all nine asset classes included in their data.

The increase in the haircut they equate to a bank run.

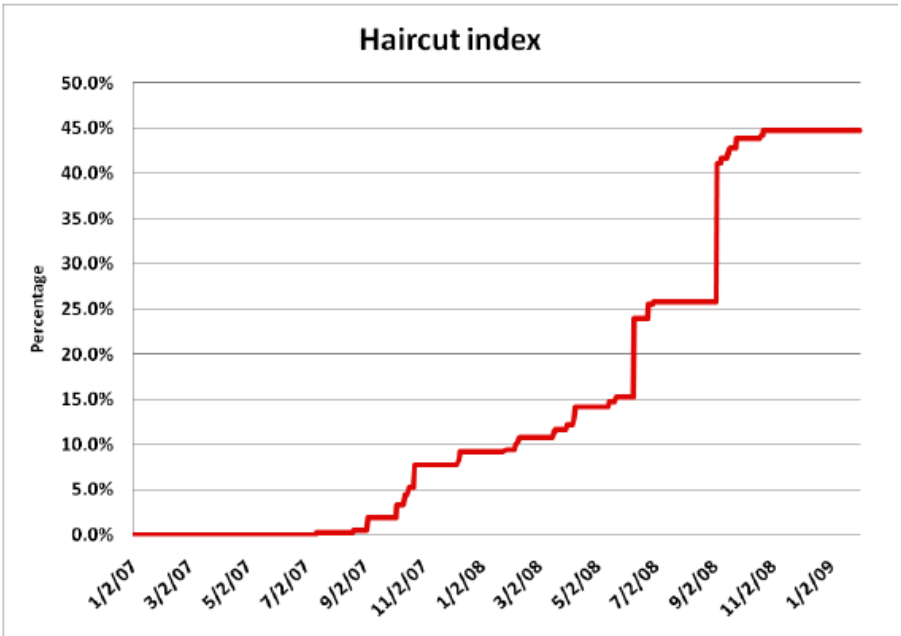



FIGURE 12: GORTON AND METRICK'S REPO HAIRCUT INDEX

Krishnamurthy et al (JOF, 2014) dispute the significance of the run on the repo, arguing that most of the shadow banking sector's use of repo financing involved government and agency securities, and that haircuts etc behaved differently for these securities than for private securities. They point instead to the role of ABCP financing by shadow banking, and links to the formal banking sector via liquidity guarantees as more important. Examining Figure 13 from Krishnamurthy et al, the transmission mechanism into tightening of credit was, they argue, more related to reduced flows (outflows) of funds into ABCP conduits from end investors.

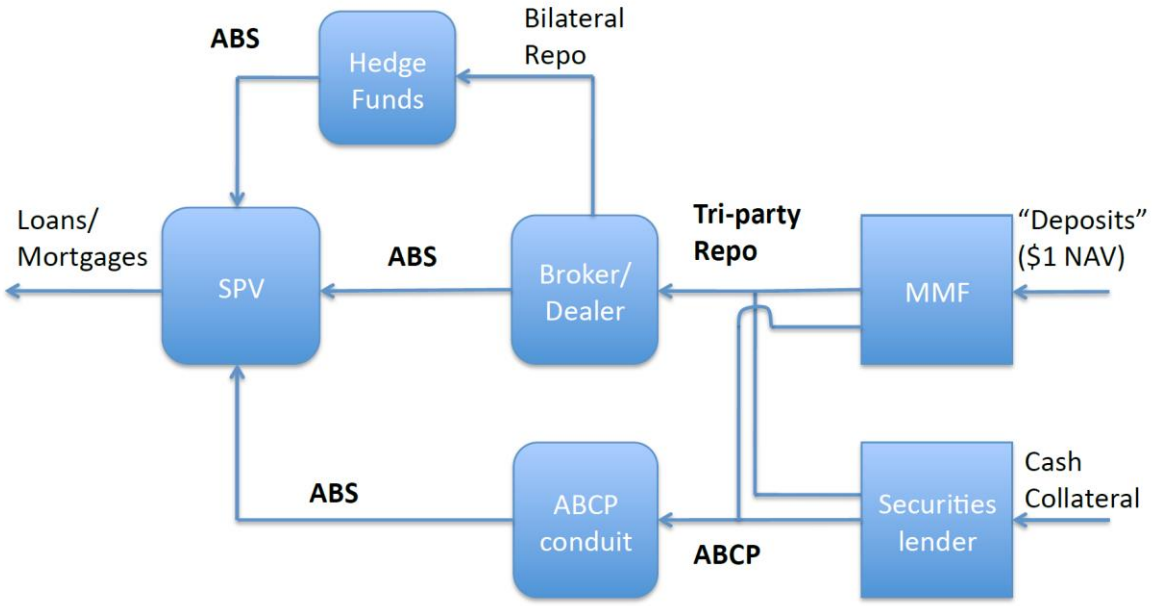



FIGURE 13: GFC TRANSMISSION MECHANISM

## 12. 6 Securities Lending

A recent overview of the (equities) security lending market in Australia and regulatory arrangements is provided by Carroll and Clarke (RBA, 2014).

> "Securities lending involves the temporary exchange of securities, usually for other securities or cash of an equivalent value (or occasionally a mixture of cash and securities), with an obligation to redeliver a like quantity of the same securities at a future date. Most securities lending is structured to give the borrower legal title to the securities for the life of the transaction, even though, economically, the terms are more akin to a loan. The borrow fee is generally agreed in advance and the lender has contractual rights similar to beneficial ownership of the securities, with rights to receive the equivalent of all interest payments or dividends and to have equivalent securities returned. The importance of the transfer of legal title is twofold. First, it allows the borrower to deliver the securities onward, for example in another securities loan or to settle an outright trade. Second, it means that the lender usually receives value in exchange for the disposition of legal title (whether in cash or securities), which ensures that the loan is collateralised." Ref: http://www.iosco.org/download/pdf/1999-securities_lending.pdf

Figure 14 provides an example of a securities lending transaction in which A lends shares in XYZ Ltd to B on 1/1/XX, for repayment on 20/1/XX. On 1/1/XX Ownership of XYZ transferred from A to B. B pays $C cash to A as collateral (or this could take the form of other securities) where the collateral value exceeds the market value of the securities lent.

Over that period XYZ pays dividend $D on 18/1/XX which is received by B as the legal owner – but which the loan agreement requires be reimbursed to A (plus the value of any attached franking credits). On 20/1/XX, ownership of XYZ shares is transferred back from B to A and B pays dividend equivalent ($D plus value of any tax credits). A returns the collateral plus some agreed part of the interest A has earned on cash collateral, or alternatively B pays some agreed fee to A.

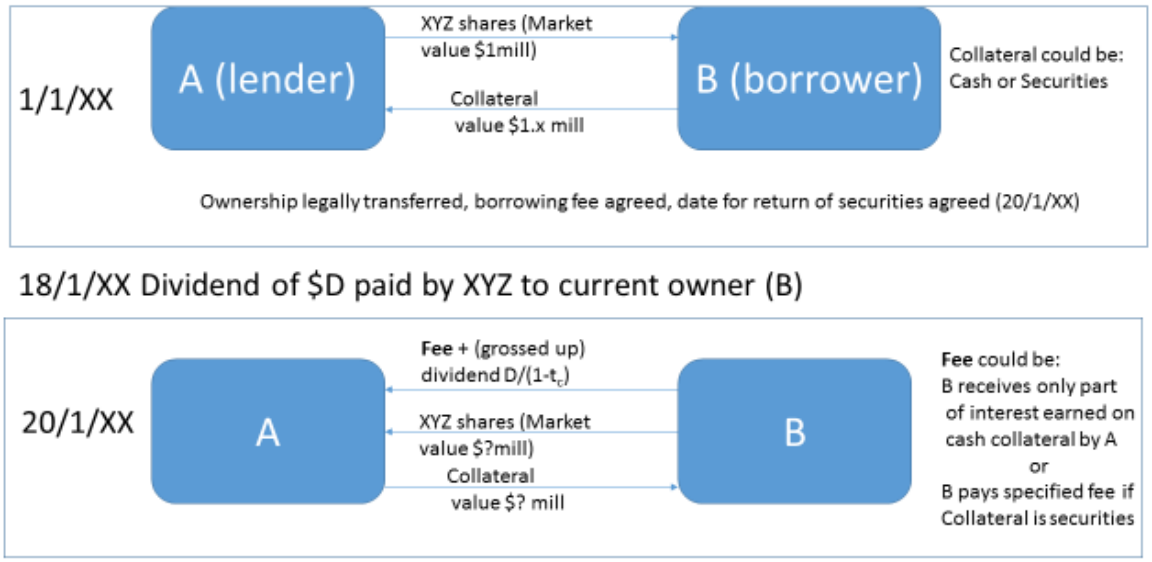



FIGURE 14: SECURITIES LENDING ILLUSTRATION

The Securities Loan is equivalent to a spot purchase of XYZ shares by B plus a forward sale of XYZ shares by B (with same counterparty A). There are obviously counterparty risks involved. For A this arises if XYZ share price increases and B doesn't redeliver stock. A will protect against this by demanding that the value of collateral exceeds the value of the stock lent.

For B counterparty risk arises if the XYZ share price decreases and A doesn't accept redelivery and make payment via return of the collateral.

One important feature of the securities loan is that voting rights transferred to borrower. This gives rise to an "empty voting" potential problem (decoupling of voting rights and economic ownership) relevant for control and governance. (Ali, Ramsay and Saunders, 2014). In 2019 ASIC released Consultation Paper 319 regarding substantial holdings disclosure by agents having securities borrowing rights from their clients. This would extend the relief given to prime brokers which required then to disclose only when they exercise a right to borrow, rather than when an agreement is entered into which gives them that right.

In a perfect market, collateral cash flows $C (at initial date) and $C* (at repayment date), and dividend $D adjustment should reflect "cost of carry" arbitrage relationship between spot and futures. The borrower of securities who provides cash collateral should get interest earned on that collateral returned. Otherwise it would be cheaper to buy the securities spot (at price $S_0$) and sell them forward at $F = S_0 (1+r)$ rather than provide the cash collateral $C = S_0$ and get back less than $C^* = S_0 (1+r)$.

In practice, legal restrictions, incomplete markets and inability to replicate transaction, supply-demand conditions, transactions costs etc., mean that the implicit interest rate on cash collateral provided in securities loans can differ from, and will be lower than, the risk free rate. Because it is the borrower of securities who is seeking a service (temporary use of the securities) they can expect to incur some cost (either lower interest rate on cash collateral provided or an explicit fee if securities provided as collateral). For the lender of the securities, undertaking the transaction provides a source of income additional to that earned from ownership of the securities.

The Australian securities lending agreement involves payment of any dividends received by the borrower plus the cash value of any attached franking credits. While that might appear to provide an opportunity for arbitrage of franking credits – by a shareholder who doesn't value franking credits lending the stock to another entity who does, the legal holding period restrictions on ability to use franking credits precludes this.

## Securities Lending History (See http://www.asla.com.au/).

1960s – emerged in UK in operations area of stockbrokers, spread to other markets

1970s – emerged in Australia, waxed and waned – affected by capital gains tax treatment. In 1985 introduction of CGT meant that securities loans triggered a tax event since a "sale" was involved. This impediment to securities lending was removed at the start of the 1990s.

Custodians are major stock lenders both on an agency basis (for eg super funds) and as principals (ie take on risk of lending securities of their clients). See here for a recent innovation aimed at opening securities lending up to direct participation by wholesale investors.

The obvious question is why do market participants engage in securities lending.

## Uses of Securities Lending

- Borrowing for failed trades -by brokers where clients haven't delivered securities on time
- Borrowing for Margin requirements
- By writers of derivative contracts
- Borrowing for Market Making and Proprietary Trading
- Where securities need to be sold for hedging, arbitrage, market making
- Borrowing for short selling
- Income Generation – lenders of securities receive a fee, giving income additional to dividends etc

As in many other markets there are Intermediary Brokers who borrow and lend securities to clients.

Superannuation funds have at times been significant lenders of equities they hold in order to generate some fee income to supplement returns for members. This has led to significant criticisms, based on the fact that short-sellers borrowing securities will tend to depress the price of the shares borrowed – which is against the interest of members. See here for a recent AFR article. In 2019 Vanguard announced that its ETFs would engage in securities lending.

## Securities Lending and Repos

Repos and Securities lending are essentially opposite sides of the same type of transaction – a temporary exchange of one type of security for another or for cash. Repos are generally seen as *"Cash Driven"* – objective is short term financing. Repos are more "commoditized" – direct dealing with electronic quotes, focus on government securities; typically fixed term; collateral is securities

Securities lending is generally seen as *"Securities Driven"* – objective is temporary acquisition of securities. Securities loans are intermediated – customised, focus on equities; typically "open" maturity; collateral is cash

In both cases, collateral given may be given a "haircut" and adjusted value required to exceed market value of loan plus margin. Margin calls made as required.

## Margins and Haircuts

The terms "margin" and "haircut' are sometimes used interchangeably, but actually refer to different things. When collateral is provided in the form of some security, its current value will need to be ascertained. It might be claimed that the market value is $120, but there may be no trading in the security and/or concerns about its value, such that the receiver of the collateral gives a "haircut" (h)of (say) 10% and regards the collateral value as only being $108. (For cash collateral there would be no haircut).

The receiver of collateral will also want the collateral value received to exceed the amount to exceed the amount of cash or securities provided to the other party by some margin (m), say 5%. So if $100 was being provided, the value of collateral received (after the haircut) would need to exceed $105.

The relationship between initial margin and haircuts for an acceptable transaction is

$(1+m)\ s \leq (1-h)\ c$

where m = initial margin, s = market value of securities loaned, h = haircut and c = market value of collateral taken.

Example: $100 ANZ shares lent (s), margin (m) of 5% required, $120 of DOG shares (c) offered as collateral but given a haircut (h) of 10%; (1+m)S=$105 < (1-h)c - $108

The initial margin and haircut reflect price volatility and valuation uncertainty of the items in question.

### Gross and Net Stock Lending

Because the borrower of stock can on-lend it in another securities lending transaction, there is often a chain of collateral which means gross and net lending figures differ substantially. Figure 15 illustrates for two Australian stocks

Gross and Net Stock Lending: 7 August 2017

Outstanding Borrowed Stock (million)

| *ASX Code* | *Gross Volume* | *Gross Value* | *Net Volume* | *Net Value* | *Daily Turnover ($ mill value)* | *Net Borrowed Value (% of Daily Turnover)* | *Stock value ($mill) Committed to Lending Arrangements** | *Borrowed stock (net) / Committed Amount* | *Market Capitalisation ($mill)* | *Net Borrowing / Market Capitalisation (%)* |
|---|---|---|---|---|---|---|---|---|---|---|
| ANZ | 15 | 459 | 0.02 | 0.60 | 95.09 | 0.63 | 10020 | 0.01% | 87535.0 | 0 |
| AMP | 95 | 512 | 42 | 229 | 23 | 9.94 | 1689 | 13.55% | 15730.5 | 1.46 |

(net < gross implies on lending)

* preceding quarter end

**FIGURE 15: STOCK LENDING (SOURCE: ASX)**

### Securities Lending & Short Selling

Short sale requires securities to be borrowed. This is facilitated by "street name" registration. The short seller must pay any dividends declared to the lender. Margin required (ie account will have asset balance equal to sale proceeds plus margin funds deposited, and liability equal to current market price of shares short sold). Net proceeds not available until position closed (some part of profits may be withdrawn if stock price declines).

Often restrictions exist on stocks which can be short sold and circumstances when a short sell can be made (e.g. only on an uptick).

Prior to GFC much short selling in Australia was "naked" (without having borrowed securities) even though not permitted ("covered" short sales required). At the time of the GFC, short selling prohibitions were introduced on a number of stocks and maintained for some time in the case of financial stocks.

## 12.7 Collateral

Provision of collateral protects a counterparty who is a creditor (via reduced loss given default, reduced borrower moral hazard risk). It is relevant to :

- repos, securities loans
- Lending – secured by financial or real assets
- Mortgage lending, pawnbroking
- Derivatives exposures ( bilateral or CCPs/exchanges)

High quality collateral – government securities, also demanded for meeting regulatory liquidity needs (CLF)

Re-use (rehypothecation) of collateral is common. An RBA survey estimates 1.6 times p.a. for govt securities

Lehmann failure illustrated risks from "collateral chains". Figure 16 shows an example of a collateral chain.

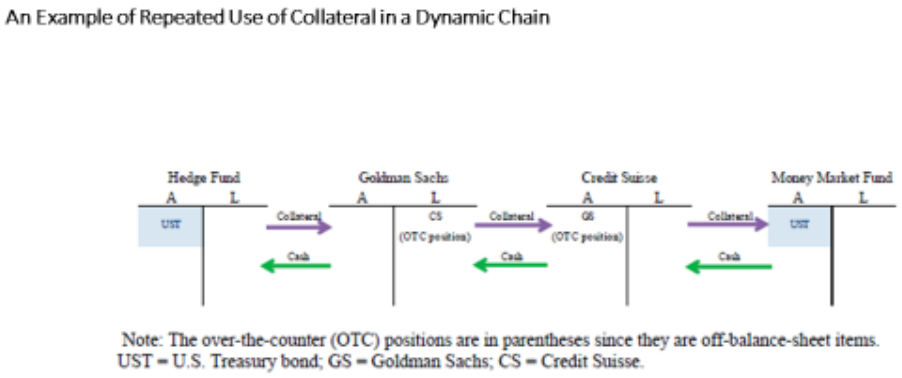



**FIGURE 16: COLLATERAL CHAIN (SOURCE: CLAESSENS ET AL 2015)**

## Collateral and Encumbrance

The use of collateral creates a number of complications because assets become "encumbered", and there has been iIncreased use of collateralised funding by banks such as for Repos and covered bonds etc. Concerns re increased "encumbrance" of bank assets, also arising from collateral provided for exposures due to derivatives positions

One issue is unavailability of encumbered assets for use to compensate unsecured creditors / depositors in bank resolution. This affects priority (preference) rankings.

Another issue is the Increase in financial system interconnectedness, may create procyclicality (eg effect of higher haircuts/margins)

Policy issues: include disclosure, limits, deposit insurance pricing

## 12.8 Prime Brokerage

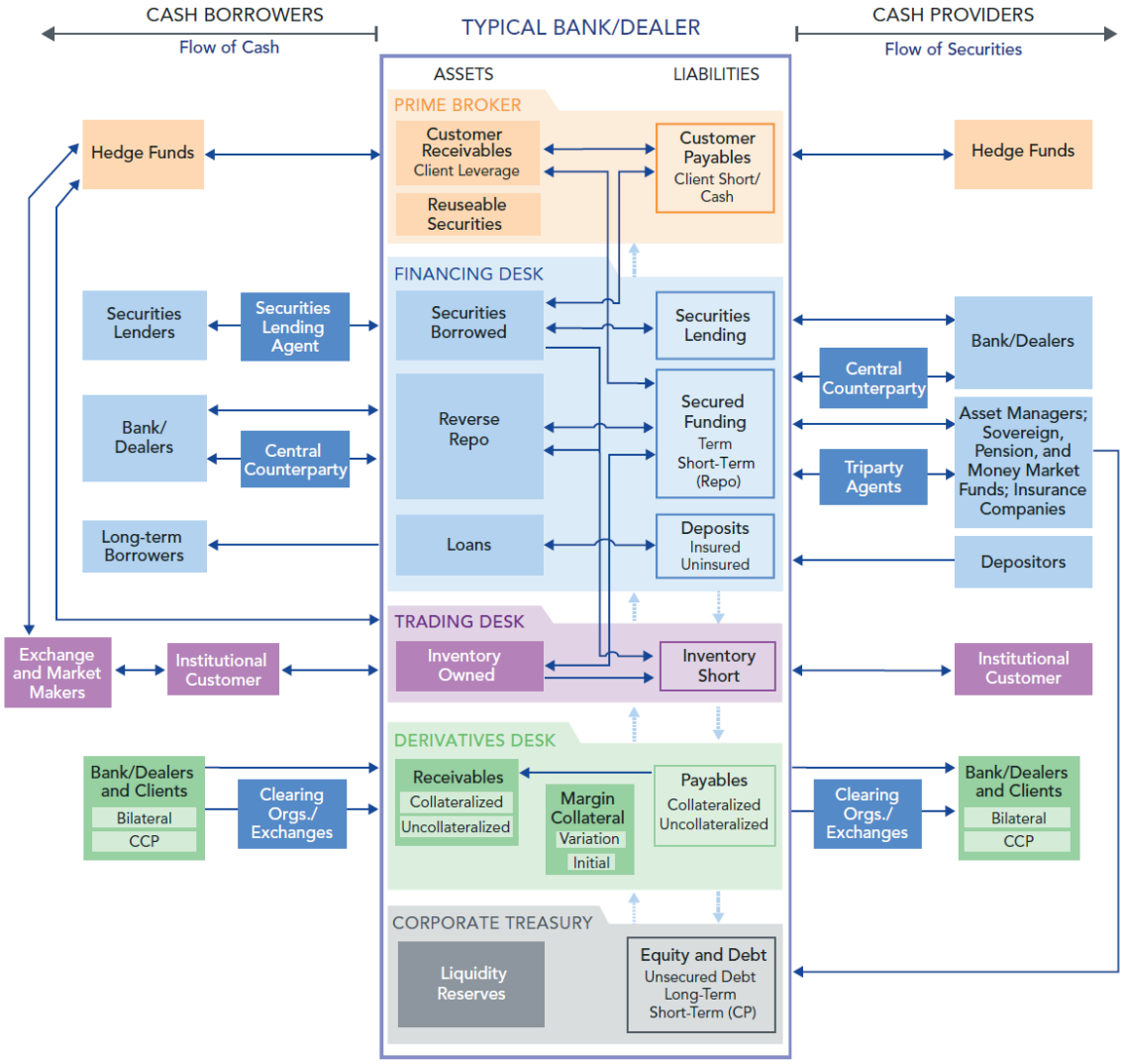
These are services provided by large financial institutions to hedge funds and others, involving financial, administrative, operational services. Prime brokers provide finance, manage collateral, global custody, clearing, margin lending, securities borrowing, financing, execution, portfolio reporting, and operational support. Financing may occur via margin financing or repos.

Hedge funds are reliant on such services, and the failure of Lehmans in the GFC led to the failure of many of its prime brokerage clients whose accounts were frozen and who were unable to switch to other service providers. (Aragon and Strahan, 2009). Rehypothecation (using collateral provided by others to provide collateral for own borrowings) by Lehmans of securities provided by the hedge fund as collateral was one way in which hedge fund clients were exposed to default risk of their prime broker.

Several other authors have suggested that hedge funds gain information advantages from their links to the large banks providing prime brokerage services. Kumar et al argue that "hedge funds make informed trades in the stocks of firms that obtain loans from their prime-broker banks." Chung et al observe co-movement of performance of hedge funds using the same prime broker which they argue can be attributed "to the prime broker providing valuable information to its hedge fund clients"

Prime Brokerage functions are one of the activities which may increase interlinkages and risk in the financial system from large bank activities as shown in Figure 17 from a paper from the US Office of Financial Research (OFR).

Figure 1. Financial Network Map Showing Relationships among Market Participants




Note: Key market participants and bank/dealer desks involved in funding are displayed in dark colors; others are shaded lightly.
Source: Authors' analysis

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**FIGURE 17: PRIME BROKERAGE FUNCTIONS**

Other perspectives on prime brokerage are provided in Figure 18 and Figure 19.

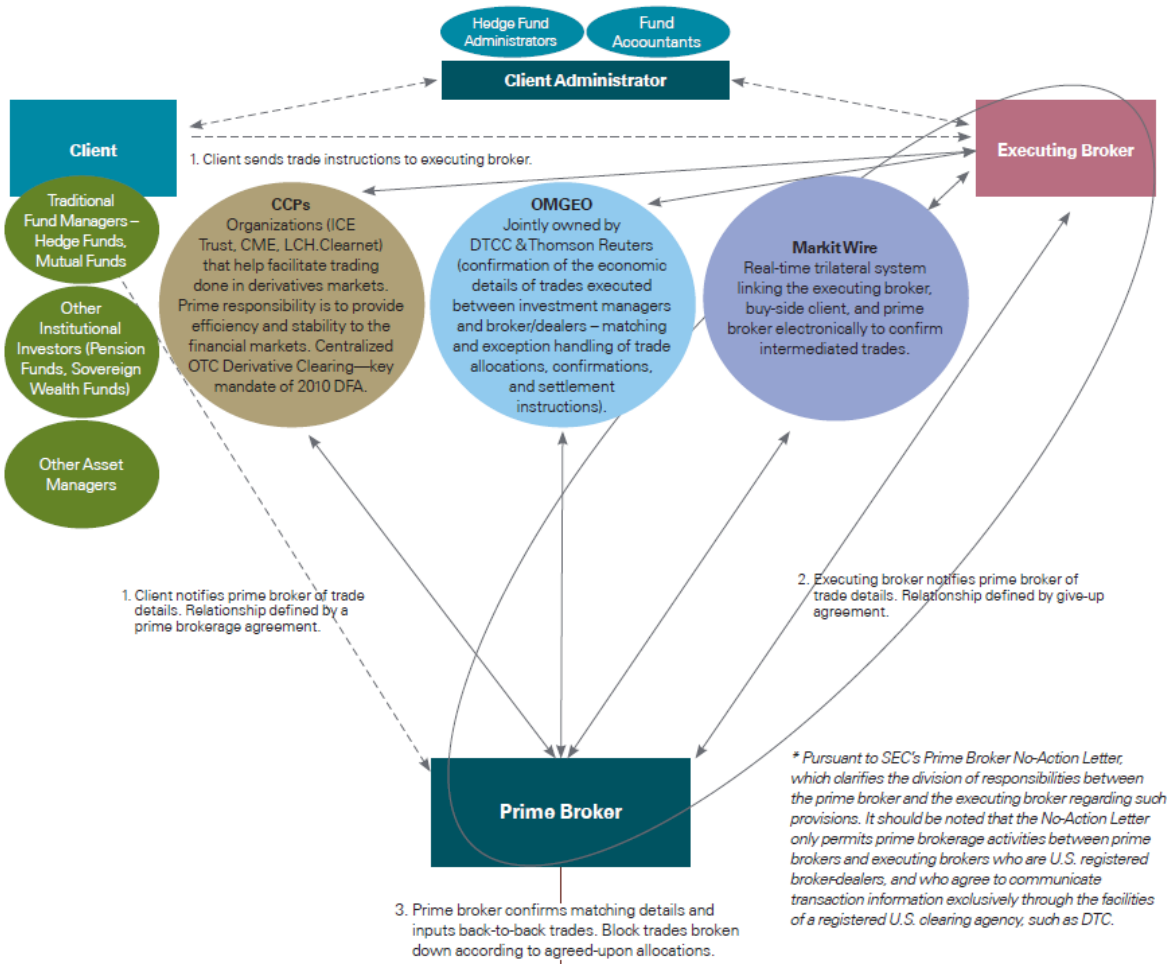



**FIGURE 18: PRIME BROKERAGE (SOURCE KPMG, 2011)**

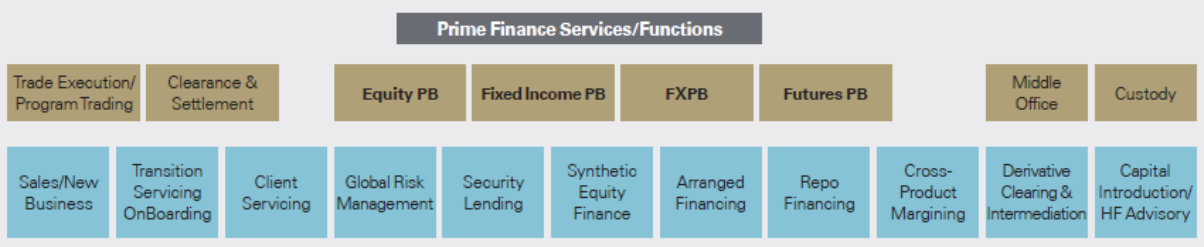



**FIGURE 19: PRIME BROKERAGE (SOURCE KPMG)**

# 13. Payments Systems

## Contents

## 13.1 Introduction

The term "Payments Systems" embraces a wide range of activities such as:

- Domestic retail payments systems such as purchases of goods and services
- International payments systems involving correspondent banking, remittance agencies
- Domestic clearing and settlement systems for transactions between banks
- Trading, clearing and settlement systems for financial markets
- Specialised payments systems such as "SuperStream" required for payment by employers of employee superannuation contributions

In this chapter the focus will be upon domestic payments systems in Australia.[1]

There is an important distinction between payments "methods" and payments "media". The former refers to the way in which an exchange of value is initiated, while the latter refers to the source of value which is to be exchanged. In one case they are the same, that being "cash" (notes and coins) transactions. But in other cases they are distinct. Use of a mobile phone app, a plastic card, an internet banking app, or a cheque are methods by which an instruction is given to initiate a transfer of value between parties.[2] The mechanisms by which instructions are transmitted between parties involved and the transfer of value are generally referred to as a payments system. Traditionally the source and target of the value transfer have been the bank accounts of the payer and payees respectively.

Figure 1 provides an idea of the complexity of the payments system, which is undergoing continual change due to the emergence of new technological innovations. These affect:

- The nature and structure of the networks involved
- The devices used to initiate transactions and communicate with the networks
- The types of financial accounts from which payments can be made

[1] A good reference for cross-border payment issues, and explanation of correspondent banking is a recent Swift Institute paper. The ACCC produced a report on retail foreign exchange providers in July 2019, the issues paper and submissions are here.

[2] Also important are standing instructions for direct debits or credits to be made to and from bank accounts (including bill payments, income receipts etc).

- The actual medium of exchange which is transferred between parties.

Some of these changes may have profound effects, and require one to think innovatively and not be constrained by what we are familiar with – which reflects the constraints imposed on payments arrangements from historically available technology. Indeed, as currency becomes less relevant as a store of value and a means of exchange, the monetary system becomes more like the "accounting system of exchange" dicussed by Fama (JME, 1980).

Among the potential changes are the possibility that the dominant means of exchange could be claims on one or more assets with a variable value in terms of the unit of account. This, in its most extreme form, is the BitCoin example – but it could be any variable value (in terms of the unit of account) asset such as a claim on a mutual fund. For example, a seller may be happy to accept 20 units in a mushroom farm agribusiness fund in exchange for selling some good giving a current specified value in the unit of account, while the buyer may proffer the same value in BHP shares. Historically, the lags and costs associated with conversion of one into the other precluded such transactions, but a "supercomputer" world where instantaneous sales and purchases of such assets in the relevant markets and transfers of value between the parties could make this feasible. More generally, and closer to the current situation, there is little reason why payment instructions could not be made on a money market mutual fund where the value of the purchaser's unit holding fluctuates continuously. If the fund is connected electronically to the payments system, it could debit the purchaser's account by the required number of units equivalent to the value of the transaction and sell sufficient underlying assets into the market to obtain credit to be transferred to the seller's bank (or other preferred form of account). The rules of access to the payments system and settlement arrangements are clearly relevant here.

Those examples are clearly different to the currently perceived interpretation of payments systems as involving transfers based on fixed value assets, such as bank deposits. But there is much potential scope for payments systems not involving bank deposits. This is best illustrated by the emergence in countries such as Kenya of M-Pesa, where mobile phone credits with value fixed in the unit of account are transferred between parties via mobile phone messages and can be converted into currency or accepted by merchants as payment. Stored value cards (such as for public transport) are often only usable for a limited specific type of transaction – but in principle could be part of the

more general payments system. Such purchased payment facilities (PPFs) could, if of sufficient scale, require enhanced regulation for consumer protection reasons.

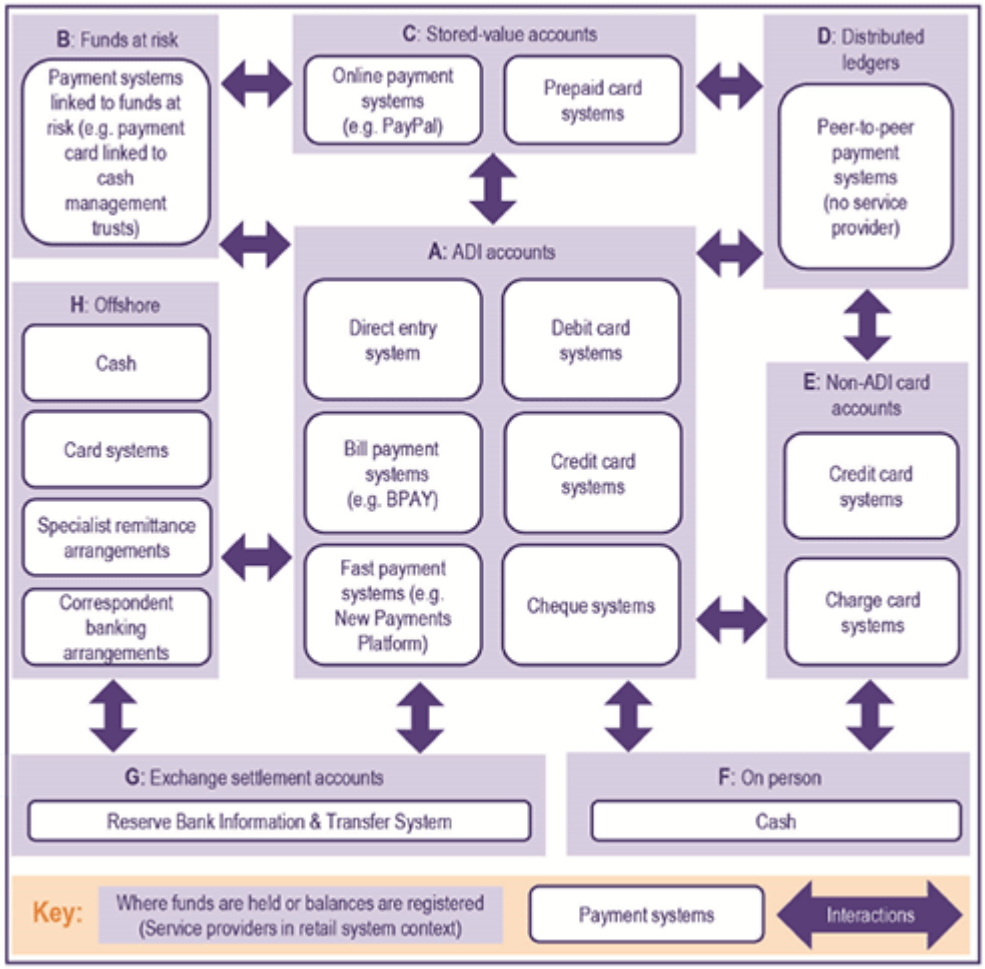


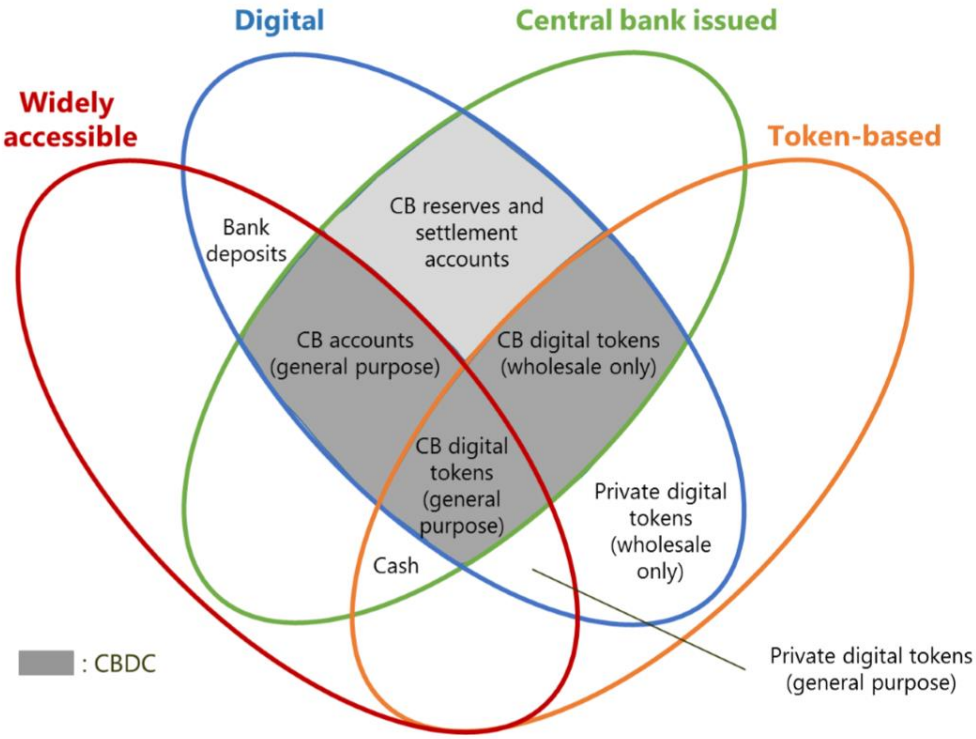

FIGURE 1: PAYMENTS SYSTEM OVERVIEW (FIGURE 10 FSI FINAL REPORT)

Another way of considering the variety of "means of exchange" is via the "money flower" shown in Figure 2. Among the distinctions outlined there, one worthy of note is the old distinction between "inside money" and "outside money" where the latter refers to "fiat money" issued by governments and their Central Banks. Outside money, can be regarded as part of the wealth of the private sector. Inside money has traditionally been thought of as money-like claims, such as bank deposits, with a

value fixed in terms of the fiat currency unit of account, and which are liabilities of the private sector issuer and thus not part of private sector wealth. Their ability to serve as a means of exchange and store of value hinge upon public confidence that the promise of redemption into fiat currency at a fixed exchange rate of one-for-one made by the issuer can be met. Note that bank deposits, being simply "accounting entries" are a form of digital money – although transfer was traditionally via mechanisms involving some physical order (such as a cheque) in contrast to modern techniques of electronic instructions. (In some countries, eg the UK, some private banks are able to issue "cash" in the form of notes which, other than the name of the issuer, are basically indistinguishable from those issued by the Central Bank[3]).

The money-flower introduces a further form of "money" in the form of privately issued digital tokens. Bitcoin and Ethereum are examples. Whether they can become widely used as means of exchange and stores of value, given their varying value in terms of the fiat currency unit of account, remains to be seen.

[3] Scottish and Northern Ireland banks have this privilege and are required to hold matching amounts of Bank of England banknotes or deposits at the Bank of England.




Notes: The Venn-diagram illustrates the four key properties of money: *issuer* (central bank or not); *form* (digital or physical); *accessibility* (widely or restricted) and *technology* (account-based or token-based). *CB* = central bank, *CBDC* = central bank digital currency (excluding digital central bank money already available to monetary counterparties and some non-monetary counterparties). *Private digital tokens (general purpose)* include crypto-assets and currencies, such as bitcoin and ethereum. *Bank deposits* are not widely accessible in all jurisdictions. For examples of how other forms of money may fit in the diagram, please refer to the source.

Source: Based on Bech and Garratt (2017).

**FIGURE 2: THE MONEY FLOWER (SOURCE: BIS)**

## 13.2 The Evolution of Payments Methods in Australia

The importance of different payments methods has changed markedly in recent years and is continuing to evolve rapidly. The RBA reports that in 2019, consumers used cash for 27 per cent of transactions by number, down from 69 per cent in 2007. In terms of value of payments, cash fell to 10 (from 40) percent. In contrast debit (credit/charge) card initiated transactions increased to 63 (19) per cent (from 26(15) per cent) of the number of transactions. There has been increased use of electronic transactions for small value transactions and growth in contactless payments (either via "tapping" or on-line transactions). The impact of the 2020 Covid crisis on payments practices (see Bullock, 2020)has accelerated this trend. Cheques are now used rarely (primarily for larger scale

transactions) while Internet banking and BPAY each account for about 2-3 per cent of consumer payments by by number, as does PayPal.[4] Automated payments (via direct debit – BPAY etc) have grown to now average around 20 per cent of consumer payments by value.

The provision of payments services involves costs for banks which they seek to recoup from customers and/or other participants in the payments system. It also creates risks for banks resulting from fraud in situations where they are required or feel obliged to bear the resulting losses rather than have those borne by the customer.[5] Banks also have significant risks of potential penalties being imposed on them from not meeting Anti-Money-Laundering / Counter-Terrorism-Financing (AML/CTF) obligations placed on them by the authorities. The cases of CBA and Westpac breaches of those obligations leading to respective settlement penalties with AUSTRAC of $700 million in mid 2018 and $1.3 billion in 2020 are cases in point.

How banks price various types of payments transactions (including account keeping fees and interest rates on those accounts) influences their use by customers and potentially the size of deposit account balances they maintain to access payments services. The RBA has examined how the resource cost of different payments services has varied over the last decade and Figure 3 provides their estimates of the relative costs involved as at 2014.

A striking finding is that pricing by banks means that "[a]cross instruments, the private cost to consumers is relatively similar despite large differences in resource costs". With the resource costs to merchants, banks and the public sector of consumer to business payments being estimated at around 0.54 per cent of GDP, there is potential for substantial efficiency benefits from more cost-aligned charging to consumers. Much of the regulatory interventions in the payments system by the RBA/PSB over the past decade or so reflect concerns that the structure of payments systems arrangements has not led to socially optimal pricing by market participants.

[4] The RBA has recently expanded its retail payments data collection, statistics from which can be found here, and which is discussed here.
[5] Fraud statistics are available from APCA. In 2016 there were 2.77 million fraudulent transactions on Australian issued scheme credit/debit cards for $510 million

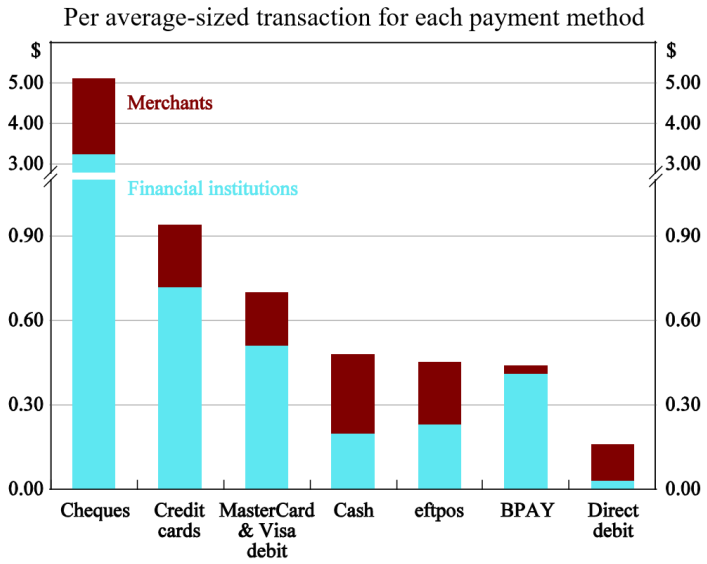



FIGURE 3: RESOURCE COSTS OF DIFFERENT PAYMENTS METHODS (SOURCE: RBA)

The RBA survey also provides information on the account keeping costs for banks associated with different payments methods per average sized transaction. For cash, the figure is very low ($0.03), for credit cards it is relatively high ($0.41), while for the other methods shown it is around $0.25. For transactions accounts and credit card accounts the annual average account keeping costs (IT, customer service, etc) to the bank are in the order of $70 per annum. More generally, overall credit card costs to banks are quite high because of the provision of an interest free credit period and cardholder rewards, in addition to the resource costs.

Relative costs of alternative card systems for merchants are shown in an March 2020 RBA Bulletin article by Occhiutto. EFTPOS debit is the cheapest at an average of around 0.3 per cent of transaction value while Visa/Mastercard debit and credit card transactions are 0.5 and 0.9 respectively. Amex and Diners are higher at 1.4 and 1.8 per cent. These costs reflect merchant fees charged by their banks which reflect interchange fees, scheme membership fees, and their profit margins. Generally the cost are higher for smaller merchants. Over the past decade these costs have fallen reflecting Reserve Bank interventions and changes in interchange fees, and a declining use of credit cards relative to debit cards. Merchant service fee income has fallen as % of value of credit and debit card transactions from over 1.5% pre GFC to around 0.75% in 2019 (Crewes and Lewis, RBA, 2020).

**TABLE 1: SOME PARTIES INVOLVED IN AUSTRALIAN PAYMENTS SYSTEM**

| Entity | Role |
|---|---|
| Australian Payments Network | Industry body (formerly known as APCA) for self regulation and standards. http://www.apca.com.au/home |
| EFTPOS Australia | Member-owned mutual company managing the EFTPOS system https://www.eftposaustralia.com.au/ |
| Payments System Board | Board of RBA, responsible for payments policy including managing access regime for payments system |
| Visa, MasterCard | Providers of four-party card payments systems |
| American Express, Diners Club | Providers of three-party card payments system |
| Apple Pay | Provider of technology for initiating and verifying a transaction (using IPhone) drawing on a debit or credit card |

Even though electronic technology is making some older types of payment systems less relevant, it is worth commencing with such systems to identify some of the general issues involved in payments systems, and implications for bank management – such as pricing of payments services provisions and deposit accounts.

## 13.3 Cash Payments System

The use of cash (notes and coins) produced by the government for making payments has long been a feature of economic systems. Such *fiat money* has the characteristics of being a store of value, unit of account and a means of exchange, even though it may have minimal intrinsic worth and a face value well in excess of its cost of production. Production of fiat money generates a profit for the government since it is put into circulation by the government by using it to purchase goods and

services. This profit is known as "seigniorage",[6] and one common historical problem has been the incentive this gives to government to create money for finance expenditures which, in extreme situations, can lead to hyperinflation. Over time, the increased use of bank deposits relative to currency as money has vastly reduced the seigniorage profits available to governments.[7] There is much current speculation about the possibility that electronic technology could lead to a cashless world, in which all transactions would occur via electronic means.[8] That, of course, would not be an attractive outcome to those who operate in the black (or grey) economy in which use of cash enables anonymity in transactions and the potential to avoid taxes.[9]

Banks have generally provided the mechanisms for individuals and businesses to meet their needs for cash, either through over-the-counter facilities at bank branches or via Automatic Teller Machines (which emerged in the 1970s). More recently, many businesses have enabled individuals to access cash through providing "cash out" facilities associated with use of EFTPOS (electronic funds transfer point of sale) machines. Figure 4 illustrates the cash payments system.

[6] Sometimes the term seigniorage is limited to profits from the production of coins by the Mint, while profits from note production by the Central Bank is referred to as banking profits.
[7] The payment of interest on bank deposits at the Central Bank also has a similar effect.
[8] See, for example the BIS Committee on Payments and Market Infrastructures 2018 Report on Central Bank Digital Currencies
[9] Various studies have attempted to measure the size and growth of the black economy by comparing the growth of currency on issue relative to national accounts measures of national income.

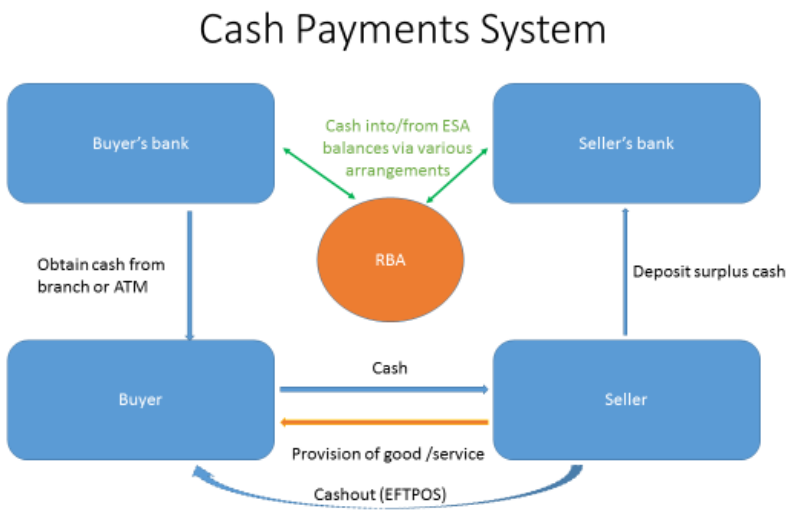



FIGURE 4: CASH PAYMENTS SYSTEM

## 13.4 Pricing of Payments Services: An Introduction

The provision of cash access and deposit services involves physical resource costs for banks, and the need to ensure adequate availability of cash at the outlets it operates (branches, ATMs). (Liquidity management is also a consideration). This raises the issue of pricing of such services, which are provided as a joint service (along with other payments services) with the provision of deposit accounts. Banks have the potential to generate net interest income from the balances in deposit accounts, but incur resources costs associated with the transactions on those accounts made by customers.

Those resource costs include interchange fees, which are payments made to other banks, arising from situations in which a customer uses another bank's ATM, or makes a payment to another party who is a customer of a different bank. The interchange arrangements are complex and discussed later. (Banks will, of course, also receive interchange fees).

The pricing dilemma banks face, in its simplest terms, is whether or not to engage in cross-subsidisation – such as providing below cost payments services financed by paying a lower interest rate on deposits. Some customers may prefer such a pricing structure (tax benefits may be

one reason), but problems of adverse selection and moral hazard are significant. Customers who make lots of transactions (creating costs for the bank) but who maintain a low account balance (providing little scope for the bank to generate NII from investing those balances) may be attracted to the bank. Existing customers may become inclined to use bank transaction services inefficiently (such as making many small withdrawals of cash), and may minimize deposit balances, placing surplus funds elsewhere offering higher interest rates. With a number of different types of payments systems involved with different cost implications, the pricing problem becomes more substantial.

Developments in payments patterns associated with electronic technology have caused banks to re-examine their pricing structures. A common approach might have been to have a pricing structure for transactions accounts which involved (a) a monthly account keeping fee (b) limited number of free transactions (c) a per-transaction charge for additional transactions (d) a rebate of the account keeping fee if the minimum monthly balance was above some specified level, and (e) a higher interest rate paid than on other transaction accounts.

On October 11, 2017 the AFR (James Eyers), reported that "Westpac takes knife to transaction fees" (p 13, 16), by placing a maximum cap on account keeping fees and offering unlimited free domestic transactions for personal accounts. NAB adopted a similar approach (with no account keeping fee) in 2010.

## 13.4 The ATM System and Pricing

The first ATM was introduced to Australia in 1981, with ATMs operated by an individual bank only available to its customers. Over time, mutual access arrangements developed such that customers could access ATMs of a different bank – but with resulting costs. Figure 5 illustrates the information flows involved in an ATM transaction (where the owner of the ATM is different from the card issuer). The required settlements between a bank ATM owner and the card issuer occur via credits and debits to their exchange settlement accounts at the RBA. (Historically, these have been "batched" and net settlements made at specified times, with a recent shift to multiple settlements per day rather than one settlement of prior day transactions each morning. The NPP will lead to real time gross settlement of ATM transactions). Where the owner of the ATM does not have an ESA account,

it will arrange settlement via credits to its account with a bank or other institution which has ESA access, with that institution operating as a gateway for access to the network.

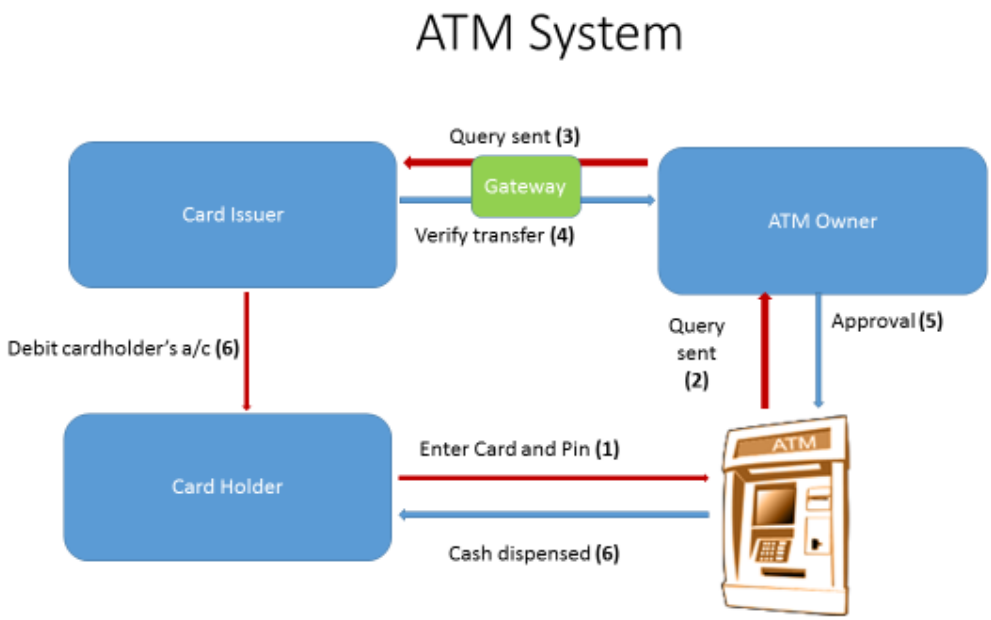



FIGURE 5: ATM INFORMATION FLOWS

While each bank has its own proprietary debit card, credit unions combined to issue a "Redicard" used for ATM and EFTPOS transactions. Co-branded cards (with Visa, MasterCard, AMEX etc) are also useable and these have tended to replace credit union Redicards.

ATMs create a particular complication for pricing. There are clearly convenience benefits for customers from having access to ATMs provided both by their own bank and other banks. But the bank providing the ATM incurs physical costs (capital outlay, maintenance, cash re-stocking, etc) and use by a "foreign" (other bank's) customer means that value needs to ultimately be obtained from the other bank via interbank transfers. And some ATMs are provided by entities other than banks, such as Cardtronics (formerly DC Transactions) with 11,00 ATMS at 2017, and Stargroup (ASX:STL) with 2,400 ATMs (following takeover of Indue), for whom all customers are "foreign".

There are, at least, two ways in which charges for foreign customer use of a bank's ATM could be levied to recoup costs. One is for the provider of the ATM to charge an interchange fee to the customer's bank for each transaction. In turn, the customer's bank could be expected to pass that fee onto its customer via a debit to their account. This was the situation which prevailed in Australia prior to 2009, and was made complex by the fact that interchange fees between the banks depended on whether the customer used a credit or debit card for the withdrawal. In 2009 the Payments System Board (PSB), under the *access regime* it operates, required banks to adopt the alternative form of pricing, whereby the foreign customer was directly charged an explicit fee (displayed at the terminal) for making the transaction. (For example a $2 fee would mean that withdrawing $100 would lead to the ATM bank provider requiring a transfer of $102 from the customer's bank and the customer's deposit account then being debited $102). Underpinning the PSBs determination was the view that this was a more transparent approach which would improve customer decision making, facilitate (via permitting differential fees) provision of ATMS in high cost locations, as well as making it easier for non-bank providers of ATMs to enter the market. Supporting the latter objective were limits placed on the fees which could be charged to new entrants to link to the ATM connection system and a general prohibition on interchange fees.

In September 2017, the major banks announced that they would cease charging for foreign customer transactions at ATMs (although not for overseas customers using foreign issued cards). While this may have been partly prompted by a desire to recoup customer goodwill at a time when banks were suffering image problems, the declining usage of cash and ability of customers to access cash via EFTPOS is also relevant. Other banks and ATM providers have not all followed suit (indeed for specialist non-bank providers, this change is a major competitive threat).

## 13.5 Cheque Payments System

The cheque payment system had been the mainstay of most payment systems worldwide until the advent of modern digital technology. A cheque is an order from the payer addressed to his/her bank to make payment of the amount specified to the payee (or bearer) indicated on the cheque. The process by which a cheque payment takes place is illustrated in Figure 6, where the numbering indicates the general ordering of events.

Because the payee is unlikely to have an account at the same bank, the system requires the ability of the payee to deposit the cheque in an account at their bank and receive credit to their account. The recipient bank then obtains a transfer of value from the issuer's bank through the payment settlement system. This historically involved physical transmission of the cheque itself, although digital imaging was permitted in some jurisdictions. Because the verification that the issuer's account has sufficient funds to make the payment (or indeed that the writer was in fact the account holder) involves lags, the recipient is generally unable to access the funds until the transaction has been cleared and settled – which may involve a number of days. That creates risk for a recipient of the cheque such as a seller of goods, and is one reason why "bank cheques" (where a customer pays the bank to write the cheque on the bank's own account) were often required for large value transactions.

Modern technology, involving lower costs associated with the settlement process and reduction in lags involved, has seen a marked decline in the use of cheques as a means of payment. Tellez (2017) notes that the share of non-cash payments in Australia made by cheque has declined from 85 per cent in 1986 to around 1 per cent in 2016. Where cheques are used they are generally for higher value transactions – but this can be expected to decline as innovations such as PEXA remove the need for use of cheques in property settlements. Tellez states that in 2016, there were less than 5 cheque transactions per capita compared to over 200 debit card and 100 credit card transactions per capita. Direct entry transactions (debits and credits to bank accounts) have also grown substantially and are about half the volume of card transactions (APCA, 2017). Some countries, particularly the USA, have been slower to move away from use of cheques.

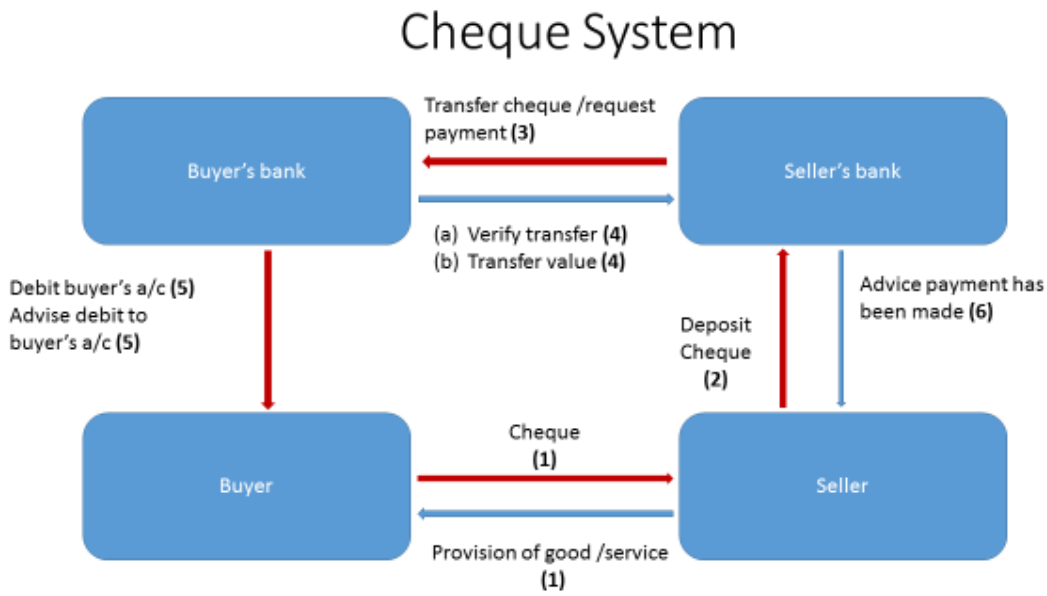



FIGURE 6: CHEQUE PAYMENTS SYSTEM

The cheque payments system is characterised by:

(a) Time lags associated with the process. Initially paper cheques needed to be transported between banks or to a clearing house where they could be "cleared" for payment. This was gradually replaced with clearance via scanning and optical character recognition, with physical transfer of the cheque occurring subsequently (if at all). It was not unusual for the payee to have to wait days before the funds involved were available to be drawn upon. This also led to the banking system benefitting from interest earned on the "float" arising from the debit to a payer's account occurring before the credit to the payee's account.

(b) Resource costs were substantial.

(c) Risks were created by the time lags involved. A seller of goods would not have information on whether the payer's account on which the cheque was written had sufficient funds.

## 13.6 Direct Entry (Debit/Credit)

A large proportion of payments, such as wages, government social security benefits, dividends, etc are made by direct entry methods. In these, the payer (an employer, for example) provides a file to its bank containing instructions to debit its account and arrange specified credits to the designated accounts of other parties (wages for its employees, for example) which may be at a number of other banks. The payer's bank transmits instructions to credit the designated accounts to the other banks involved, and settlement between the banks involved occurs according to agreed protocols. Individuals may also have put in place direct debit arrangements for transfers to relatives, while banks will generally require that borrowers agree to regular direct debits of required loan repayments to their accounts (to the credit of the bank). With the advent of phone and internet banking, the flexibility for individuals to arrange direct debits to their accounts for one-off payments to bank accounts of other parties has increased.

Businesses such as utilities who are payees, and who have arranged with customers for payment of bills by direct credit, will also provide a file to their bank instructing it to arrange debits to customers' accounts and credit its account.[10]

## 13.7 GIRO Payments Systems and BPay

One of the early alternatives to the cheque system was the Giro system, such as emerged in the UK, typically operated by the government-owned post office. In this system, a supplier of goods or services would provide the purchaser with payment instructions. The purchaser/payer then initiated a sequence of instructions leading to a credit to the payee's bank account as shown in Figure 7. Unlike the cheque system where instructions and value flows went in different directions, in the giro system the flows were uni-directional.

The clear risk for a seller of goods was that the buyer would not initiate the payment transaction, or do so with a lag – and require prompting. In this regard, the system worked best for either transactions where the seller did not supply the goods until payment was received (which would

[10] An information sheet on direct entry arrangements is available from APCA

work for consumer durables etc) or where the customer was dependent on ongoing supply from the seller (such as in the case of utilities etc).

The modern day equivalent to a Giro system in Australia is the BPay system launched in 1997, but where the instructions are routed via electronic means. BPay is owned by a consortium of banks and others. While there may be lags in the payee initiating the transaction, once commenced the credit to the payer's account is virtually instantaneous (depending upon whether batched or real time gross settlement is involved at the bank level). For merchants (sellers) banks charge a once off fee to set up participation in the BPay system (of around $100-$150 in 2020) and a per transaction fee (of around $0.80-$0.90 in 2020).

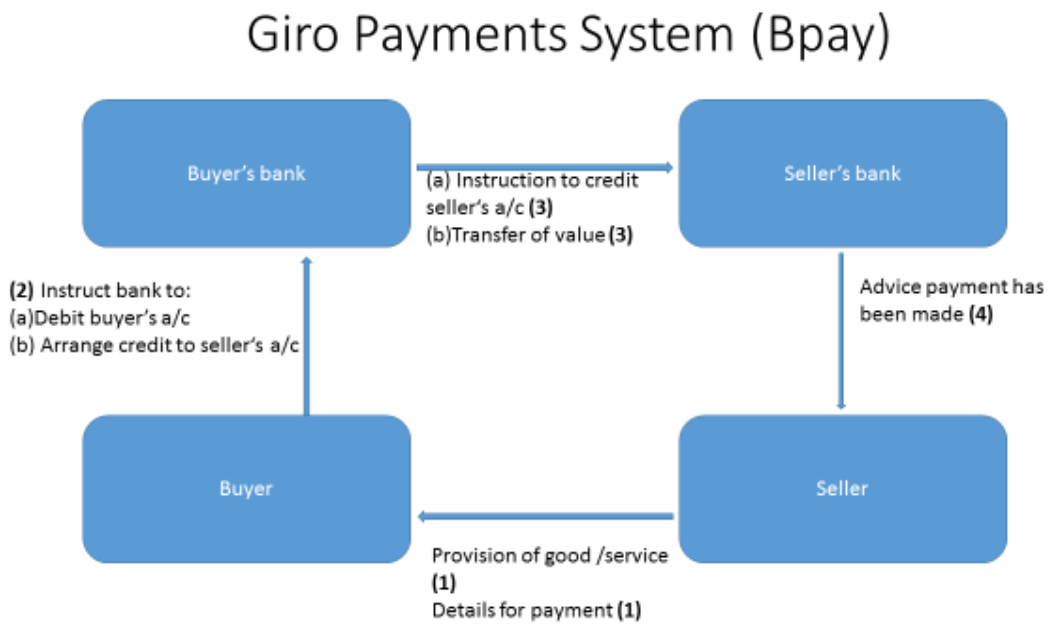



FIGURE 7: GIRO SYSTEM

An alternative to BPay is provided by Australia Post which operates the PostBillpay System. The invoice sent by the seller to the buyer of goods contains PostBillpay details (as well as BPay and other alternative payment method details) enabling payment via Australia Post, either physically at a Post Office or electronically. Australia Post receives the funds from buyers into its bank account and transmits those funds next day to the seller's bank account and provides details of payments made

to the seller. An incentive for sellers to make this payment option available to customers (and promote its use) can arise if the charges levied by Australia Post are less than the charges levied by banks for using the BPay system. In practice, many larger businesses will provide customers with the option to use either system as well as other methods (such as payment via the web site of the business using debit or credit card).

## 13.8 Card Schemes and Interchange Fees

The "plumbing" of the payments system linking customers, merchants and their banks is provided by a number of "schemes" including EFTPOS (run by the Australian banks), Visa, Mastercard, Amex, and others. These emerged prior to the growth of electronic networks and were based on paper transactions in which a card holder would sign a paper document which the merchant would submit to the system for ultimate credit of its account and debit to the customer's account. The different schemes had different "plumbing" via which this occurred, and sometimes merchants had different machines for use in dealing with the customer. That does not generally occur nowadays with use of common terminals, and the system is electronic rather than paper. Decisions made by the customer (unless pre-programmed into their card or device being used), such as whether to press "Savings", "Cheque", or "Credit", determine through which scheme the transaction is routed. Table 1 provides an overview of card systems and types found in Australia,

**TABLE 2: CARD SYSTEMS AND TYPES**

- *Debit Cards:*
    - Cards issued by individual's bank.
    - Use involves immediate debit to a/c
    - Uses EFTPOS switch system
- *Dual Branded Debit Cards*
    - Also branded with Visa/MasterCard and able to use that switch system as well as EFTPOS
- *Credit Cards (Four party scheme):*

  - Cards issued by banks providing access to Visa / Mastercharge switch systems
  - Actual debit to a/c deferred, credit provided by bank
  - Revolving credit
  - "BankCard" was a competitor issued by banks until 2006
- *Charge Cards (Three party scheme):*
  - Payment due by specified date
  - Credit provided by card issuer (Amex, Diners) who makes payment to merchant and receives payment from cardholder.
  - "Companion cards" are Amex/Diners cards issued by banks, where transactions routed via Amex/Diners system. No interchange fees per se but Amex charges operate similarly
- *Purchased Payment Systems (Stored Value Cards)*
  - Examples are the rechargeable cards issued by transport system operators for use on their systems, or "Gift Cards" issued by department stores.
  - Some cards could be used for purchases across a number of suppliers.

Each of the schemes involve "interchange fees" which, currently in Australia are paid on each transaction by the merchant's bank to the cardholder's bank. These were needed under older technology to distribute the costs of operating the system amongst bank participants, although the rationale for significant transaction based fees under electronic systems is less clear. Despite that, without regulation there appears to be a tendency for such fees to be significant – reflecting partly a response to competition via offer of rewards points to card users, for which the card issuing banks require interchange fees to fund. Consequently there has been significant RBA/PSB regulatory intervention in the market, as well as encouragement of payment system operators to make desired

changes. There is ongoing debate about whether scheme operators have an incentive to charge interchange fees which are inefficient.[11]

Figure 8 provides an overview of the interrelationships between the various fees and benefits involved in a four party payments system.

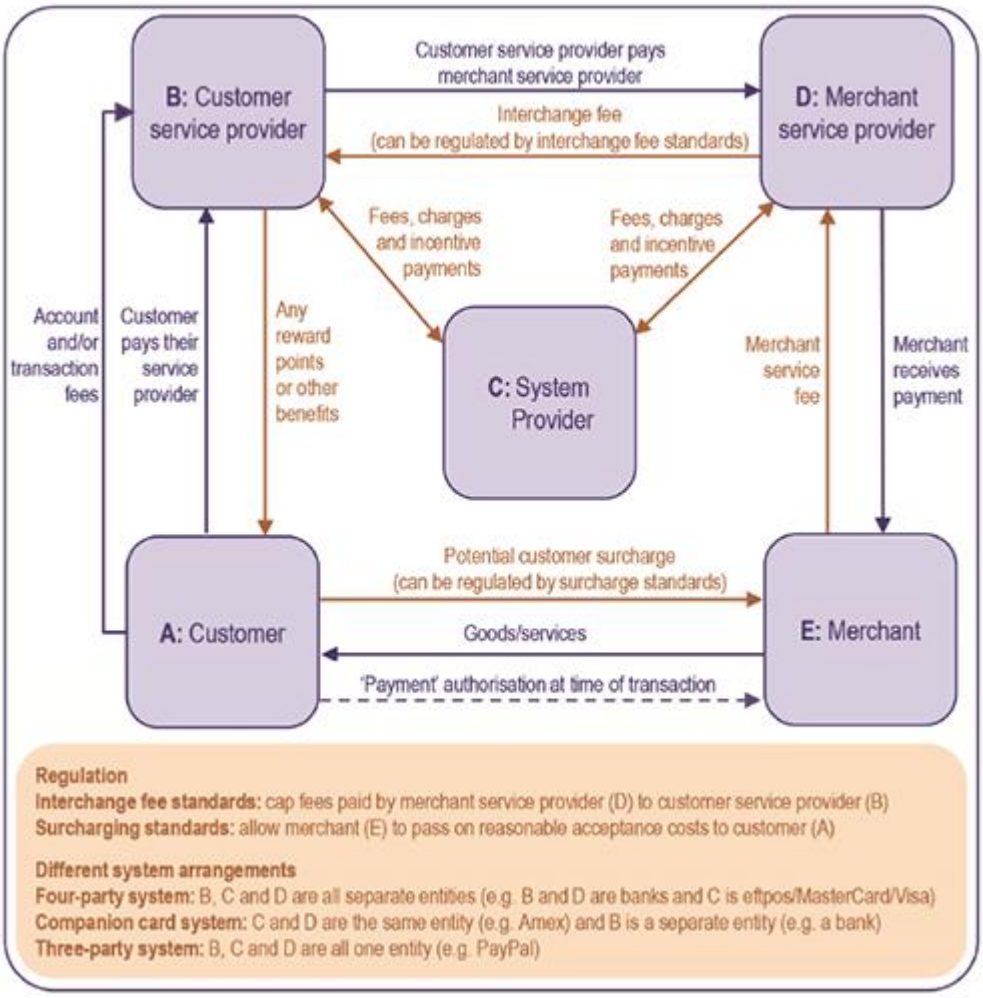



**FIGURE 8: RETAIL PAYMENTS SYSTEM FEES AND CHARGES (SOURCE: FSI FINAL REPORT, FIGURE 11, P172)**

[11] Bedre-Defolie et al (AEJMicro, 2013) and Heidhues et al (RIO, 2015).

## Electronic Payment Systems - EFTPOS

Most transactions nowadays occur via electronic systems, such as when payment is made to a merchant using an EFTPOS (electronic funds transfer point of sale) terminal via presentation of a plastic debit or credit card (or mobile phone on which a payment "app" is loaded) and initiation of the payments process via authorisation by the payee. Over time, the developments in technology have meant that the method of presentation of the card has change from "swiping" enabling the terminal to read data from a magnetic strip on the card, to insertion of the card to enable information in a chip on the card to be read, to use of contactless near-field wifi technology. (In the early years, credit and debit card transactions using such terminals where electronic connection was not available, involved the merchant obtaining a paper document which was presented and cleared much like cheques. Increasingly, requirements for presentation of a physical plastic card are becoming less common, with electronic wallets contained in smart phones storing "card" information and enabling transactions to be initiated by use of contactless near-field technology or by initiating a payments message through some other means. Other electronic payments arrangements include PayPal which commenced operations in Australia in 2005.

EFTPOS was established by the major banks in 1984.[12] It does not involve a centralised switch as does VISA/Mastercard, but uses the bilateral links between different bank participants. The interchange fee was set such that it flowed from issuer bank to the acquiring bank. Anecdotally this reflected the need to minimise explicit costs charged to merchants in order to get them to install the physical infrastructure. Large merchants may own the terminals while others lease them from their bank. A relatively recent entrant into the merchant acquirer space and provider of EFTPOS terminals is Tyro.

[12] The Australian banks introduced the BankCard credit card system in 1974. It was phased out in 2006

Initially bilateral agreements between banks determined interchange fees. In 2009, a centralised operator (ePAL) was established in 2009 and multilateral interchange fees were established such that from 2011 the interchange fees in the EFTPOS system flow from the merchant acquirer (or the retailer if a "self acquirer") to the card issuer. There is also a fee charged by the EFTPOS operator for management and development of the system (the fee is currently 1.5 cents per transaction charged to both issuer and acquirer).

Figure 9 illustrates the information flows in the EFTPOS system. Where the card issuer is not one of the core network participants, the information will be sent via a core participant acting as a "gateway" for access to the system. (If the same bank is the merchant acquirer and card issuer for a transaction (an "on-us" transaction), the information does not need to be on-sent to another bank). When customers press "savings" or "cheque" on a merchant's terminal (or via a mobile app) the transaction is routed via the EFTPOS system rather than one of the credit card systems.

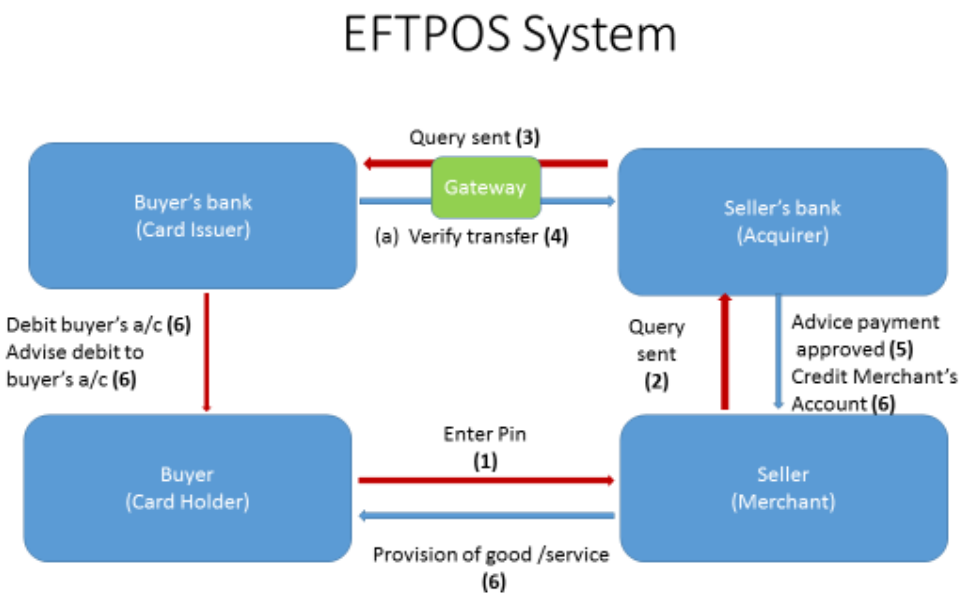



FIGURE 9: EFTPOS SYSTEM

## Electronic Payments Systems – Four Party Schemes

Figure 10 illustrates the operation of an electronic system for credit and debit cards. The critical component is the "Switch" connected to the seller's terminal and to the banks of the buyer and seller. Such switches and the associated telecommunications are operated by either Visa, Mastercard. Depending on the type of card presented by the payer, the transaction will be routed via the relevant switch system (raising issues of interoperability of the physical terminal across different systems). Because communication are electronic, the approvals and debiting and crediting of accounts is virtually instantaneous – unless there is some telecommunications problem. One risk management issue for banks is how to deal with situations in which such problems occur. For example, if the switch cannot contact the payer's bank to confirm available funds, should the transaction be allowed, or denied – much to the merchant's and purchaser's displeasure. Most banks will set limits for allowing unauthorised transactions in such circumstances.

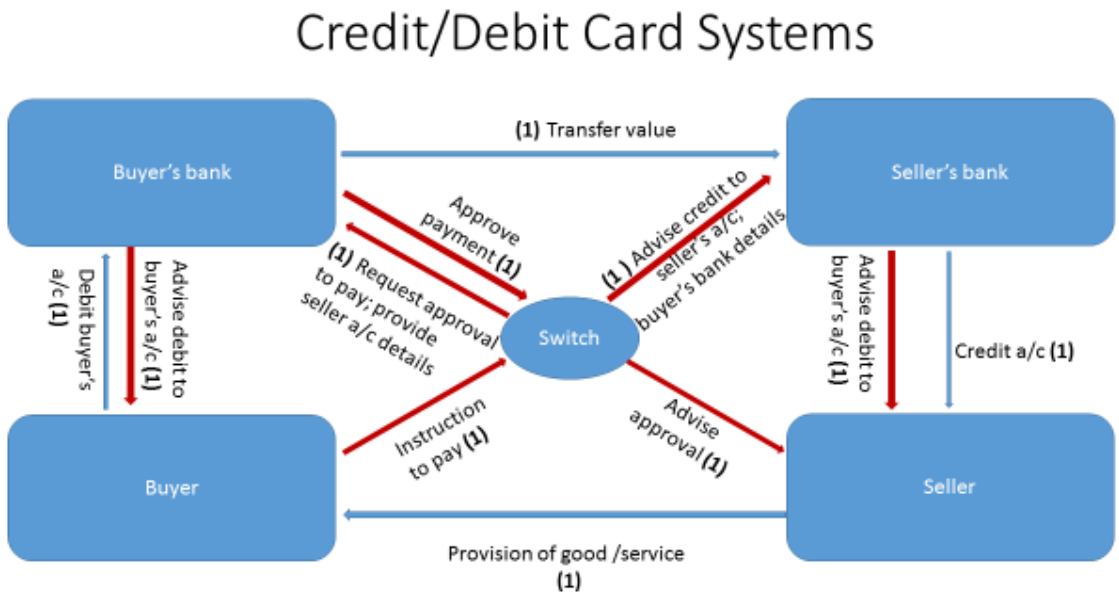



FIGURE 10: ELECTRONIC PAYMENTS SYSTEMS

Systems such as that illustrated in Figure 10 are referred to as four party systems which involve two banks and the payer and payee. In these, the banks issue credit cards, labelled with the Visa or Mastercard brand (and provide the credit) with transactions routed via the card system's switch, and

"acquire" merchants. In Australia, CBA and Westpac have had a larger role as card issuers than NAB and ANZ with the latter having a larger role in merchant acquiring. Visa was originally a mutual organisation owned by a large number of member banks, but demutualised in 2008. There are significant entry fees (eg $100,000) for ADIs to become members of the scheme which has inhibited some very small ADIs from joining.

An important feature of such systems is the protection against fraud for both the merchant and the customer. Traditionally, when paper based communications prevailed, the system operator (Visa, Mastercard) would guarantee the card holder should someone have presented a fraudulent/stolen card. That would lead to a "chargeback" where the cardholder's bank reverses the debit to his/her account and the merchant's bank reverses the credit to the merchant's account. That has now become important in the context of electronic transactions, where internet transactions can occur with "card not present" transactions. If the customer was unable to ultimately meet the required payment, that default risk was borne by the bank. The ePayments Code in Australia provide details about rights of customers in the case of electronic transactions.

## Three Party Schemes

An alternative is the three party system such as operated by American Express and Diners Club. In these systems, the operator is the card issuer and provider of temporary credit, as well as the merchant acquirer. As initially created these were not a revolving form of credit but are a "charge card" required payment of the entire balance (eg via transfer from a bank account) on the due payment date. Unlike a credit card, there is generally no pre-authorised maximum outstanding balance on the card.

Figure 11 illustrates the information and cash flows. The system operator will impose a fee for provision of the card and will charge the merchant a fee per transaction. While these are not "interchange fees", they can operate in a similar fashion to influence use of the system relative to other payment systems, and have thus been subject to RBA/PSB interest and oversight.

Over recent years, there had been debit/companion cards issued by banks which carry the AMEX brand, and generally involved the holder receiving a higher level of "reward points" than RBA/PSB regulations permitted on other debit cards. Changes made by the RBA/PSB in December 2015, which cap the interchange fees on such companion cards have reduced the interest of banks in such joint branding – with ANZ announcing the scrapping its offering in March 2017. Innovation is tending to blur the differences between systems – such as with Amex now offering credit cards in addition to their traditional charge card.

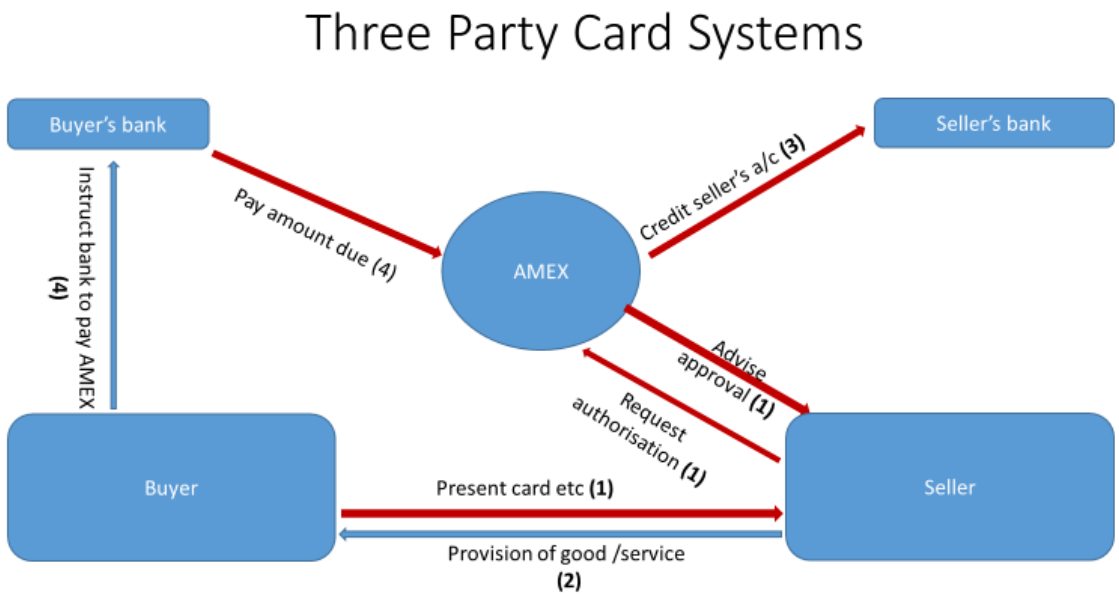



FIGURE 11: THREE PARTY PAYMENT SYSTEM

## 13.9 New Payments Platform (NPP)

The NPP (see Figure 12) is a private sector project but was driven by the RBA after a previous initiative by the banks (MAMBO – Me and My Bank Online) was scrapped. It commenced in early 2018 and provides much greater flexibility for payments and for improved linkages between payments and business accounting and management systems. One deficiency of the pre-existing system which it rectifies was that the technology limited the size of information that could be

attached to a payments instruction to a maximum of 14 characters. By using the international standard for financial communications IS02022, interoperability with other systems is enhanced.

Another benefit of the NPP is that participants are able to use alternative identifiers (mobile phone numbers for example) rather than having to provide details of account numbers and bank BSB's when making payments. This means, for example, that "electronic wallets" in a mobile phone can be linked directly to a bank account for payment rather than requiring details of a debit or credit card to provide ultimate access to funds in that account.

Finally, the system involves near to real time settlements.

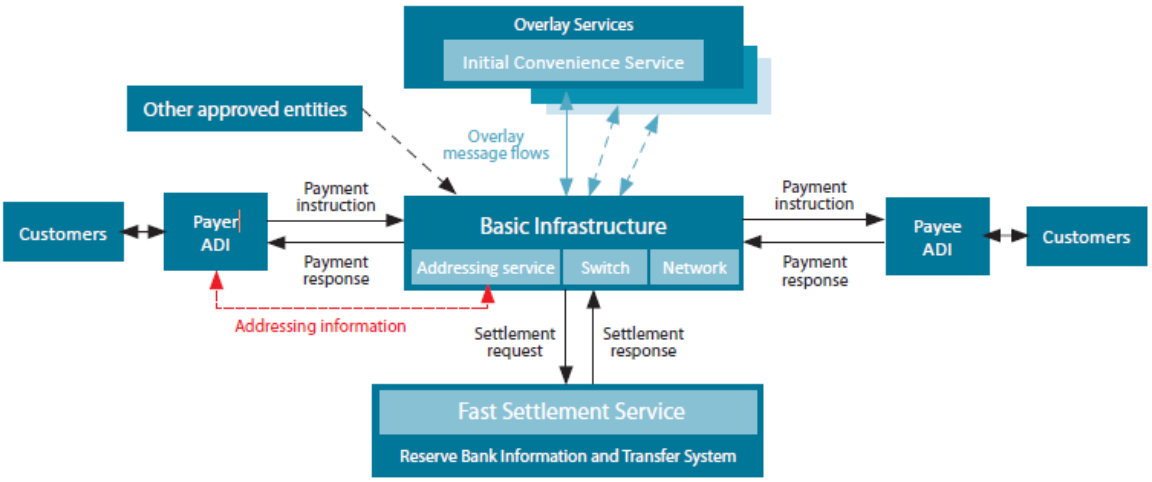



FIGURE 12: THE NEW PAYMENTS PLATFORM (SOURCE, RBA)

## 13.10 Other Innovations and Electronic Wallets

### OSKO

The BPay system has leveraged off the NPP to introduce a facility for individuals to make real-time electronic payments to other individuals. If both parties bank with financial institutions offering the OSKO facility and have a mobile phone identifier set up then, for example, a buyer of goods can initiate a funds transfer to the seller using the mobile phone number. This provides an alternative for online retailers to the use of PayPal, avoiding the commission charged by PayPal..

## PayPal

One of the most well-known additions to the payments system has been PayPal, which emerged as the dominant payments method for transactions conducted via EBay. PayPal's offerings have developed markedly over time, but its initial innovation was to provide a secure method of on-line payments, in which neither party obtains bank or card details of the other. Purchasers provide authority to PayPal to debit their bank account or credit card (or a pre-funded PayPal account) and provide the credit to the designated seller who has an account with PayPal, and can have those funds transferred to its bank account. PayPal has its own proprietary network to enable the book entries involved, and is a participant in the clearing/settlement system to enable the ultimate transfers to and from the banks involved. Sellers of goods and services are charged a fee (currently 2.6% plus $0.30 AUD for online sales) while purchasers incur no fees. (There are some fees for international payments, where the exchange rate applied by PayPal is also relevant).

## Escrow

Escrow is an online payments system much like PayPal except that it involves the funds provided by the purchaser being held in a bank trust account until both the purchaser and seller provide notification that the goods involved have been delivered satisfactorily. It is thus used for higher value transactions where buyer and seller do not meet face to face, and also is engaged in the verification of documentation regarding transfer of ownership. It is thus something of a substitute to bank letter of credit facilities.

## Alipay

Alipay is part of the Chinese Alibaba consortium and part of Ant Financial. It originated to facilitate payments for goods from online purchases using Taebao, much like Paypal and EBay. It has expanded into a range of other activities, drawing on the large information set created by the transactions flow. These include providing a range of business promotion services to merchants such as notifications to customers via a mobile phone app of special deals and offers and information about nearby merchants (drawing on information about travel plans and location).

## Electronic Wallets

The pervasiveness of mobile phones and advances in their technology has meant that a range of new ways of effecting payments is becoming available. These include "Apple Pay" and other proprietary models, which operate via use of the existing payments systems but provide alternative ways to connect with it. In general, the consumer's account or card details are stored in encrypted form in the phone and via an electronic interaction with the merchant's technology, a "token" is passed into the system leading to debits and credits to the participant's accounts. One issue is the extent to which the technology allows the user to choose which system is used for the information flows.

## M-Pesa

M-Pesa is an innovative form of payments system introduced in Kenya (by Vodafone's SafariCom) in 2007 which involves the transfer of pre-paid mobile phone credit via phone message. The recipient can then exchange the credit for cash from a local "broker" or use it in purchases (via a further transfer) from others who accept it as a form of payment. *Safaricom* is the dominant telecom in Kenya which introduced the system.

## Crypto-Currencies

The emergence of BitCoin and other crypto-currencies (such as Etherium) has attracted much attention and speculation about their future role as means of payments. While there are some "stable coins" that are structured to maintain a fixed link to an underlying fiat currency which is the conventional unit of account (such as the dollar), most crypto-currencies have (highly) variable values. In this regard, they are best thought of as speculative "assets" with a value dependent on variations in underlying demand and supply. While they are used for some payments, and particularly for illegal activities, they are not a generally accepted means of exchange, even though the apparent goal of BitCoin's developer(s) was the creation of a private money which could replace fiat currency.

Crypto-currencies have made innovative use of modern technology. Etherium enables the writing of contracts with conditional clauses which are automatically executed should specified events happen. BitCoin introduced the concept of the BlockChain as a mechanism for recording transactions and current and previous ownership of an asset in a decentralised ledger. Ultimately, its process for

decentralised verifying of transactions by "proof of work" may be its downfall due to the increasingly immense use of computing power and resulting electricity usage required. Nevertheless, the blockchain concept, with decentralised recording and verification, has been seen as a potentially valuable alternative to a centralised ledger system – if the resource costs involved do not make it inefficient. The ASX for example has been developing a blockchain model for clearing and settlement of equity trading, where members of the ASX on both sides of a transaction would enter and verify transactions.

While not contemplating use of blockchain technology, Central Banks around the world have been investigating the concept of central bank digital currencies (CBDCs)– whereby electronic transactions on accounts held by all at the central bank would replace use of physical currencies. Modern technology would appear to make this feasible, but there are many complications to resolve – including the fact that such a development would put the central bank in competition with commercial banks for deposits. This BIS report discusses some of the issues including "data governance, consumer protection and anti-competitive practices arising from data silos" which arise from the enormous creation and collection of personal data in the electronic age.

## 13.11 Regulatory Interventions

The "plumbing" of payments systems is relatively complex, since it requires participation of multiple participants to achieve transmission of payments instructions and ultimate exchanges of value. There are significant "network" effects since there are substantial economies of scale in provision of the technology to transmit payments instructions. Consequently, there is regulatory oversight of the system by the Payments System Board (part of the RBA) and an "access regime" in place to ensure that operators of the established systems do not inappropriately exploit their positions of market power by inappropriate pricing of transactions or restrictions on entry. These issues also extend to the arrangements by which participants in the system provide facilities for consumers to access cash, such as via ATMs.

The ability of the PSB/ RBA to regulate payments systems is governed by the Payments System (Regulation) Act (1998). It currently regulates: ATMs; EFPOS; Visa Credit; MasterCard Credit; Visa Debit) in regard to: interchange fees; access to systems; restrictions on merchants; transparency.

Most recent regulatory changes made in May 2016 include:

- Limiting the surcharge to customers that merchants can apply for accepting a credit card in a transaction to cost recovery of the fees they are charged by the scheme. The objective is to ensure that customers using expensive cards (such as those which provide them with rewards benefits for transactions, and which involve higher interchange fees and thus incur greater fees for the merchant) are charged appropriately, rather than this being cross-subsidised by users of cheaper cards. Improved price signals, it is hoped will, lead to more efficient choices of payments methods. It is likely to reduce the appeal and use of cards which have significant rewards points attached (which banks purchase from suppliers such as airlines and must recoup via interchange fees or charges to card holders). While these regulations do not encompass American Express, Union Pay, JCB or Diners Club, those systems may apply similar rules on merchant surcharging of their cards.

In November 2019 The PSB announced a Review of Retail Payments Regulation which has been delayed due to the Covid Crisis and is now expected to be completed in 2021. Topics canvassed for consideration in the November Issues Paper included interchange and merchant service fees, least cost routing of transactions, surcharging, electronic wallets – although the Review is planned to incorporate a wide-ranging consideration of issues. Among those are matters associated with the interaction of buy-now-pay-later schemes with the payments system, access to the payments system, and the implications of "fintech" developments.

In May 2021 the PSB released its consultation paper giving the preliminary conclusions from its review.

These included:

- Banks would be expected to issue dual network debit cards that enable a payment to be routed by the least cost nework

- The RBA's interchange standards would set a lower cap for single network debt cards versus dual network cards.
- Least cost routing of payments functionality is to be expected
- BNPL operators would be allowed to maintain a no-surcharge rule for merchants

## 13.12 Payments Systems and AML/TCF Risk

Historically there were three main types of risks which banks faced in their provision of payments services.

One was the possibility of fraud such as where a third party may have forged an account holder's signature on a cheque which the bank had honoured. Nowadays the equivalent is where a customer's debit or credit card details have been used by a third party to purchase goods via an internet transaction. The bank would generally be liable for the loss unless it could demonstrate that the customer's actions had contributed to the fraud – such as by providing card details to a third party.

A second was the possibility of an account holder making purchases without having adequate funds in their account – the "bouncing cheque".

The third is exposure to other participants in the payments system – when credits have been made to customer accounts, but settlement has not been received from other banks.

The most famous is the Herstatt Bank failure in 1974 when the FX markets were disrupted.

In recent years, however, a major risk has emerged in the form of penalties imposed by regulators for not complying with AML/CTF financing requirements. In Australia, CBA was fined $700 mill by AUSTRAC in 2019 and Westpac was fined $1.3 bill in 2020. These fines were in the order of 8 and 20 per cent respectively of the previous year's total profits.

### The AML/CTF Framework

AUSTRAC was established by the Australian government in 1989 as a government agency with a mission to identify, via financial transactions, criminal and illicit activities as part of law enforcement. The focus is specifically on money laundering, terrorism financing, organized crime, tax evasion, and

welfare fraud. It is one of a number of such agencies established in many jurisdictions following the creation of the international Financial Action Task Force agency established following the 1989 G7 meeting.

# APPENDIX: Payments System Regulatory Decisions

**TABLE 3:REGULATORY DECISIONS**

| Date | RBA Action | Comment |
|---|---|---|
| April 2001 | Designation of Credit Card Schemes | Introduction of an access regime for Visa, Mastercard and Bankcard enabled PSB/ACCC to intervene in pricing and other aspects of schemes based on competition concerns. |
| Aug 2002 | Cost based cap on average interchange fees, removal of no surcharge rule for Visa, Mastercard, Bankcard, | Amex and Diners provided undertakings to follow suit |
| July 2003 | Publication of draft access regime | Caused interchange fee on credit card transactions to be reduced from 34pprox.. 0.95% to 0.55% |
| Oct 2003 | | |
| Feb 2004 | Access scheme introduced – enabled SCCI's to issue and acquire Visa/Mastercard credit cards | |
| Feb 2005 | Standards issued for EFTPOS and Visa debit schemes | |
| Aug 2005 | Access rules applied to Visa debit scheme | |
| Nov 2005 | Common cost standard for interchange fees for Visa, Mastercard and Bankcard | Objective of reducing incentives to issue high-cost cards |
| April 2006 | Restrictions on EFTPOS interchange fees (which flow from issuer to acquirer). Cap on Visa Debit interchange fees (which flow to issuer) | |

| | | |
|---|---|---|
| | Remove Visa system ability to require merchant acceptance of Visa debit and prohibition on surcharging.<br>Limits on price EFTPOS can charge to new entrants | |
| Sept 2006 | EFTPOS access regime | |
| Nov 2006. | Caused further reduction in interchange fee on credit cards to 12 cents per transaction. Reduction in EFTPOS interchange fee on debit cards to 4-5 cents | |
| Jan 2007 | Honour all cards rule no longer permitted | |
| Dec 2008 | Designation of Australian ATM system<br>Abolition of interchange fees paid to ATM providers. Enable ATM owners to charge customers | |
| Oct 2015 | Designation of Amex Companion cards, debit Mastercard scheme, and EFTPOS, Mastercard and Visa prepaid card systems. | |
| May 2016 | Merchant pricing of card transactions | Limits merchant surcharges to cost recovery of cost charged by merchant acquirer |
| May 2016 | Interchange fees for credit card schemes | |
| May 2016 | Interchange fees for debit card schemes | |

**FIGURE 13: RBA/PSB REGULATORY INTERVENTIONS**

# 14. Banks: International Trade and Finance Services

## Contents



## 14.1 Introduction

Banks play a vital role in facilitating international trade. When physical goods are being shipped across national borders significant risks arise due to the time lags involved in transportation and from imperfect knowledge about the characteristics of the counterparty involved in the transaction. Payment prior to receipt of the goods exposes the purchaser to the risk of non (or delayed)-delivery and/or inferior quality. If payment is to be made after receipt of the goods, the seller faces the risk that the purchaser may not make payment. Seeking legal action associated with either of those situations involves costs and difficulties associated with dealing with the legal system of a foreign country. In addition, differences in

currency preferences of buyer and seller mean that banking services will be needed to facilitate the foreign exchange transaction. If the international trade is in services (rather than physical goods) the same issues arise due to the need to enter contracts for provision of services and verify that the agreed services have been suitably delivered.

Banks provide *trade finance* facilities to enable importers and exporters to undertake international transactions at much reduced risk. These may be part of a larger relationship between a bank and its customer such as provision of finance for the production of goods which will be ultimately repaid by the sale overseas. History tells us that banks followed their customers overseas to facilitate trade and to maintain relationships and business with firms that established overseas operations. Also, firms dealing in international markets face foreign exchange risk. The AUD value of a USD payment due or expected can vary significantly if the AUD/USD exchange rate changes. Banks will offer FX hedging services (forward FX, swaps and options), and advice relating to their use, to their customers which can be used to mitigate such risks. These risks will also exist for the many Australian companies which have established operations overseas and where the AUD value of that investment may depend on changes in the exchange rate.

Global capital markets also create a role for banks to facilitate overseas borrowings or investments by their clients. For large entities, imperfections in financial markets may make it cheaper in AUD terms to issue debt, or borrow, offshore in a foreign currency and swap the proceeds and future repayment obligations into AUD terms. Banks will both facilitate the process of raising funds in the foreign market and provide the hedging (swap) facilities. Likewise, investors (such as Australian superannuation funds) will want to purchase foreign financial assets (such as equities) but may not want to have the AUD value of those assets fully exposed to changes in the value of the AUD against foreign currencies. As well as facilitating the transaction, banks can provide the required hedging facility for the investor, generally, but by no means always, undertaking an offsetting position with other market participants to reduce the risk taken on by the bank and lock in a profit from the spread on the two transactions.

The growth of international financial markets and global financial centres has also encouraged large banks to establish a presence in foreign markets in order to participate in such markets.

## 14.2 Trade Finance Facilities

All of the major banks provide detailed information on trade finance facilities on their websites[1], and hence only a brief overview is provided here.

### Delivery versus Payment

As mentioned earlier, the lags involved in international shipment create risks arising from differences between delivery date and payment date. Banks can help ameliorate these risks by providing facilities that ensure payment is made when delivery is verified or vice versa. And part of their ability to do so arises from the fact that banks in each country will have better knowledge of the counterparty in their country involved in the transaction. While an exporter in Australia and importer in the UK may have little information about honesty, reliability, and credit-worthiness of each other, they each will have a relationship with a bank in their country, and the two banks in the two countries will have a relationship with each other. Thus the informational deficiency separating the exporter and importer can be overcome by the chain of better informational links between the Australian exporter and her Australian bank, that between the Australian and UK banks, and that between the UK bank and the UK importer.

There are, at least, five general methods for dealing with the non-synchronous nature of delivery and payment.

1. Payment made by the importer prior to delivery – this is high risk for the importer, but low risk to the exporter.
2. A *Documentary Letter of Credit* – where the importer's bank promises to pay the exporter the amount due either once shipment has occurred or at some later agreed date, as long as the terms in the letter are met. These will include receipt of a *bill of lading* which reduces the risk of non-shipment to the importer. The exporter is guaranteed payment if the terms of the letter are met and there is no credit risk of non-payment by the importer's bank. For a fee the exporter could get her local bank to *confirm* (guarantee payment) by the foreign bank.
3. A *Documentary Sight Collection* – when the shipped goods arrive the goods will not be available for collection from the shipper until change of ownership documents are provided. In this method, the importer's bank pays the exporter's bank to receive and hold those documents and only releases them when the importer has made payment. The importer still has the risk that the goods are not exactly as ordered.

[1] See, for example, NAB, ANZ, CBA, Westpac.

4. *Documentary Term Collection* - here the bank provides the documents to the importer, enabling them to inspect the goods, on a promise of repayment once that is done.
5. *Payment post shipment delivery* - the importer pays once the goods have been delivered – which is high risk to the exporter.

These methods of payment involve difference allocation of risks between the two parties. By having trusted banks involved – as in methods 2 to 4, the risks can be ameliorated. Of course the banks are also involved in methods 1 and 5 due to the need for a currency conversion.

## 14.3 Services for corporate and institutional clients

### Managing Foreign Exchange (FX) exposures

Business clients of the bank who operate in overseas markets are exposed to risk due to exchange rate fluctuations. First, the domestic currency value of already known future foreign currency cash flows can be altered. Such an exposure is referred to as a *Transactions Exposure*. Closely related are *Translation Exposures* which refer to the impact of exchange rate changes on accounting statements such as the corporate balance sheet if, for example the business has assets or liabilities denominated in a foreign currency. The second major type of effect (and the most important) concerns the impact of exchange rate changes on the ability of the firm to compete in domestic and/or foreign markets. An exporting firm's ability to profitably generate future foreign currency cash flows can be affected by exchange rate changes. An import competing firm may find, for example, that a strengthening of the AUD enables overseas producers to achieve greater penetration of domestic markets. These are examples of **Operating exposure** (sometimes also referred to as **Economic exposure)** reflecting the dependence of company's value upon the exchange rate through its impact upon competitiveness of its operations.

Advising business clients on the nature of the FX exposures and providing solutions to adjust such exposures to a preferred position is an important activity of banks. Transactions exposures will generally be easy to identify, and various forms of FX hedging can be provided – such as forward FX or options contracts sold to the customer. Similarly for translation exposures – although accounting conventions can create some issues for the impact on financial statements. It may be, and this also applies to economic exposures, that an appropriate form of FX hedging might involve borrowing (or investing) in foreign currencies, and the bank will be able to provide, or arrange, such facilities.

As well as operating businesses, banks will also provide FX hedging facilities to financial institutions (and high net worth individuals) wishing to change the risk associated with investing in foreign assets (such as equities and bonds). Superannuation funds have become important clients in this regard. NAB provides information on FX hedging practices of Australian super funds from a biennial survey. Hedging magnitude and approaches used differs between funds and over time, but as a generalisation, super funds hedge between 30-40 per cent of international equity exposure and around 50 per cent of foreign fixed interest exposure. In the 2019 report NAB indicated that many super funds were focusing less on a "hedge ratio" and more on achieving some desired level of exposure to foreign currencies.

## Foreign Bond Issuance by Australian Companies

Larger Australian companies have tended to issue bonds into international markets rather than into the Australian domestic market. One popular market has been the US Private Placement market. Typically these bonds will be USD denominated and a cross-currency-interest-rate swap will be used to convert the borrowing into a synthetic AUD borrowing. To issue in such markets, the company will need the services of placement agents and Australian major banks will typically act as a co-agent supporting the US banks who act as the placement agents. Similarly when issuing debt into other international markets, companies will typically need the services of a major investment bank from that jurisdiction, with Australian banks being associated with the issuance process.

## Kangaroo Bond Market Issuance

The Australian major banks are important players in arranging access to the Australian financial markets for international issuers of AUD denominated bonds – the so-called Kangaroo Bond market. This is a substantial market involving supranational, sovereign or quasi-government agencies (SSAs) and international companies and financial institutions (see Bergmann and Nitschke (RBA 2016) for more information). Table 1 provides information on the lead arrangers of Kangaroo Bond issues since 1996. The four major banks are in the top 9 lead arrangers with around a 30 per cent share of the market. While the rankings vary year by year, these figures provide a reasonable indication of their role in recent years.

**TABLE 1: KANGAROO BOND LEAGUE TABLE (1996 - 2021): SOURCE: KANGANEWS**

| Bookrunner | Volume AUD Mill | No. of Deals | % of Total Volume |
|---|---|---|---|
| TD Securities | 74,880 | 674 | 16.8 |
| RBC Capital Markets | 63,896 | 520 | 14.3 |
| ANZ | 40,298 | 300 | 9 |
| Commonwealth Bank of Australia | 40,162 | 257 | 9 |

| | | | |
|---|---|---|---|
| Deutsche Bank | 38,596 | 371 | 8.7 |
| Nomura | 29,438 | 313 | 6.6 |
| Westpac Institutional Bank | 28,800 | 182 | 6.5 |
| UBS | 27,049 | 155 | 6.1 |
| National Australia Bank | 25,107 | 154 | 5.7 |

## 14.4 Correspondent Banking

Banks play a crucial role in facilitating international payments. Generally, the two end-parties in a transaction will have different currency preferences. A US seller of goods to an Australian, for example, will want ultimate payment as a USD credit to their bank account in the US, while the Australian purchaser will want to make payment using AUD funds in their Australian bank account. A very costly and inefficient way of doing this could be for the Australian to buy US currency from her Australian bank and post those to the US purchaser to deposit in his US bank account.

Not surprisingly, banks around the world have, long ago, established inter-bank arrangements and systems which enables low cost, efficient, and risk free transfers of funds across national borders.

A correspondent banking relationship arises when one bank provides banking services to a bank from another jurisdiction. And typically the relationship will be reciprocal. "At the most basic level, correspondent banking requires the opening of accounts by respondent banks in the correspondent banks' books and the exchange of messages to settle transactions by crediting and debiting those accounts." (CPMI, 2016)

Banks use the Latin terms *Nostro (ours)* and *Vostro (yours)* when referring to accounts held by one bank at another bank. A *Nostro* account is one held at a foreign bank usually in that foreign currency. A *Vostro* account is one held on behalf of a foreign bank. Thus, if XYZ bank from the US had an AUD account in Australia with CBA bank, XYZ would record that as a nostro account whereas CBA would record that as a vostro account. The same account is referred to by different terms depending on whether the perspective is from the account holder or the account provider.

CBA provides a list of its correspondent banks on its website, and has, for example, Bank of New York Mellon and Barclays Bank as its US and UK correspondent banks respectively. If CBA has funds in its nostro account with Barclays (for example) that balance would be included among cash and liquid assets in CBA's

accounts. If CBA offered an AUD account to Barclays, the amount in that Vostro account (from CBA's perspective) would be a liability in CBA accounts.

One feature of recent decades has been a decline in the number of correspondent banking relationships which has prompted attention from international agencies concerned about possibly damaging effects on trade and financial flows and financial inclusion in emerging nations. Behind the decline in numbers is the risks associated with correspondent banking. Unless the counterparties involved in the chain of transactions are well known and reputable, there is a major risk of falling foul of AML/CTF legislation and incurring significant fines.

## A Correspondent Banking transaction example

While CBA has a correspondent banking relationship with Barclays, the UK recipient of a payment from a CBA customer might have an account with a different UK bank (Bank of Scotland, for example). Barclays would then be involved in transactions with both CBA and Bank of Scotland to ensure the payment ultimately reaches the bank account of the intended recipient.

Figure 1 provides a highly simplified illustration of a correspondent banking transaction enabling the Australian, Jo, to make a payment of USD 100 to Pi who banks with ABC Bank in the USA. The example assumes that the exchange rate used in all transactions is USD 1 = AUD 1.50, and does not provide detail on how the messages between banks are sent. (Note that as an alternative to crediting Yank Bank's account with it, Aussie Bank could have instructed Yank Bank to debit Aussie's account with it by USD 100).

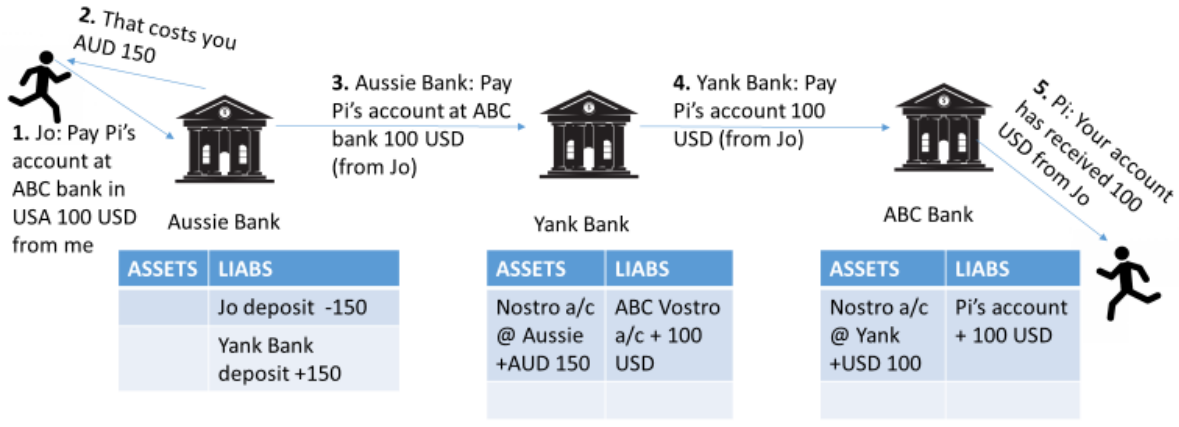



FIGURE 1: A SIMPLIFIED CORRESPONDENT BANKING TRANSACTION

## 14.5 International Payments Arrangements

Payments across international borders nowadays involve banks sending digital (electronic) messages through the SWIFT network to banks in other countries to make transactions on the sending bank's account at the receiving bank. Before the advent of "wire transfer" mechanisms, the process involved mailing of bank cheques or orders to the foreign bank to pay a third party by drawing upon funds held in an account held at the foreign bank.

### The SWIFT Network

SWIFT (the Society for Worldwide Interbank Financial Telecommunication) was established in 1973 (and operational from 1977) as an international payments messaging platform. As well as the platform enabling users to interface with and access this service and the computer systems to transfer the messages, it also developed protocols or standards to be used in messages. With the development of the internet new interfaces (other than direct leased telecommunication lines) have been developed, and technological improvements have reduced the messaging price charged to around 3 Eurocents per Kilocharacter (a thousand characters).

It currently provides such facilities for over 11,000 entities such as banks (including central banks), securities organisations, market infrastructures and large corporates. A number of the banks are also its owners under its cooperative ownership structure which relates shareholdings to usage of the service. Not all banks will be directly connected to SWIFT, with smaller entities relying on dealing via larger banks and their correspondent banking relationships.

As well as payments services, SWIFT also provides technology underpinning many securities organisations and market infrastructures where both the settlement payment and the transfer of ownership of assets needs to be effected and recorded.

### A SWIFT message

The standards developed by Swift enable payment messages to be sent between banks in different countries. A message will involve a number of required, as well as optional, fields. These specify, *inter alia*: details about the sending and receiving bank; information about accounts to be debited or credited at the receiving bank and subsequent transaction information to enable payment to or from the ultimate end user; the amount(s) involved.

Figure 2 provides an example in which the Australian payer 's bank is a member of SWIFT, but the British receiver's bank is not. The originating bank in Australia sends instructions to its correspondent bank in the

UK to debit its GBP account with UK bank and credit the account of the recipient's UK bank which, in turn is to credit the recipents

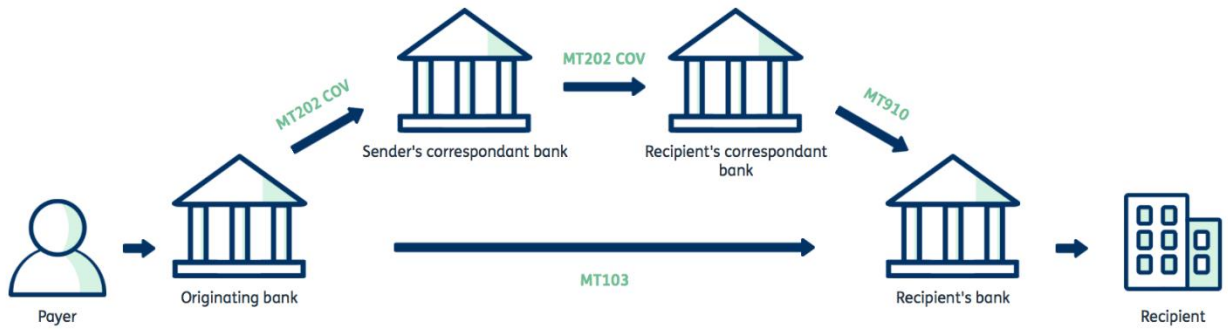



FIGURE 2: SWIFT MESSAGE: SOURCE: MONEY MOVER

## 14.6 Remittances and Retail FX transactions

Remittances are transfers of money between individuals, generally across borders and involving an exchange from one currency to another. They may reflect an underlying business transaction, but are more generally thought of as involving transfers of funds between family members in different countries – such as gifts or repatriation of earnings in a foreign country. These transfers have traditionally been done through a range of informal networks, small busineses, large money transfer operators (such as Western Union), and banks. However, in recent decades, the growth of internet business allowing international purchases via the web has increased the amount of small business-related foreign currency transactions and seen the growth of new participants such as PayPal and internet-based foreign exchange transfer service companies such as CurrencyFair and Wise. These platform based services (which can, for example, match retail customer demand and supply where possible and trade any overall imbalance at wholesale rates, leading to them providing prices close to wholesale rates) can be expected to eventually reduce the wide margins which bank retail customers face in making foreign exchange transactions. This 2019 ACCC report on retail foreign currency conversion services provides valuable information).

The remittance industry has a long history, often traced back to around 700AD in China (Buencamino and Gorbunov, 2002). Physical transfer of currency by trusted agents was one mechanism used, as was use

of banks based on their correspondent banking networks in foreign countries. The term "remittance man" referred to expatriates from countries such as the UK, living in Australia supported by funds sent from their families in their home country – often under the condition that they never return home.

It is a large industry, with the World Bank reporting transfers reaching $554 billion in 2019. Official statistics include a range of transactions including: transfers (eg of wages) from individuals currently overseas to family members in their home country; wages of guest/temporary workers; migrants transferring wealth to their new country. Remittances from workers overseas are important for increasing living standards in low income countries. For many such countries, remittances are larger than foreign direct investment, and the World Bank outlined problems arising from the decline (after many years of strong growth) in remittances in 2020 and 2021 associated with reduced global mobility and economic downturn arising from the Covid crisis.

Figure 3 (from Andreassen, 2006) provides a schematic example of the remittance process which highlights the issues involved for users of remittance services. They include: risk of a transaction being successfully completed; speed; convenience; complexity and cost. With modern technology, the instruction to pay, and availability of funds can be virtually instantaneous, as can be the settlement of the foreign exchange transaction between the local and the foreign agent – particularly if they are part of the same bank or other financial firm. But that was not always so, and when the recipient has limited access to financial institutions, such as not having an account at a bank acting as the foreign agent the process can be problematic. Many of the transactions are for relatively small amounts ($200 or so) such that costs charged can be a large proportion of the total.

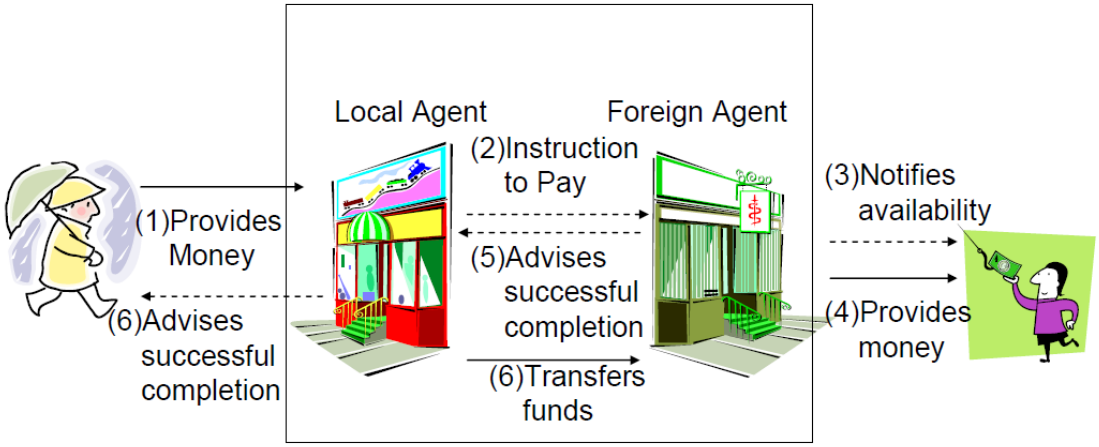



FIGURE 3:THE MONEY TRANSFER PROCESS: AN ILLUSTRATION

For many years, authorities have been concerned about the cost of such transactions – particularly since many users are lower income groups (such as guest workers in a foreign country making remittances of relatively small amounts to their families in their home country). Those costs can reflect explicit fees charged and the exchange rates used in the conversion from one currency to another. International agencies and governments have been attempting to lower the cost of remittances, which the World Bank estimated was an average of 6.51 per cent of the amount sent in 2020 (down from 9.67 per cent in 2009). The costs vary depending on the countries involved and the remittance provider, with banks generally being the most expensive. Digital remittances sent to bank or other non-bank transaction accounts or e-money accounts are among the cheapest.

Also of concern to authorities is the role of remittances as a possible way of money laundering and financing of terrorism. In response to concerns about AML/CTF, many banks have closed accounts of small, informal, money transfer operators – reducing the range of options available to individuals wishing to remit money. In Australia, Westpac was one bank which adopted such an approach, but then became mired in scandal, and in 2020 was fined $1.3 billion by AUSTRAC, due to extensive money laundering activities of some customers not being recognized and reported.

# 15. Bank Management and FTP

## Contents



## 15.1 Introduction

A Funds Transfer Pricing System (FTP) is an important and integral part of the management structure for large multi-divisional banks. Funds raised in one part of the organisation will not necessarily be needed by that division for lending and thus need to be made available elsewhere, where there are more profitable uses. In setting loan interest rates, it is important to be aware of what the funds used cos. The various risks faced by the bank, such as funding, liquidity, interest rate, and credit risk need to be managed optimally, and central oversight and/or management is required. The FTP system enables these outcomes. While smaller banks (such as those with only one division) may not have an explicit FTP system, the principles underpinning FTP are important consideration for pricing of products and risk management.

## 15.2 Funds Transfer Pricing

FTP has gained importance in modern banks, given the multiple roles it fulfils in terms of product pricing, liquidity management, performance measurement, balance sheet steering and regulatory compliance. FTP frameworks should be commensurate with the bank's activities and size, varying in complexity and methodology, and processes accordingly.

Deloitte (2015)

Funds Transfer Pricing Systems, typically run by a central ALM unit act as a counterparty to the bank's BUs to match all the buy and sell fund transactions they do with customers, but at prices set by the FTP unit. Those prices reflect the opportunity cost to the bank of instead dealing with the market at similar tenors – but where, of course the operating costs, credit risk, regulatory requirements might differ. The BUs have discretion as to the setting of prices at which they deal with customers, subject to varying degrees of central oversight, and under financial (and other) performance targets. Since each deal with a customer has a counterpart FTP transaction, the prices set in the FTP system are an important determinant of performance and influence upon BU price setting.

Essentially the FTP buys funds deposited by customers from business units, and sells funds to business units to lend to customers. For example, as shown in Figure 1, a branch may be able to obtain a customer deposit for $100 for 3 months at an interest rate of 6.50%. It will, via the FTP system, deposit that with (lend to) the ALM at the rate being paid through the FTP – which might be 7.00% for 3 months. The "profit" made by the branch will have to cover the operating costs of the branch and other charges allocated to it by head office. Likewise, another (or the same) branch may be able to make a loan to a customer for 2 years at an interest rate of 10.00 per cent, and will obtain 2 year funds via the FTP at, say, 8.00%. Its "profit" (more precisely "margin") of 2.00% p.a. on this transaction also needs to cover operating costs etc., but also is contingent upon the customer actually repaying the loan. For a portfolio of loans, the branch manager would hope that the loan interest rate charged is sufficiently above the FTP cost of funds to cover bad debt experience and operating costs.

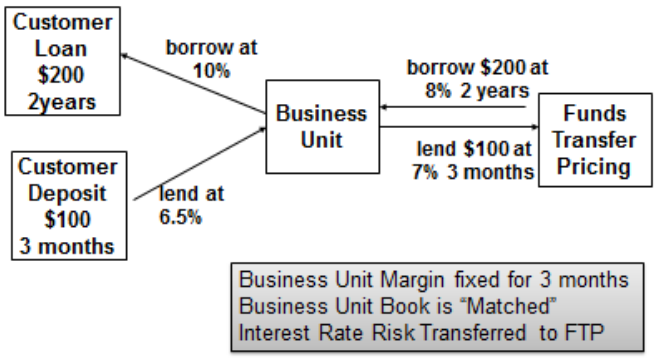
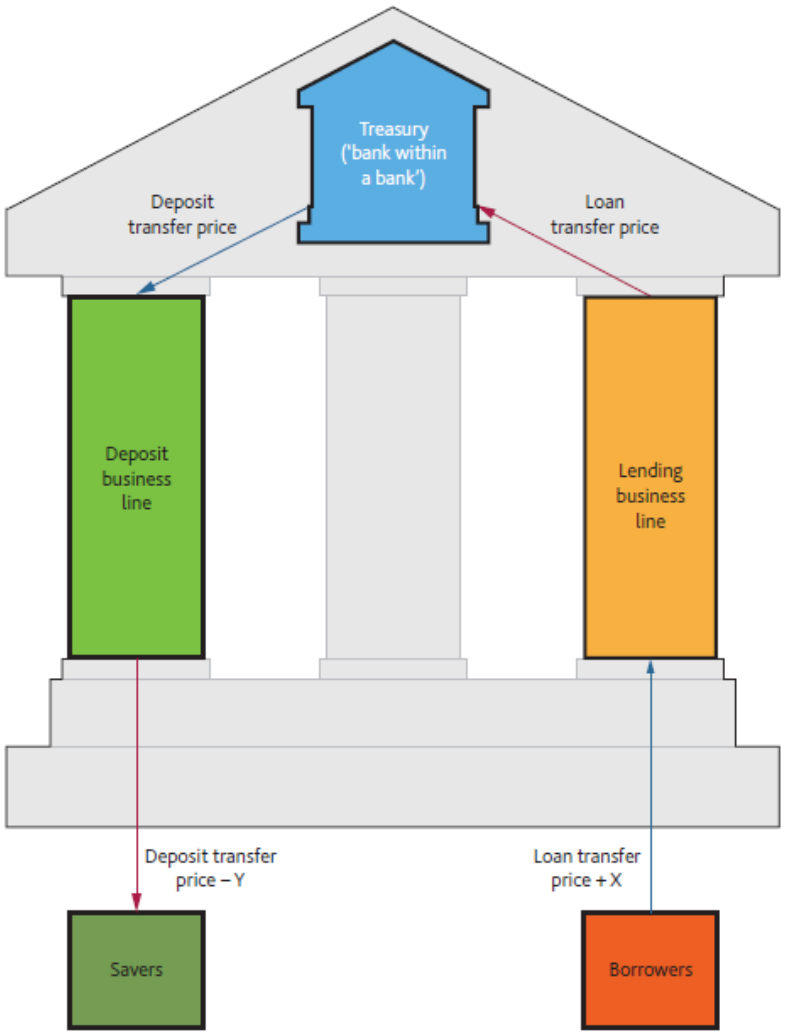



FIGURE 1: BANK FTP TRANSACTIONS WITH A BUSINESS UNIT

Figure 2 illustrates the role of the FTP system as akin to "a bank within a bank". It is typically operated by the bank's treasury or other central unit and enables consistency in product pricing.




(a) The transfer price is specific to each new loan or deposit product.
(b) A blue arrow indicates the rate at which the business line is remunerated for lending funds to the treasury centre or to borrowers. A red arrow indicates the rate at which the business line pays to borrow funds from the treasury centre or savers. The treasury centre also transacts directly with counterparts in wholesale markets for wholesale funding and to invest any excess funding.
(c) X and Y are the margins which the business lines accrue and represent the difference between the customer rate and internal transfer price.

**FIGURE 2: FTP AS A "BANK WITHIN A BANK" (SOURCE BANK OF ENGLAND, 2014)**

Several consequences immediately flow.

First, business units have a "matched book" in terms of maturity. This means that they do not face any interest rate risk arising from their activities – every asset or liability from transactions with customers has an equal and opposite counterpart in a transaction with the FTP. The interest rate risk has all been passed to (hedged with) the FTP. This enables the bank to *identify the overall interest rate risk arising from its business operations and manage it centrally*.

The accounting outcome for the current quarter for the business unit in the example in Figure 1 (assuming it does both the transactions illustrated above) is shown in the simplified financial

statements below (which ignore other costs and revenues). It doesn't matter what happens to interest rates in the current quarter the net interest income is locked in by the matching transactions with the FTP. Moreover, at the start of the next quarter, the 3 month assets and liabilities will have matured – so there is no carry over effect on future business unit income statement of the interest rate risk from the initial maturity mismatch of deals done with customers. It will have the original 2 year loan and offsetting FTP transaction still on the books (each now with 21 months to maturity) with an interest spread fixed at 2 per cent. The interest rate risk from the original maturity mismatch of transactions with customers has been transferred to the FTP unit.

*Business Unit Balance Sheet*

| Assets | | Liabilities | |
|---|---|---|---|
| Customer Loan 2 year @10% | 200 | FTP funding 2 year @8% | 200 |
| FTP investment 3 mo @ 7% | 100 | Customer deposit 3 mo @ 6.5% | 100 |

*Business Unit Income Statement*

| Current quarter income | | Current quarter expenditure | |
|---|---|---|---|
| $200 x 10%/4 | 5 | $200 x 8%/4 | 4 |
| $100 x 7%/4 | 1.75 | $100 x 6.5%/4 | 1.625 |
| | 6.75 | | 5.625 |
| Net Interest income | 1.13 | | |

Second, each business unit faces no liquidity risk. When customers wish to withdraw funds, these are available from the offsetting transaction which had been undertaken with the FTP for the same maturity. However, one complication (to which we return later) is apparent. What is the appropriate FTP treatment of at-call deposits or loan commitments where the customer has an option to obtain funds when they wish, so that the maturity is uncertain? Ignoring that for the moment, a second feature of the FTP approach is that it enables *centralisation of liquidity risk management and funding needs*. For example, some business units may bring in $1 million of deposits (of varying maturities) while others need $2 million to meet customer loan demands. The FTP makes the required funds available (or absorbs surplus funds from business units) so that individual business units are not constrained by imbalances in demand and supply among their customer base. But the FTP unit must deal with any overall imbalance, going into the wholesale market to lend surplus funds or borrow needed funds. In doing so, it will know the time profile of expected inflows and outflows of customer funds and can select maturities at which to deal in the wholesale market to offset imbalances as it desires. (Of course, it may opt to have a mismatch of overall maturities for future dates on the grounds that it can profit by doing so and undertake future transactions to close those mismatches before they become a current problem).

Third, the prices set by the FTP unit in its dealings with business units provide guidance to managers of those units as to appropriate prices (interest rates) to set. If, for example, the bank can deal in the

wholesale markets for 3 month maturity at 7 per cent, with no default risk involved and no (or minimal) operating costs, then a business unit considering taking deposits will only be adding value if the overall cost (interest paid to the customer and operating costs involved) are less than 7 per cent. The business manager knows that 3 month funds received from customers will be invested via the FTP at 7 per cent and will set prices for customers by reference to this benchmark. The flexibility given to the manager as to how much he/she can offer deposit (loan) rates below (above) the benchmark may vary between banks, with outcomes from decisions made using such flexibility relevant for assessing performance. Because market interest rates can shift frequently, the internal FTP system means that the business unit manager does not need to monitor market interest rate levels, but instead relies on the signals from the FTP system. Of course, the manager will need to be aware of rates being offered and charged by close competitors.

Figure 3: FTP and Product Pricing (Source: Bank of England 2014)Figure 3 provides a stylised example of the role of the FTP price as one of the building blocks of loan and deposit pricing. On the loan side, this can be seen as essentially equivalent to the risk-based loan pricing approach in which expected loss, operating costs, and whatever mark-up can be achieved is added to the weighted average cost of funds (equity, deposits, debt). The “mark-up” (or “mark-down” in the case of deposits) will reflect how much market power the bank has in determining rates independent of competitors, customer-specific relational matters, as well as strategic considerations regarding bank policy towards those particular product markets.

The FTP system is relevant in considering how deposit rates offered by banks are related to such factors as loan growth (or whether that might be met by use of wholesale market funding). Itzhak et al (2015) examine deposit rates offered by branches of US banks between 2007 and 2012 and find that the internal capital market operated via the FTP system leads to the loan growth in other parts of the bank having more influence on deposit rates than, for example, market discipline in response to bank capitalisation.

Another important consideration drawn out by Figure 3 is that the performance evaluation of a business unit of a product needs to incorporate the “capital charge” element. First, there is the question of how that capital charge is determined for particular products (which we discuss elsewhere). Second, because the standard FTP approach essentially fully funds the loan with deposit/debt funding and generates a “matched book” for the business unit, the internal management accounting will either need to incorporate the capital charge as an add-on to the reporting, or the FTP system will need to be modified to incorporate some equity funding and the capital charge.

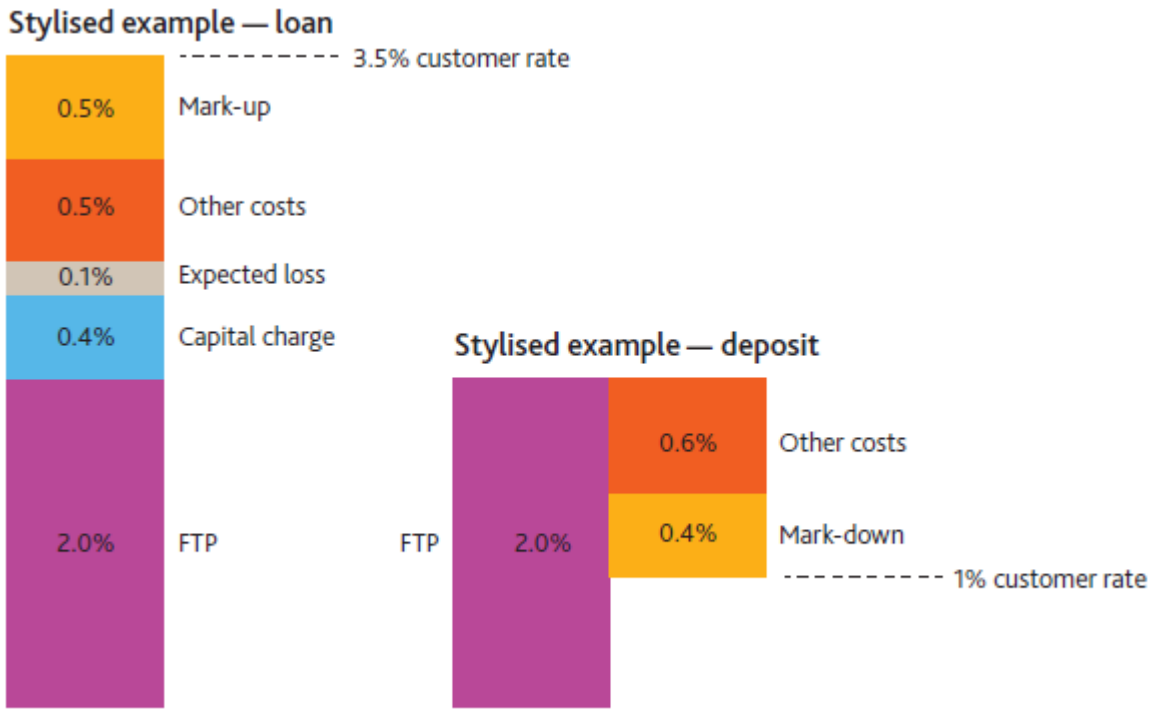



FIGURE 3: FTP AND PRODUCT PRICING (SOURCE: BANK OF ENGLAND 2014)

Head office may also use the FTP system to influence the structure of the bank's activities by introducing "management overlays" to the pure FTP rates. For example, if there is a desire for strategic reasons to grow a particular type of deposit product, then FTP rates for funding that product could be increased to encourage business unit managers to promote such a product.

Fourth, the FTP system is one of the components of internal performance management systems. Interest rate risk and liquidity has been removed from the business unit concerns and from the determination of net interest income (NII) of the business unit. The financial performance of the business unit will depend on how well that NII covers the operating costs, possible losses from loan defaults, and other centrally imposed charges on the business unit. A business unit manager who makes bad loans or has excessive operating costs will have a financial result which cannot be attributed to those other bank risks (interest rate and liquidity) outside his/her control.

Fifth, the FTP system generates transaction cost savings for the bank in terms of its dealings with the wholesale markets. Only the net surplus or deficit from customer transactions needs to be externally invested or funded, rather than each business unit's position being separately externally matched. Arguably, larger banks will have greater benefits in this regard from greater diversification of customer demand and supply and netting off within the bank.

## 15.3 Economic Theory and FTP

Lindblom and Elliot (2017), drawing on Dermine (2012) and others provide an economic theory justification for FTP systems. Considering a deposit market in isolation, the bank faces an upward sloping marginal cost of deposits, but an infinitely elastic supply of funds from the wholesale market. The optimal quantity of deposit ($D^{OPT}$) in Figure 4 arises from equating the marginal costs. The FTP system provides the signals to business units regarding deposit levels and pricing. Similarly, a downward sloping marginal revenue from loans, and infinitely elastic wholesale market investment opportunities drives the determination of the optimal loan level ($L^{OPT}$) independently of the deposit level. Depending on whether optimal loan level exceeds (RH panel) or falls short (LH panel) of optimal deposit level, the operator of the FTP needs to fund or invest the difference in the wholesale markets. The shaded areas illustrate the economic gains from being able to determine loan and deposit levels independently by access to the wholesale market.

Note that the marginal cost curves need to incorporate operational costs etc., and that marginal revenue and cost may differ from price depending on the market structure (and whether the bank can operate as a discriminating monopolist in its pricing of existing versus new loans/deposits). The figure ignores these complications.

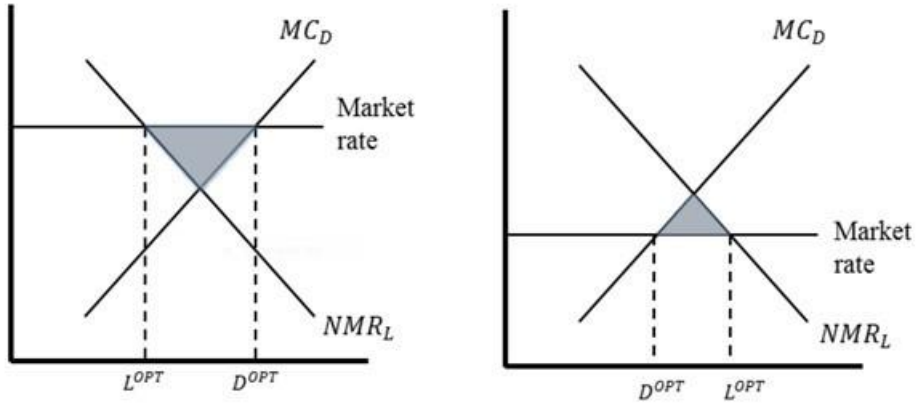
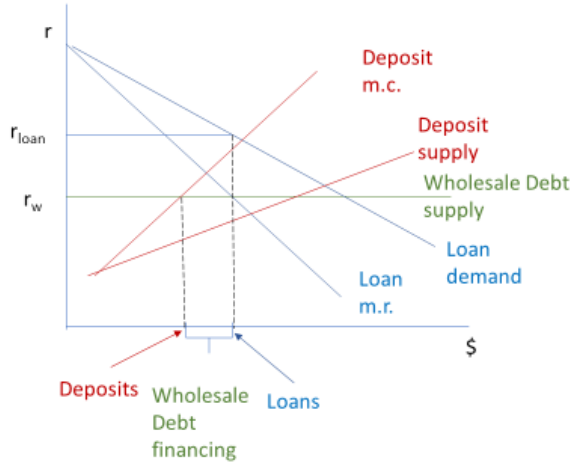



Figure 4:Optimal loan and deposit volumes under the separation theorem (*Source: Lindblom and Elliot (2017))*

This stylised view of bank pricing decision-making may need amendment when the specifics of a bank's business model, strategy, and economic circumstances are recognised. Consider for example, a bank which has a large supply of customer deposits at, say 3%, when the wholesale market rate is 5%, but has relatively little loan demand. Does it make sense for the bank to use the 5% rate as the benchmark for FTP pricing of its loans? Compared to investing surplus funds in the wholesale market, there may be strategic benefits from forgoing higher current profits by charging a lower loan rate to grow the loan book.

Figure 5 provides an elaboration of the argument applicable to the major Australian banks where loan demand generally exceeds deposit supply. While the major banks have some degree of market power in deposit and loan markets they, arguably, face a perfectly elastics wholesale market in which they can borrow or invest funds at a constant interest rate. This is thus both the marginal cost and marginal revenue against which loan and deposit decisions should be made. With less than perfectly elastic deposit supply and loan demand, profit maximising rates are set by equation of marginal costs and revenues. If, for example, interest rates increased in wholesale markets (eg US market rates – after allowing for costs of hedging back into AUD) then the upwards shift in the wholesale debt supply curve would have the following effects: (a) loan interest rates would increase (but by somewhat less depending on elasticity of loan demand) and loans decline; (b) deposit interest rates would increase (but by somewhat less depending on elasticity of deposit supply) and deposits increase; and (c) there would be less use of wholesale funding. Of course, the outcome in aggregate would depend upon (a) the policy reactions of the RBA and (b) the extent to which capital requirements affect decision making – the example assumed no bank equity funding of loans. (The simple example also only considers one common maturity of deposits and loans).

Figure 5: Marginal Costs and FTP




## 15.4 Decomposing Net Interest Income

The decomposition of the bank's net interest income into the various components arising from the FTP process is instructive. To do so, let us adapt the example above to one where the business unit takes a short 3 month term deposit at 6.50% and makes a 2 year loan at 10.00%, which are both for $100 and assume these are the only transactions of the bank with customers. FTP deals are done at

rates represented by a market derived yield curve (which is the rates the bank can deal at in wholesale (interbank) markets for different maturities). This is shown in Figure 6.

The overall Net Interest Income (NII) = Interest Received – Interest Paid is \$100 x (0.10 – 0.65) = \$3.50. That can be divided into (a) a Loan spread (the interest rate charged to the borrower in excess of the yield curve rate) of \$100 x (0.10 – 0.08) = \$2.00; (b) a Deposit spread (yield curve rate less rate paid to depositor) of \$100 x (0.70-0.65) = \$0.50; and (c) an Interest Rate (yield curve) spread (mismatch) of \$100 x (0.08 – 0.07) = \$1.00. Thus the relative contributions of different business activities to the NII can be determined – enabling the possibility of comparing these against the risks posed for the bank by those activities. Specifically:

- Is the deposit spread adequate to cover the costs of service provided to depositors?
- Is the loan spread adequate to cover administrative costs and the possibility of default (and losses arising there from)?
- Is the bank happy with the interest rate risk or liquidity risk taken on?

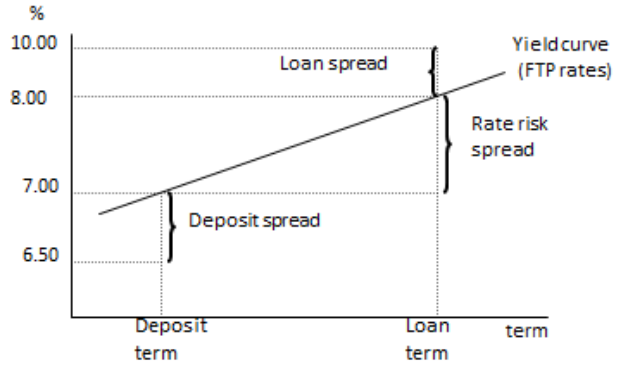



FIGURE 6: INTERPRETING THE NET INTEREST MARGIN

Figure 7 illustrates in a simple way the consequences of the outcome of the FTP process. The net effect of business unit activities are centralised via the FTP leading to a potential liquidity/funding mismatch and an interest rate mismatch. If for example, customer loan demand exceeds deposit supply, the bank's treasury will need to go to the wholesale markets to raise additional funds. That may be short term funding, or if the imbalance is perceived to be more structural and longer term, the treasury might look to raise longer term debt funding. In doing so, should it be simultaneously attempting to remove any interest rate mismatch that has arisen?

In practice, the funding task and management of interest rate risk will be undertaken separately. Large banks will have "trading desks" whose sole responsibilities are to operate in financial markets to take

positions involving interest rate (or other risks). In general, the ALM will "pass" any interest rate mismatch arising from the "banking book" (Business Units A,B, and C in this figure) to the trading desk (part of Treasury) by an internal deal and hedge the interest rate exposure of the "banking book". For example if the net position is that if $1 million would be lost for every 100 bp increase in market interest rates, a trade would be done with the trading desk which exactly offset that, but leave the trading desk exposed to interest rate risk. The traders on the desk would then be tasked with managing the exposure according to the bank's view on interest rate trends, market opportunities, and limits imposed on the trading desk (and the bank's overall exposure).

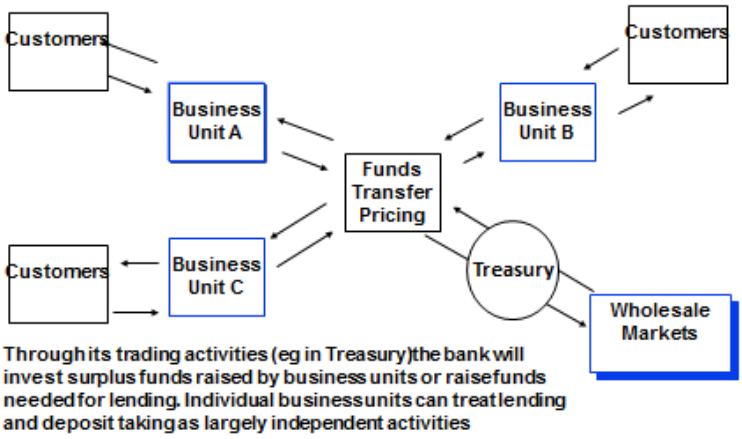



FIGURE 7: FTP AND THE BANK'S TOTAL BALANCE SHEET

Of course, there may be circumstances in which rather than passively replicating wholesale market yields in the FTP prices, the ALM may decide to adjust FTP prices to influence business unit behaviour and activity levels. For example, if the bank has excess loan demand, the need to raise significant funds in the wholesale markets could adversely affect its credit rating and cost of borrowing. So, it might be appropriate to raise the cost of funds from the FTP system to business units to choke off some of the lending growth, and raise the rate paid for deposits to attract more deposits. Similarly, if the maturity mix of deposits and loans was thought to be undesirable, changes to the FTP rates for different maturities could be made to affect demand and supply at those maturities.

## CASE STUDY: FTP and Bendigo Bank Community Banks

The introduction and promotion of the "Community Bank" concept in 1997 by Bendigo Bank has proven to be popular (partly in response to the withdrawal of branches of major banks from various communities, which prompted a Parliamentary Inquiry) and led to the establishment by December 2002 of 87 such banks. At 2017 there were 313. Community members are invited to subscribe "equity capital" to the organization (a company with one vote per shareholder) which is established and operates under a franchise arrangement from Bendigo Bank. Banking products provided by the

community bank are those of Bendigo Bank, and provided at prices determined by Bendigo Bank. A funds transfer pricing model means that the branch generates income from the difference between interest rates paid and received by customers and those specified via the FTP system. This is the main source of income for covering operating costs and, hopefully, making a profit.

For regulatory purposes, the community bank is viewed as a branch of Bendigo Bank, such that separate regulatory reporting and supervision is not involved. The governance structure involves a community bank board being elected by shareholders which makes decisions about operational matters. Dividends paid to shareholders in the community bank are determined by the Board which also allocates some part of profits to community causes.

Not all community banks have been profitable – indeed many of them required loan funding from Bendigo Bank in early years after establishment when losses meant that capital subscribed by shareholders had been lost. Some have their shares listed on the National Stock Exchange of Australia, although there is very limited trading, and most operate a transfer facility for small parcels of shares via their websites.

## 15.5 FTP Implementation and Complications

### Maturity Buckets

There are a range of issues involved in implementing an effective and efficient FTP system. First there is the question of the maturity structure of FTP prices. In principle, these should mirror the opportunity costs implicit in the yield curve facing the bank in dealing in the wholesale markets. But it may be impractical to produce FTP "term sheets" showing rates for every daily maturity at which the bank might deal. Simplified systems might provide one rate regardless of maturity or use a "stepped" ladder system (where different rates are provided for prescribed buckets, such as 0-30 days, 30-90 days, 90-180 days, and so on).

### Bank Credit Rating and FTP spreads

A principle of FTP is that the opportunity cost of customer transactions is the rates at which deals can be undertaken in the wholesale markets. While the rate which can be received on investment of funds is not sensitive to the bank's credit rating, that is definitely not the case for raising funds in wholesale markets. A bank with a lower credit rating will face higher costs of raising funds in the external market. While all banks will face some spread between investing and borrowing rates, this will be higher for banks with a lower credit rating. Moreover, the spread is likely to widen as the bank attempts to obtain more funds from the wholesale market.

The bank will thus be concerned about its credit rating because of the effect it can have via the FTP system on its product pricing for customers.

Most FTP systems will have some spread between the investing and borrowing rates charged to business units at each maturity. Naturally, this is not appreciated by business units who may see it as a "tax" by the bank's central operations, and a source of unearned profits for the bank's treasury. Most major Australian banks have implemented two-part systems (which are discussed later) which separately identify a risk free component and a credit spread/liquidity component.

## Product Maturity, cash flows and repricing

The simple explanation of FTP given above assumes that the financial products involve a one-off cash flow at maturity and involve a fixed interest rate over that period. However, many financial products involve interim cash flows, such as a mortgage where repayments amortise the principal amount over the life of the loan.

Consider a simple example where there are two loans with different cash flow patterns. One (loan A) has all repayments (principal and interest) in two years' time. The other (loan B) has half of the principal (and some interest) repaid after one year, and the remainder after two years. These have different duration, and thus interest rate risk, as well as different future funding implications. A principle of "matching" of cash flows in an FTP system (to ensure appropriate risk and funding transfers) would appear to involve setting two FTP rates (for one and two years) for loan B reflecting the timing of the two cash flows. (Loan B could be interpreted as two loans – one for one year and the other for two years). That could get very complicated when the bank has a portfolio of different loans each with many contractual cash flows at different frequencies (such as weekly etc). Instead, trading off precision and simplicity suggests that the bank will calculate appropriate single FTP rates for different types of products which reflect their cash flow patterns. For example, if the yield curve was upward sloping, the FTP rate for loan A would be higher than for loan B. That single rate would involve determining the single rate which when applied to all expected cash flows of the product gives the same present value as from applying the relevant "zero curve" rate to each cash flow. The rate is locked in from the date of inception and the charge per period is based on the amount outstanding at the start of that period. In implementing this approach, the FTP system would provide a terms sheet to all business units specifying, for example, the rate to charge on loans with cash flow structures such as A and B.

Also, many financial products (housing loans for example) may involve resetting of the interest rate over the life of the loan, either at the bank's discretion (as common in Australian mortgages) or in line with movements in some prescribed market rate. Consider, for example, a one year floating rate loan for $100 with semi-annual interest at say ($BBSW_{180}$ + 3)%. This would be treated in the FTP system as a single 6 month loan and the full principal amount match funded accordingly. When, in six months, the rate is reset in accordance with the then value of $BBSW_{180}$, match funding of the principal amount

would again occur. The business unit retains no interest rate risk, since in six months hence the loan interest rate and the FTP rate both reset by the same amount.

Many bank deposits also have no contractual maturity (ie are at call) such as transactions accounts. But there tends to generally be some reliable pattern in the overall pattern of net inflows or outflows for the portfolio of such deposits. A bank might therefore identify some part of its at call deposits as "core" (sticky/not particularly sensitive to interest rates) which might be assumed to have some specified average maturity, or could estimate an average turnover rate of at-call deposits to estimate an "average maturity".

This is also relevant where, for example, deposits from a particular sector (eg SMEs) might tend to have a specified maturity (eg 1 month) but their "behavioural maturity" is longer (eg 1 year) in the sense that there is a tendency for them to be rolled-over relatively automatically.

### Customer Options

Bank customers often have a number of implicit options associated with the products provided by banks. Loans may be prepaid early. Loan commitments give the customer the option to drawdown a loan at a time of their choosing. Deposits may be at call (withdrawable on demand) or with notice of withdrawal provisions. Banks need to make some assumptions, based on past experience about the likely effective tenor in these cases.

## 15.6 Setting FTP Rates and Liquidity Transfer Pricing

Alternative perspectives on how to set FTP rates can arise from viewing the rates as reflecting the opportunity cost of using or raising the funds involved. One perspective would involve asking what is the interest rate on the best alternative use to which funds of a particular tenor required for a loan could be put. In principle that would be the interest rate available in wholesale markets for investing those funds. An alternative perspective would ask what is the lowest cost of obtaining those funds, such as from raising them in the wholesale market. There is clearly a margin between the rates derived from the two approaches, reflecting market bid-ask spreads, but also the credit spread involved in the bank borrowing in wholesale markets. A third alternative would be to ask what is the interest rate available in derivative markets to hedge the interest rate risk arising from particular types of transactions with customers.

None of these perspectives is sufficient in and of itself, since the bank will generally be faced with a number of, sometimes conflicting, objectives and constraints. These include: limits on the extent to which the bank wishes to rely upon certain types of funding (such as short term wholesale borrowing);

requirements for central allocation of some part of bank funds into liquid asset portfolios to deal with liquidity risk.

All the major Australian banks operate some form of a two part FTP system in which one part uses the third alternative approach to transfer market interest rate risk and a second part to deal with credit spreads and liquidity costs and benefits associated with sources and uses of funds. These approaches reflect the complications in trying to achieve multiple objectives via the FTP system. Those objectives are: (a) centralisation and management of interest rate risk; (b) management of funding/liquidity risk and requirements; (c) interest rate/price setting guidance to BUs; and (d) BU performance appraisal.

With regard to the first of these objectives, Interest rate risk can be readily hedged in wholesale financial markets using derivatives such as swaps and futures. These incorporate little, or no, default risk in the terms on which they can be accessed. Using the wholesale market prices of such derivatives enables transfer pricing of the interest rate risk involved, and these are thus the prices used in the first part of bank FTP systems. Thus the "core" FTP prices will be based on market "risk free" prices such as the cash rate, OIS rates and BBSW rates.

However, loan funding in excess of deposit raising requires the bank to raise additional funding from wholesale capital markets where it will need to pay some credit spread over the risk free rates involved in hedging of interest rate risk. Thus it is appropriate to impose some additional cost (a "liquidity premium") in the transfer pricing of the cost of funds to lending business units.

Alternatively, some types of deposit funding may, via regulation, be required to be invested in low yielding liquid assets, the return on which is determined exogenously (ie there is a perfectly elastic supply) to the bank. Arguably, the inability to use those funds to lend at higher rates might warrant a liquidity cost being subtracted from the FTP rates paid to the business unit raising those funds.

The issue of how bank systems should cope with the liquidity costs associated with provision of products to customers has prompted substantial interest in recent years. (Relevant articles include: Accenture (2015), FSI (2011)). This has been prompted partly by the introduction of new liquidity regulation requirements (LCR and NSFR). But it also reflects two fundamental influences. One is the fact that for certain types of funding (such as at-call deposits), the bank will want to hedge the liquidity risk involved. Even though the average maturity of such deposits might be (say) 2 years, the risk of net outflows at any time means that the bank may invest (say) 5 per cent of each dollar raised in liquid assets, rather than those funds being all available for loans. A second consideration is the fact that business unit decisions lead to liquidity risk which can be hedged by the Treasury but at the incurrence of costs which should be reflected in the transfer pricing system to influence business unit behaviour.

For example, providing mortgage borrowers with a "redraw" facility whereby they can withdraw amounts repaid early on the loan in excess of that contractually required, creates a liquidity risk.

To understand the basis of FTP systems applied by Australian (and other global) banks, it is useful to consider a highly simplified hypothetical bank balance sheet as shown in Table 1, where there are two customer-facing business units, BU1 and BU2 which both make loans (L) and take deposits (D).

**TABLE 1: SIMPLIFIED BANK BALANCE SHEET**

| Assets | | | Liabilities | |
|---|---|---|---|---|
| Loans made by BU1 | $L_1$ | | Deposits taken by BU1 | $D_1$ |
| Loans made by BU2 | $L_2$ | | Deposits taken by BU2 | $D_2$ |
| Liquid Assets Portfolio | C | | Wholesale Funding | W |
| | | | Equity | E |

Because, in general, D ≠ L, at both the BU level and in aggregate, and where the difference is not balanced by the bank's equity funding (E), the bank's Treasury will need to either raise or invest funds in wholesale markets to ensure source of funds equals uses of funds. For Australia's major banks, the situation has been one where they have needed to raise funds in the wholesale markets (W). But also differing maturities of loan and deposit transactions create a liquidity risk for the bank, which (and reinforced by liquidity regulations) requires the treasury to maintain a portfolio of liquid assets (C).

In the process of centralisation of interest rate risk by charging and reimbursing BU's using appropriate risk free interest rates for transfer pricing, the full benefits or costs to bank funding and liquidity management arising from the BU activities are not, however, reflected. There are thus resulting opportunity costs (or benefits) which need to be incorporated into charges and reimbursements to BU's.

These can be simplistically incorporated into the FTP "match funding" approach, by allocating charges to the BUs for their contribution to the need for wholesale funding and for the holding of liquid assets. In practice the details involved in doing so can become quite complicated and different between banks. As an example, suppose BU1 collects at call retail deposits (which are covered by the FCS) and BU2 collects at call deposits from other financial institutions. The LCR will apply a higher "run-off" rate to the latter implying a greater liquid assets holding is required. To reflect the fact that the BU2 deposits will generate a lower average return on assets for the bank (since some part is invested in lower yielding liquid assets), a lower FTP rate may be applied.

However, there also remains an issue of how to deal with the equity component of the bank's balance sheet. While it implicitly provides some part of the funding for BU assets, and is required to protect

against risks created by BU activities, the FTP "match funding" allows no place for a transfer of a quantum of equity funding to BUs, even though bank capital management involves some "allocation" of equity to each business unit. It is, in principle, possible to adjust the FTP model to incorporate some transfer of equity funds to finance assets, but centralisation of interest rate risk management would be impeded (since BU's would retain some such risk due to having incomplete balance sheet matching). Instead, some form of price adjustment is commonly used. The FTP system can involve adjusted prices to reflect the no-interest cost of equity notionally allocated. Alternatively, in BU performance evaluation some adjustment to reported profit outcomes can be made.

## 15.7 Dealing with Variable Rate & Indeterminate Maturity Products

There are two important complications involved in applying matched funding approaches in FTP systems.

First some deposits have no defined maturity, but are at call, and have interest rates which can be changed at any time. Inflows and outflows of such deposits mean that there is some proportion of the aggregate level which can be treated as "core" deposits which will remain with the bank for some substantial time. (Alternatively, a probability distribution of the likely life of deposits can be derived). It is therefore possible to think of such deposits as providing funding of some average term and use a transfer price associated with that term, rather than using a "cash rate". Since the potential volatility of such deposits implies funding risks for the bank (and a need to hold liquid assets) the transfer price can also be expected to take this into account.

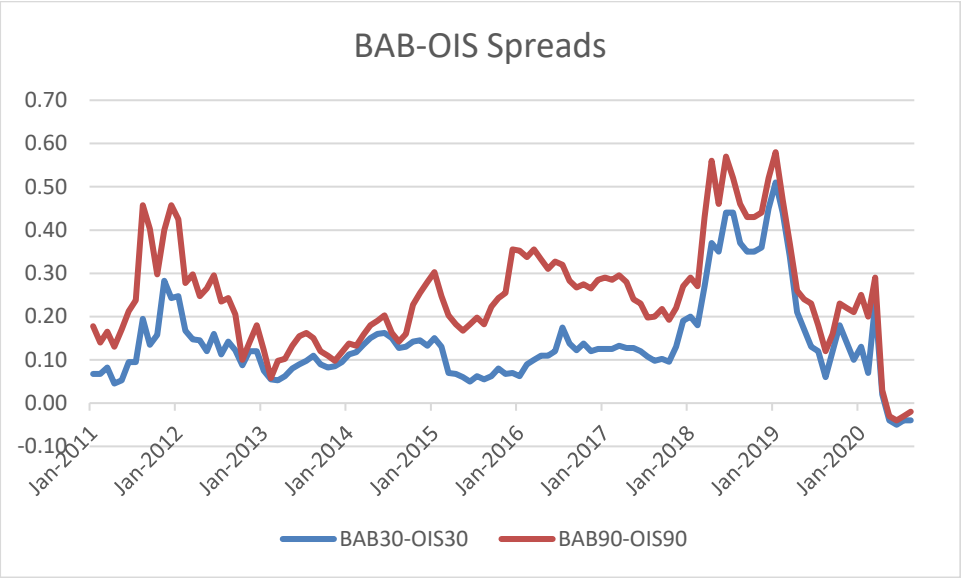
Second some assets such as residential mortgage loans will be "variable rate" where the bank has the discretion as to when and by how much to change the interest rate charged. This flexibility suggests that the "cash rate" might be a relevant transfer pricing rate for transfer of interest rate risk, even though the loans are long term and require long term funding. However, banks will normally hedge such interest rate risk using 90 day derivative products (due to the depth of the market) and thus may use a "cash plus" approach in which some premium is added to the cash rate.

This premium is a result of requiring funding at a longer tenor than overnight such as involving the 90 day bank bill rate. This leads to an adjustment involving the 3 month BBR-OIS spread (where the latter is the expected cash rate over the next three months). The spread is thus a short term measure of the credit spreads banks must pay for funding of that tenor, although this confounds hedging and funding issues. Figure 8 provides a chart of recent behaviour of the BBR-OIS Spreads.

In practice, Australian banks appear to deviate from strict marginal cost pricing in their FTP approaches to variable rate residential mortgage products. One reason is the need to incorporate both short term

interest rate and longer term funding considerations. A second is that changes to such rates affect both the "front" and "back" books (new and existing loans respectively) and thus have implications for average returns on the loan portfolio. A third reason is the one of aiming to reduce excessive variability in politically sensitive home loan interest rates. Thus, some form of "average" pricing may be applied where the FTP rate involves some average (based on overall funding proportions) of the marginal cost of short term funds and the average cost of the bank's wholesale borrowings.

**FIGURE 8: BBR-OIS SPREADS (SOURCE RBA TABLE F01D).**



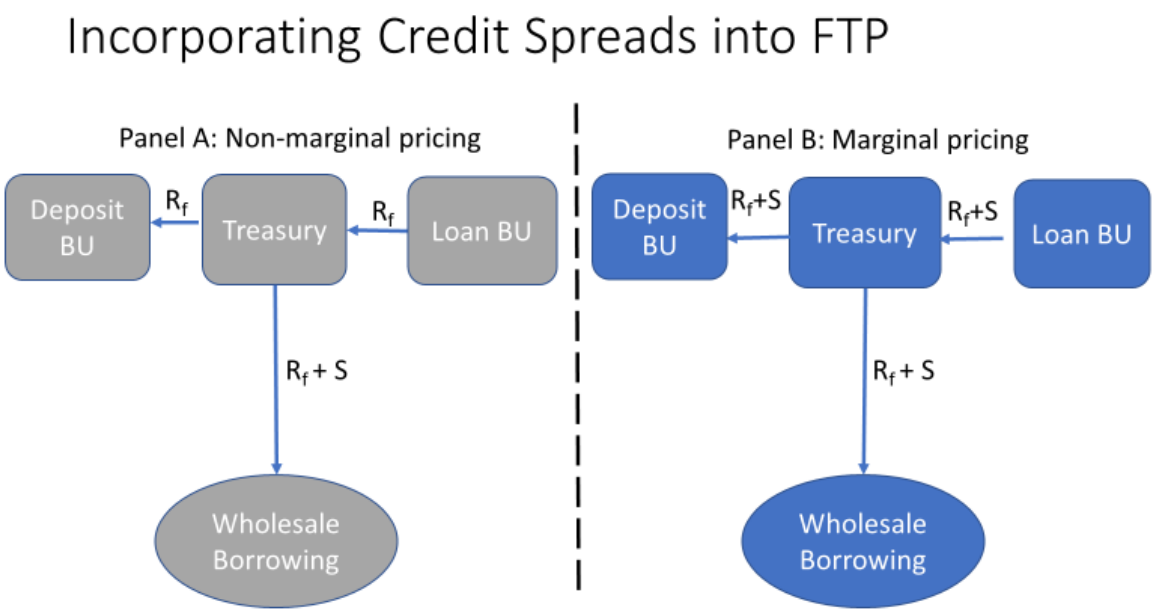

The need for longer term funding of variable rate mortgage loans leads to a requirement to also include a liquidity premium in their transfer pricing which reflects the credit spread on required longer term funding. Given the indeterminate maturity of such loans (due to early repayments etc), there is no single marginal rate which is necessarily appropriate, although banks will calculate an average behavioural maturity. But rather than apply that rate, some instead apply a form of average cost pricing, using the average historical cost of total deposit and debt funding, for the liquidity premium component of the transfer price.

The combination of these two approaches means that while changes in the level of short term rates (such as the cash rate) will be quickly reflected in the mortgage rates applied (through the base FTP component), changes in longer term rates and the credit spreads faced by the bank will be incorporated more gradually.

## Incorporating Cost of Wholesale Funding Spreads

The simplest of the additional factors to understand is the cost arising from wholesale funding. Figure 9 illustrates in a simple fashion, showing how loan funding could be financed either from deposits or wholesale markets, with the latter involving a credit spread of "S" and being the marginal source of funding due to aggregate loans exceeding deposits. In the left panel, the bank FTP system only compensates the Deposit BU, and charges the Loan BU, at the risk free interest rate. This does not send the appropriate signals to the business units. Each additional dollar of deposit funding reduces the bank's reliance on wholesale markets and thus avoids incurrence of the credit spread of S. Each additional dollar of loans requires additional wholesale funding at a cost of $R_f$+S. Consequently, to reflect the marginal benefits and costs to the bank, it is necessary to reward the Deposit BU at the rate $R_f$+S, and charge the Loan BU also at that rate – as shown in the right panel.

FIGURE 9




As well as the transfer pricing of funds between business units at the relevant risk free rate in the "core" FTP system, the second system will involve the "add-on" of the relevant credit spread element (S). The specific details differ depending upon how the system treats deposits and wholesale borrowings of different maturities and repricing dates, and bank objectives regarding reliance on wholesale market funding. Note that it is maturity which is particularly relevant in a Liquidity Transfer Pricing (LTP), since the credit spread "S" for wholesale borrowings will depend upon maturity rather than repricing characteristics.

## Liquidity Risk and Cost

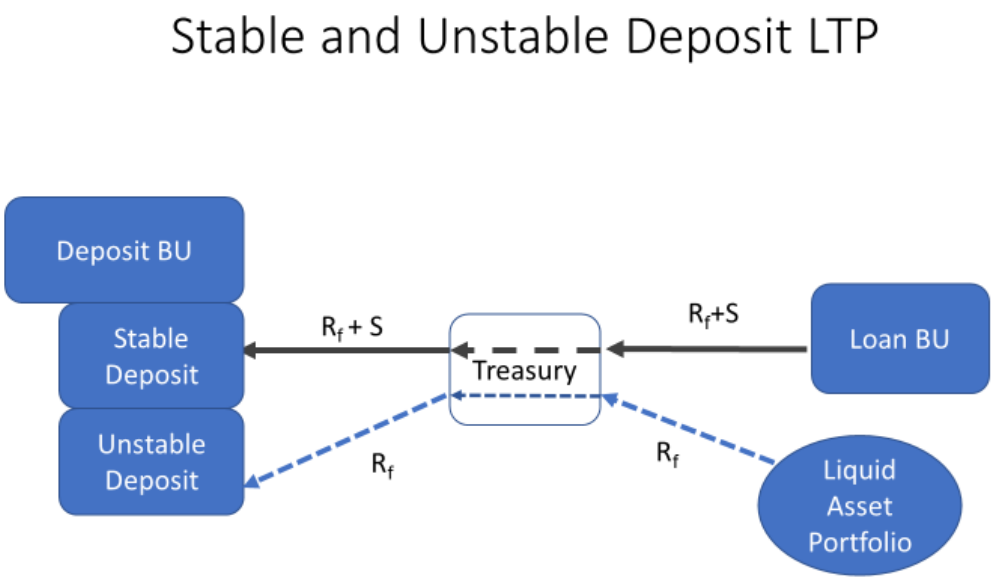
Another issue addressed in the "add-on" LTP systems is the need for the bank to manage liquidity risk arising from different maturities of assets and liabilities, where (generally) the longer maturity of assets means that the bank could be exposed to outflows of deposits which cannot be easily met by liquidation of assets. While having access to wholesale market funding can be one way of managing such liquidity risk, the GFC experience (of access to such markets closing in a time of crisis) and subsequent liquidity regulation have led to more emphasis being placed on maintenance of portfolios of liquid assets and closer balance being achieved between asset and liability maturities. The relevant liquidity regulations are the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) requirements.

These regulations create different types of complications to be addressed in the LTP system. The LCR means that different types of short term sources of funds will require the bank to hold different amounts of high quality liquid assets (HQLA), rather than all those funds being available for lending to customers. For example, short term insured retail deposits have minimal required HQLA holdings, whereas short term institutional deposits or wholesale funding requires HQLA holdings of the same (or near-same) amount.

In practice, this is further complicated by the ability of banks to meet part of their LCR requirement by use of the committed liquidity facility (CLF) operated by the RBA. Rather than holding HQLA, the bank can pay a 15 basis point fee on the amount involved for the right to access the CLF should it be necessary, and hold assets such as RMBS (instead of HQLA) which are eligible securities to be provided as collateral when using the CLF.

There appears to be no single "correct" way to deal with this complication. One approach is to note that "unstable" deposit funding requiring 100% HQLA does not contribute to reducing the gap between deposit and loan levels. It therefore should not, in principle, be eligible for the credit spread add-on to the transfer price which otherwise applies. Since LCR requirements vary from 0 to 100 per cent for different types of short term funding, the discount applied to the credit spread add-on will vary accordingly. Figure 10 provides a simple illustration. Whereas the stable deposit would receive the LTP add-on of "S" due to it reducing the need for wholesale funding, the unstable deposit receives no add-on since it is invested in HQLA, and does not reduce the need for wholesale funding.

FIGURE 10




Several complications should be noted. First, the HQLA portfolio need not be comprised of short term securities. So, where longer term risk free rates exceed short term rates, the short term risk free rate applied to unstable deposits in the FTP process understates the value provided by those funds (since they can be invested in higher yielding long term HQLA). Thus, while they do not get the wholesale credit spread add-on, there may be some add-on warranted reflecting the yields on longer term HQLA relative to the short term risk free rate provided in the FTP process. (In practice, this will be affected by the bank's attitude to bearing any resulting interest rate risk).

A second complication arises from the ability of banks to use "self securitisations" to create, out of housing loans, securities which can serve as collateral for the CLF. This implies that such "unstable" deposit funding does contribute to reducing the gap between total loans and deposits and thus need for reliance on wholesale funds (and incurrence of a credit spread). In this case, the credit spread "add-on" is warranted, but the 15 bp cost of the CLF fee (and additional costs incurred in creating the self securitisation) should be charged against that source of deposit funds.

Since the LCR requirements for "unstable" deposits will be met by some mix (roughly 50:50) of holdings of HQLA and CLF facilities, the net effect on the LTP rate will be some average of these various factors. Consequently, it is to be expected that the overall transfer pricing rates will be higher for retail versus institutional short term deposits, with consequent effects on the rates business units will offer different customers. (An additional factor having a similar effect would be where the average "behavioural" maturity of at-call retail deposits is assessed to be relatively long term (such as three years) such that the risk free rate applied in the FTP process is the higher longer term risk free rates).

The LCR does not appear to have any implications for transfer pricing for loans or other credit facility transactions with customers. It is possible, however, that some credit facilities may be regarded by the bank as having higher liquidity value than others. For example a three month loan is a more liquid asset than a one year loan. There may therefore be a rationale for charging the latter loan some additional LTP premium to reflect this.

This type of analysis is relevant to understanding the incorporation of the NSFR into the LTP system. Longer maturity assets which create a "required stable funding" (RSF) obligation imply a corresponding need for longer term funding to ensure that "available stable funding" (ASF) is adequate. The regulation requires that ASF / RSF > 1, and most banks operate with a target ratio in excess of unity.

Consider a long term fixed rate bullet loan for simplicity. It will have been transfer priced at the corresponding long term risk free rate plus the LTP credit spread add-on. In this regard, there would appear to be no additional complications through the NSFR requirement of matching long term funding to meet the ASF need. A long term deposit would also have been transfer priced at the corresponding long term risk free rate plus the LTP credit spread add-on. However, the requirement for such long term funding may increase the overall cost of deposit funds due to the higher long term deposit premiums demanded by customers. These term premiums may be greater than those contained in the risk free rate curve used in the first stage of FTP. Consequently, it may be appropriate to impose a LTP charge on the long term loan, and pass that benefit on to long term deposits.

## 15.8 Transfer Pricing of Equity

To understand how an FTP system might appropriately deal with the funds provided by equity, particularly for performance attribution, it helps to take a very simplified example of a bank with only one business unit which makes loans of L at interest rate $r_L$, takes deposits of D at interest rate $r_D$, and incurs operating costs of OC. The bank has equity of E = L-D, which is required to act as a buffer to absorb any losses from the BU activities, with bank profits going to the providers of equity capital . The bank profit is $r_L.L - r_D.D - OC$. If a notional FTP system operates between a hypothetical centralised Treasury (which has no operating costs), and where the transfer price for the BU for both loans and deposits is (for simplicity) $r^*$ then the BU profit will be:

BU Profit = $(r_L - r^*).L - (r_D - r^*).D - OC = r_L.L - r_D.D - OC - r^*(L-D) = r_L.L - r_D.D - OC - r^*E$.

This is below the profit of the bank by the amount $r^*E$ which is the interest earnings available from use of equity to fund loans, and in the absence of further adjustment accrues to the hypothetical Treasury. While in more complicated structures it may be appropriate to allocate some part of that profit to Treasury, in this simple example all of that amount should be treated as income of the BU (which is

the only operational activity of the bank). In that way performance of the BU is able to be benchmarked against the required return on the equity associated with the BU activities.

To achieve this, there are several possibilities. One would be to include equity as one form of FTP source of funds for the BU. Thus, for example, where loans of $100 are funded with $95 of deposits requiring $5 of equity funding, a BU with a loan of $100 might receive only $95 of matched funding (with same repricing features as the asset) and $5 of equity funding with no interest cost. This would, however, leave some interest rate risk with the BU.

Alternatively the equity position might be treated independently of the FTP system by making a lump sum allocation of a notional revenue amount of r*E to the BU. Determining the appropriate interest rate involved in that allocation is problematic. But in performance measurement, the BU has been compensated for the equity capital raised to cover its risks and which has been invested by the bank in some form of income earning assets.

A third approach would be to adjust the transfer prices paid and charged such that the amount r*E accrues to the BU. This could be done by reducing the transfer pricing rate charged for loans, or by increasing the rate paid for deposits.

(Here's a few industry papers if you are interested)

Deloitte "Funds Transfer Pricing: A survey to assess the state of European banks' practices"

SAS "Funds Transfer Pricing and Risk- Adjusted Performance Measurement" SAS White Paper

EY "Fund transfer pricing. Roadmap to managing pricing and profitability for NBFCs"

Funds Transfer Pricing Barbican Consulting, 17th January 2012

# 16. Risk Management, Governance and Economic Capital Allocation

## Contents



## 16.1 Introduction

Banks have become ever more complex large organizations facing a wide range of risks, and requiring sophisticated risk management techniques and processes. Risk management involves a number of important steps. These include: the identification of risks and their sources; assessment

of the severity of the risk (the exposure); management of the risk. Specialist sections of the bank will be engaged in each of these steps, and the bank will have a set of policies specifying exposure limits consistent with the bank's risk appetite, and responsibility for management of the various risks.

How the bank manages the overall level of risk and limits the risk taken on by various parts of the bank will vary between banks, but a common modern practice is via the determination of a desired level capital to absorb risk, and the allocation among business units of that capital. The term "Economic Capital" is generally used in this context, and refers to the amount of equity (or other forms of loss absorbing capital) available to absorb unexpected losses. (Expected losses are incorporated into provisions for losses mad in the bank accounts and deducted from the balance sheet figure for capital). By allocating that overall economic capital to various business lines the bank can provide incentives and constraints. High profit activities can be allocated higher economic capital to encourage their expansion, and all business units need to ensure that the risk taken on implies a "use" of economic capital consistent with their allocation. At the aggregate level, if economic capital use exceeds that currently available, the bank will need to raise more capital from the market, or cut back on some of the activities generating that usage.

## 16.2 Identification of risks and their sources

It is conventional to divide risk faced by banks into a number of major categories, which do not include the general types of risk or uncertainty, such as strategic risk, political risk, competitor risk, which affect all types of businesses. It is worth noting, however, that among those other types of risks, banks (and other financial institutions) might argue that they are subject to much greater *regulatory risk* (changes in regulation which affect the profitability of various activities) than many other industries. (One example of that type of risk is that of *legacy products* where, for example, insurers may be required to change the form of new products sold, but are unable to change conditions of older products which run-off slowly and involve higher operational costs as the amount outstanding declines and fixed costs increase in significance).

Banks face risks which can be classified into categories of:

- Credit (counterparty) risk – which arises from loans granted, failure of counterparties in derivative transactions to meet obligations, guarantees provided etc.
- Market (trading) risk – which arises from the activities of treasury trading desks in foreign exchange, interest rate, and derivatives markets etc.
- Liquidity risk – which is the risk of being unable to meet contractual payment obligations and arises because of differences in maturity of assets and liabilities. Sometimes this is divided

into funding liquidity risk (related to ability to raise funds from deposit or debt markets) and asset liquidity risk (related to ability to sell assets into a liquid market without adversely affecting the price received).

- Balance sheet (interest rate) risk – which arises from the difference in interest rate resetting characteristics of deposits and loans and other items on the balance sheet. Typically, deposits will have a shorter duration than loans, such that banks have an expected profit from "riding the yield curve" but are exposed to risk of loss if the yield curve slope turns negative.
- Operational risk – which is the risk of direct or indirect losses resulting from human factors, external events, and inadequate or failed internal processes and systems.

All of these types of risk are (now) the subject of regulatory standards promulgated by the Basel Committee. Those standards generally provide for either reliance on (accredited) internal risk models and management practices of (sophisticated) large banks or compliance with template approaches provided by regulators. Of course, even in that latter case, banks may adopt different approaches to risk management, as long as those also imply risk levels which are compliant with the regulatory standards. A (now somewhat dated) overview of Canadian Bank risk management practices is given in this Bank of Canada (2012) article.

There are many more risks that banks and regulators concern themselves with including:

- Capital risk – which is the risk of having inadequate capital to meet regulatory standards, ratings agency standards, internally determined minimum requirements, or to pursue profitable business opportunities
- Business risk – which relates to changes in the economy which render existing business models unprofitable, and to the possibility that strategic decisions regarding changes in product offerings, markets entered, etc., lead to significant losses.
- Insurance risk – many banking conglomerates will be involved in insurance activities with the resulting possibility that claims made will exceed those allowed for.
- Legal risk – which reflects exposure to changes in the law affecting the future profitability of various business activities. (Exposure to legal claims arising from failures in existing activities are generally classified under operational risk).
- Tax risk – particularly for institutions operating across international boundaries, where many activities may be largely driven by opportunities to arbitrage differences in national tax systems, there is a risk of tax changes rendering these activities unprofitable.

- Regulatory risk – the risk that changes in government policy and regulation may impact adversely on the profitability of the bank.

Burns et al (JRMFI, 2020) also identify industry concerns with cybersecurity risk, regulatory risk, model risk, systemic risk, fintech risk, and macro/monetary policy risk as important. Regulators also rank cybersecurity risk high.

ANZ Bank (as an example) in its Principal Risk and Uncertainties Report 2020 lists 29 different types of risk as shown in Table 1. Some of these are somewhat specific to current circumstances or emerging issues such as covid-19, real estate market conditions, and replacement of benchmark interest rates. In past years, other examples would have included the risks associated with the replacement of national European currencies by the Euro, or the Y2K computer concerns. And while the risks arising from Brexit for the bank's restructuring of European operations is not explicitly listed, it is one item considered under heading 2. Likewise, "fintech" is not explicitly listed but is a major consideration under heading 3 of competition. But most of the areas listed are ongoing issues. Notably, failures of the banks risk management systems to appropriately manage existing risk or identify new risks is included.

- TABLE 1: ANZ LISTING OF RISKS

| | |
|---|---|
| 1 | **The COVID-19 pandemic** |
| 2 | **Changes in political and general business and economic conditions,** |
| 3 | **Competition in the markets in which the Group operates** |
| 4 | **Weakening of the real estate markets** |
| 5 | **Sovereign risk events may destabilise global financial markets** |
| 6 | **Market risk events** |
| 7 | **Changes in exchange rates** |
| 8 | **The regulation, reform and replacement of benchmark rates** |
| 9 | **Acquisitions and/or divestments** |
| 10 | **Credit risk** |
| 11 | **Challenges in managing the Group's capital base** |
| 12 | **The Group's credit ratings could change** |
| 13 | **Liquidity and funding risk events** |
| 14 | **Changes in the valuation of some of the Group's assets and liabilities** |
| 15 | **Changes to accounting policies** |
| 16 | **Regulatory changes or a failure to comply with laws, regulations or policies** |
| 17 | **Litigation and contingent liabilities** |

| | |
|---|---|
| 18 | **Significant fines and sanctions in the event of breaches of law or regulation (AML/CTF)** |
| 19 | **Changes in monetary policies** |
| 20 | **Increasing compliance costs, penalties, scrutiny, with respect to global tax reporting regimes** |
| 21 | **Unexpected changes to the Group's licence to operate** |
| 22 | **Operational risk events** |
| 23 | **Reputational risk events including operational failures and regulatory compliance failures** |
| 24 | **Conduct-related risk events or behaviours** |
| 25 | **Disruption of information technology systems or failure of new technology systems** |
| 26 | **Information security including cyber-attacks** |
| 27 | **Impact of future climate and geological events, and diseases** |
| 28 | **The risk management framework may fail to manage existing risks or detect new and emerging risks** |
| 29 | **Lending to customers that could be directly or indirectly impacted by climate risk** |

## 16.3 Assessment of the severity of the risk

Banks have developed a wide range of sophisticated techniques for measuring the severity of various types of risk. Many of these techniques use modern finance theory and thus are difficult for non-specialists to fully understand. This applies both in the undertaking of business activities which generate risk, as well as in the centralized processes of aggregating and understanding risk positions.

In some areas, it is often argued that excessive reliance upon such statistical models rather than experience of bank officers has led to difficulties. For example, reliance solely upon credit scoring techniques without personal interviews by loans officers has been seen as a recent failing.

A more general problem is the one of reporting risk positions in a manner which is understandable to senior management who are ultimately responsible for setting the bank's *risk appetite*. The risk appetite is generally defined as being some level of risk which the bank is willing to accept in its search for profits. At the aggregate level, many banks operate with risk appetites in the order of a 1 in 500 chance that the bank may fail over a one year horizon. At the business unit (or lower) level acceptable VaR levels will be set by reference to levels of profitability expected from that activity, and typically converted into trading (or position limits).

A common popular technique for aggregating and reporting risk is Value at Risk (VaR) which estimates a size of loss for which there is a specified probability of exceeding. The difficulties with

VaR include its reliance on assumed correlations between asset returns (which may change in times of stress) plus the uncertainty about how large the losses in excess of the VaR figure may be.

## 16.4 Management of risk

Modern financial markets provide a wide array of methods of changing the risk position of the bank. Derivative markets can be used to alter the risk arising from operating activities, by transferring that risk (at a price) to third parties. If for example, the estimated VaR is too high for a particular activity, such as positions arising from foreign exchange trading, the bank's traders can alter the risk position by transactions in spot, forward, swap, or options markets.

Effective overall management of risk is one of the most difficult problems facing large banks. Senior management have ultimate responsibility for the bank's risk taking, but need to delegate some responsibility to more specialized staff, who in turn oversee the bank personnel whose activities generate risk while in search of profit. Providing appropriate remuneration structures for such personnel which aligns their incentives with those of the bank is one challenging problem. Ensuring that new (or altered) products are not introduced by business units without adequate assessment of the risk involved is also an important part of risk management control processes.

Most banks will adopt some form of risk management structure which involves the following levels of responsibility, delegation, and reporting. Generally, Boards will set the overall risk appetite of the bank and determine the general policies under which the risk position of the bank is to be managed. A Chief Risk Officer (CRO) is now a common position, reporting to the CEO and CFO, with responsibility for overseeing the risk position of the bank.

One complication in risk management is that banks typically are divided into a range of business units for operational efficiency, and most types of risk arise from activities of these diverse business units. Banks may be structured along, customer, product, or geographic lines, or some combination of all of those features. Thus, for example, there may be business units for consumer banking for each region in which the bank operates. Credit risk, interest rate risk, operational risk, liquidity risk etc., will all arise in each of these business units. Thus, there is likely to be a head of credit risk for the bank, whose group will be responsible for aggregating information about and managing credit risk from all business units (and reporting to the CRO). At the same time, the head of each business unit, requires information about the overall level of risks taken by the unit, and ultimately, the units performance will be assessed by reference to profitability relative to the risks taken on.

# Risk Management Structures and "Three lines of defence" – Australian Banks

A common structure for the governance of risk management in banks is the "Three lines of defence" model. The first line is the ownership of, and accountability for risk by the Business Unit which originates the risk. The second is line is to have functionally independent oversight of risks via specific committees who report to senior management and the Board. The third line is to have independent assurance (such as via compliance, internal and external audit) that the risk reporting and management systems are operating in accordance with bank policies.

The risk management structures for NAB and Westpac are shown in the following diagrams.

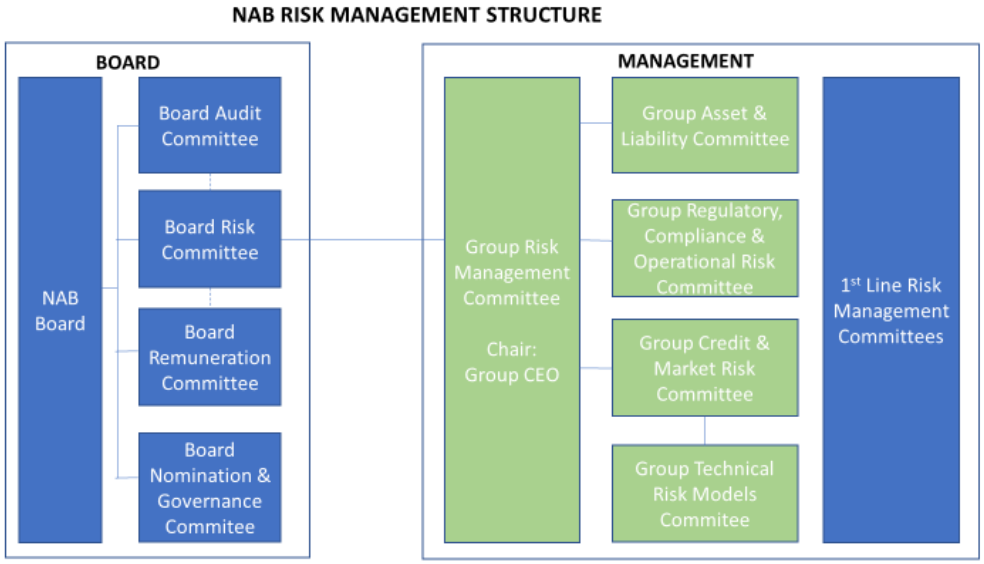



FIGURE 1: NAB RISK MANAGEMENT STRUCTURE 2017

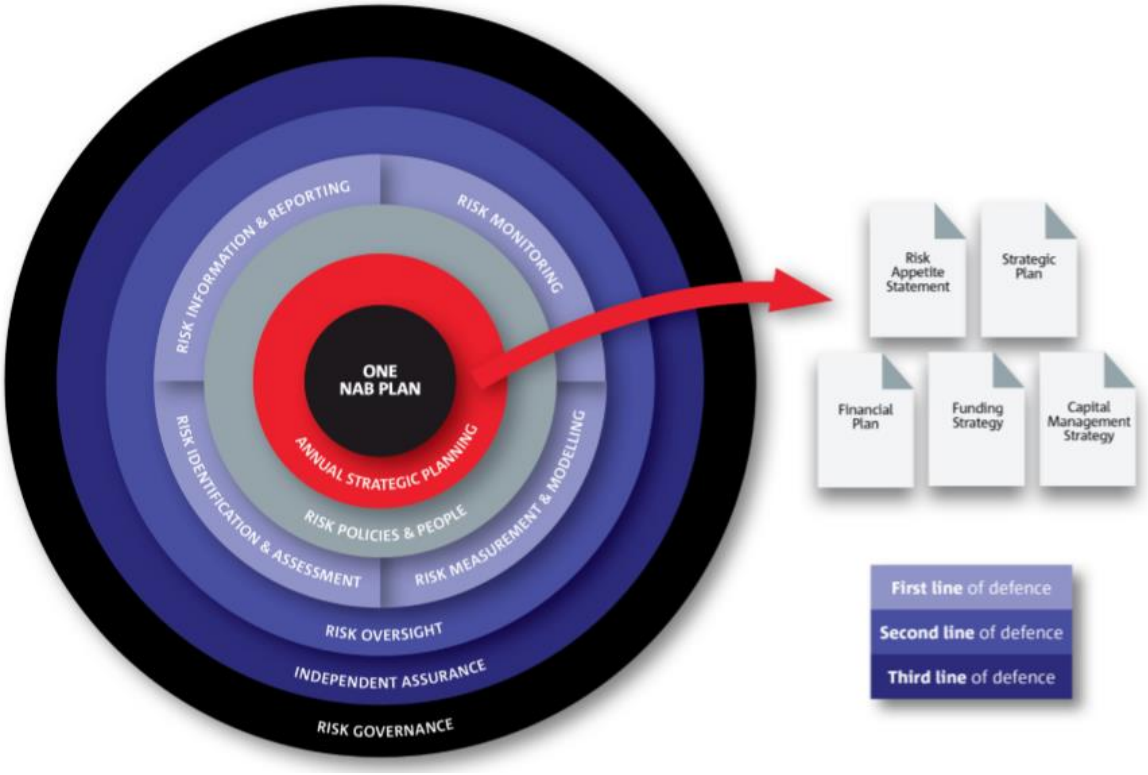



FIGURE 2 NAB RISK MANAGEMENT


FIGURE 3: WESTPAC RISK MANAGEMENT (*SOURCE:* WESTPAC)

ANZ Bank provides a useful depictions of responsibilities of the different lines of defence show in Figure 4.

| | Responsible area | Key responsibilities |
|---|---|---|
| First line of defence | Business / Enablement | • Primary accountability for the understanding of key risks and related control environment.<br>• Undertake day-to-day management of risks, related decision-making and reporting.<br>• Promote a strong risk culture of adhering to thresholds, managing risk exposure and making sustainable risk decisions.<br>• Ensure operational risk information is up-to-date and reflective of the true operational risk position. |
| Second line of defence | Divisional Risk | • Provide independent oversight and guidance to enable consistent application of the operational risk measurement and management framework (ORMMF).<br>• Coordinate, oversight and report on material operational risks and change initiatives.<br>• Contribute to the identification of systemic issues and risk collation across the Division. |
| | Group Risk | • Independent function responsible for overarching risk oversight across the bank.<br>• Set Group operational risk appetite statements.<br>• Develop and maintain relevant policies and procedures to support consistent execution and continuing appropriateness of ORMMF.<br>• Monitor and report compliance with ORMMF, consider and approve any exception requests.<br>• Source external loss data.<br>• Lead scenario analysis and operational risk capital calculation process.<br>• Central point of contact with regulators.<br>• Provide global insight and commentary on consolidated bank wide view and identify group wide exposures and trends. |
| Third line of defence | Internal Audit | • Provide independent and objective assurance to management and ANZ Board regarding compliance with policy and regulatory requirements.<br>• Perform objective assessments across all geographies, Divisions, Lines of Business and processes.<br>• Ensure independent review of the adequacy of the ORMMF is undertaken. |

**FIGURE 4: THREE LINES OF DEFENCE ALLOCATION OF RESPONSIBILITIES (SOURCE ANZ P68)**

## 16.5 Risk Management – Regulatory Requirements

APRA requires banks to have an approved risk management structure and process in place under Prudential Standard CPS 220 Risk Management, including: an appropriate risk management framework; board-approved "risk appetite"; board approved strategy, board-approved business plan; adequate resources for compliance; notification to APRA of breaches.

In the APRA Prudential Inquiry into CBA criticisms were made of inadequate articulation of policies, staff training and guidance, and processes for handling exceptions to policies, and also of lack of clear separation required in the three lines of defence model. Also criticised was the need for 1st line Chief Risk Officers to have appropriate independence from the business unit executives to ensure that risk reporting to the 2nd line is not inhibited. In April 2018 CBA entered into an enforceable undertaking (EU) to address the deficiencies identified in the Inquiry regarding risk governance, accountability and remuneration, operational risk and compliance function shortcomings, dealings with customers, and need for cultural change.

Following the Westpac AUSTRAC prosecution and a subsequent review of Westpac's risk governance, concerns over progress in rectifying problems led APRA in December 2020, to require Westpac to enter an EU to correct risk governance deficiencies under a plan to be monitored and assessed by an independent evaluator (The Promontory Group). The root problems were seen to be

"• An immature and reactive risk culture;
• Organisational construct that creates complexity;
• A three lines of defence model that is not well understood or embedded;
• A shortfall in risk management capacity and capability; and
• Challenges in execution and 'staying the course'." Promontory Report

More detail can be found in the Promontory Report

### Trading Desk Limits

An important component of risk management is the setting of limits on activities or positions taken by bank employees to whom authority has been delegated to do so. The bank will need to express those limits in some way which is easy to calculate and verify, and which relates the limits to the potential risk and reward of those activities. A method for setting of limits on positions taken by traders (on interest rate or FX desks for example) which generate market risks provides a simple example. Of course, since trading desks can involve a large number of individual traders, it is also necessary to link limits of the individual traders with limits on the desk overall in some way.

The principles involved have been spelt out by international standard setters.

A trading desk must have a clear risk management structure.

(a) Risk management responsibilities: the bank must identify key groups and personnel responsible for overseeing the risk-taking activities at the trading desk.

(b) A trading desk must clearly define trading limits based on the business strategy of the trading desk and these limits must be reviewed at least annually by senior management at the bank. In setting limits, the trading desk must have: (i) well defined trading limits or directional exposures at the trading desk level that are based on the appropriate market risk metric (eg sensitivity of credit spread risk and/or jump-to-default for a credit trading desk), or just overall notional limits; and (ii) well-defined trader mandates.

(c) A trading desk must produce, at least weekly, appropriate risk management reports.

**FIGURE 5: BCBS MINIMUM CAPITAL REQUIREMENTS FOR MARKET RISK**

The BCBS document provides much detail on how to implement the setting of desk and individual trader limits across a range of market risks. The Appendix provides a simple example to illustrate.

## 16.6 Economic Capital

"Economic capital can be defined as the methods or practices that allow banks to consistently assess risk and attribute capital to cover the economic effects of risk-taking activities." Basel Committee

"Banks allocate capital to their business lines to assess those lines' relative performance, which informs their strategic decisions. Capital allocation, together with Fund Transfer Pricing (FTP), are

two important internal processes used by banks to support business optimisation decisions." Bank of England Quarterly Bulletin (2018)

At an aggregate level, one might be tempted to interpret economic capital as an optimal capital level, as in corporate finance where an optimal capital structure maximises the value of the firm (or equivalently minimises its weighted average cost of capital). While that might turn out to be the case (although unlikely), that is not how economic capital is interpreted in banking. Rather it is the level of equity capital required to be consistent with the "risk appetite" of the bank's board and management. Typically this is expressed as ensuring that there is sufficient capital such that the probability of failure of the bank in the next year is below some very small probability (such as a 1 in 1000 chance).

Thus, economic capital is focused on risks, and its calculated value will be one input, along with regulatory requirements, into a bank's determination of its desired (optimal), and thus its actual, level of capital. The actual capital level will need to be at least as large as its economic capital to be compatible with the bank's risk appetite. Actual capital also needs to exceed minimum regulatory requirements which, since the introduction of Basel 3, typically exceed bank estimates of economic capital. And because of its focus on the ability of the bank to survive adverse shocks, some adjustments will be made to conventional accounting figures to strip out assets which would not have value in a time of crisis. For example, some figure for goodwill may be included as an asset in the bank's accounts but that intangible asset may be worth zero in a time of distress.

The economic capital concept is more relevant for the internal processes of the bank. The overall risk of the bank arises from its various activities, and assessing, managing, and pricing for those risks is fundamental to bank performance. As described by the Basel Committee:

> "Economic capital provides banks with a common currency for measuring, monitoring, and controlling: (i) different risk types; and (ii) the risks of different business units." Basel Committee

By determining, and notionally allocating, economic capital to the various activities, the bank can determine whether the expected profit from that activity is sufficient to compensate for the risk involved. The allocation will affect pricing of the activity, since the required return on economic capital will be incorporated into pricing decisions. Relative performance of business units and their activities can be compared via performance measures based on economic capital.

## Economic Capital and Loss Distributions

The losses determining economic capital can arise from a range of risks. Most commonly identified (and reflected in regulation) in banking are: credit risk, liquidity risk, market risk, and operational risk. (Business and strategic risk are not generally considered in the same framework, but could be relevant in, for example, determining the economic capital relevant for expansion into a new market where success is questionable and the investment of funds required could be lost).

While economic capital can be calculated for the different risks associated with an activity, the most common and important calculation is for the credit risk associated with loans.

There is for a portfolio of loans a probability of loss distribution such as shown in **Error! Reference s ource not found.** (where zero loss would involve full repayment of all loans). Only the losses are relevant, since the loan contract has no "upside" of payments beyond those agreed contractually to the bank. The bank will, based on past experience (or other methods), have some estimate of the "expected losses" on that portfolio (for example that on average 0.8% of contractual repayments of principal and interest will not be recovered). This will be incorporated into the determination of interest rates charged on loans, such that over time the profits made on successful loans are expected to offset the losses on unsuccessful loans and achieve the required return on the portfolio.

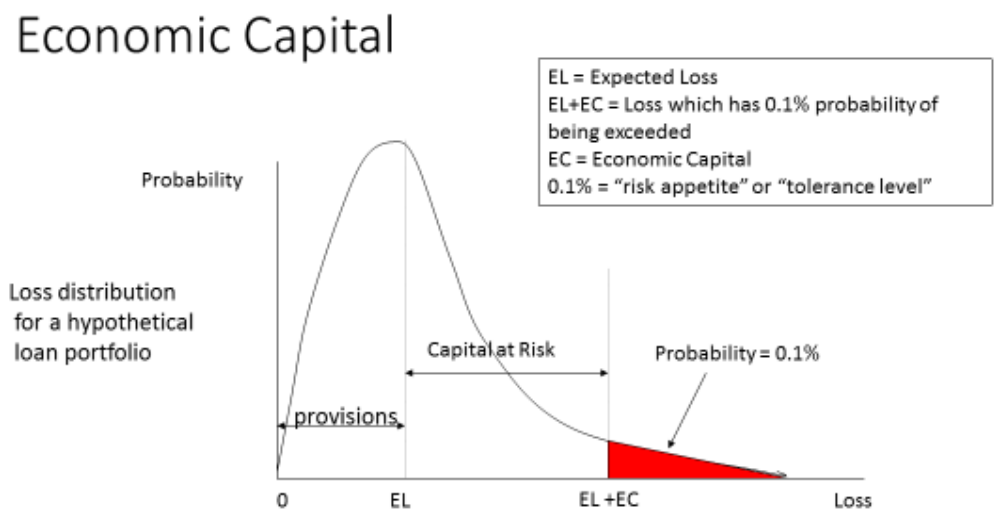



FIGURE 6: LOSS DISTRIBUTION AND ECONOMIC CAPITAL

Of course, actual losses will rarely equal expected losses. While provisions should allow for expected loss, there needs to be adequate capital available to absorb losses beyond that amount for the protection of depositors and other creditors of the bank. *Economic Capital* is the term used for the level of equity, in excess of provisions/expected losses which is available to perform this role. It has

commonly been defined as that amount of capital which would be sufficient to absorb losses on the specified portfolio (position) for some proportion (such as 99.9 per cent) of possible outcomes over a specified horizon. That is a Value at Risk (VaR) approach which does not take account of the extent of the shortfall of capital to losses which might occur in the 0.1 per cent of outcomes.

In recent years, there has been greater use of the Expected Shortfall (ES) concept for such a calculation which incorporates the size of loss not covered by available capital. Both measures require an assumption about the probability distribution of future outcomes, generally estimated by reference to past experience, which can be prone to error. (In particular, in considering a portfolio, the correlation between the components is important to the overall outcome. In the GFC, VaR measures based on historical correlations were found to be misleading because correlations shifted towards unity in the crisis).

## Loan loss provisioning and Economic Capital

When a lender makes a loan it will generally associate with that loan an *Expected Loss* amount reflecting the non-zero probability that full repayment won't occur. There is also the *unexpected loss* reflecting the fact that the probability of default (PD) and loss given default (LGD) differ from the expected values assumed by the bank.

The expected loss associated with the portfolio of loans is reflected in the pricing of the loans (as was shown in the risk-adjusted loan interest rate determination). Moreover, a bank will aim to make provisions associated with that expected loss. Unfortunately, this gets us into the murky world of bank accounting principles and practices.[1] Rodgers (2015, Section 2 and Appendix A) provides a brief overview of Australian bank practices up to that time. Traditionally, loans were entered using historical cost accounting as an asset with a value equal to the amount lent (less principal repayments to date) and loss provisions were only allowed to be created when there was some evidence that full repayment would not occur. This could take the form of either *specific provisions* associated with a particular loan likely to default, or *general provisions* associated with a portfolio of loans where it was believed that some would default (even though the identity of which ones was not known). An increase in provisions at any date, such as due to an economic downturn, would be treated as an expense in the income statement for that period. General provisions would be determined based on historical loss experience

Concerns about the backward-looking nature (incurred loss) of loss provisioning has ultimately led to a new accounting standard (IFRS9) for use in provisioning by banks. The Basel committee has been

[1] BCBS (2015) provides relevant information on bank accounting and how that interacts with bank regulation to affect bank behaviour.

instrumental in this, because loss provisions are deducted in calculating eligible bank capital for regulatory purposes. If provisions are inadequate given knowledge about likely losses, then regulatory capital will overstate the amount available to act as a buffer to absorb (both expected and unexpected) losses.[2] The G20 leaders also called for changes in 2009.

The estimation of economic capital can be done at the level of risks associated with a particular portfolio such as default losses on housing loans (such as depicted in **Error! Reference source not found.**) or for valuation changes on a trading book of equities or fixed interest securities. In the latter case, the distribution would show both gains and losses (and be approximately symmetric). Again, however, in calculating economic capital, it would only be the loss tail of the distribution which is relevant.

## 16.7 Aggregate Economic Capital and Actual Capital

At the aggregate level, a bank's desired economic capital will be determined by the bank's board as the amount sufficient to absorb losses in most circumstances reflecting what is often termed the "risk appetite". Often this has been calculated using a Value at Risk approach at some degree of confidence such as 99.9 per cent for a one year horizon. If believable, that suggests that the bank would be likely to fail once in 1,000 years as a result of losses exceeding available capital. In practice, because balance sheet capital is the residual of assets less other liabilities, inadequacies in accounting can make such estimates unreliable, while (on the other hand) a bank noting accumulating loan or other losses might (if able) undertake new equity raisings to counteract that trend.

At the aggregate level for the bank, the actual amount of capital can be compared with the economic capital required to meet the bank's "risk appetite". (Note that actual capital as recorded in the balance sheet will reflect provisions made for expected losses via, in Australia, the net loans and advances figure shown as an asset equalling the gross figure minus provisions). Flannery (JMCB, 2014) considers how well book capital based on expected losses reflects market assessments of the bank's strength. He calculates the implied PD for a sample of US Bank Holding Companies over the period 1986-2011 using the Merton model and market data on BHC equity prices. He finds that in about 2/3 of bank-year observations, the implied PD was greater than the Basel regulatory standard of 0.1% and over 0.5% in half of the observations. He notes that book capital is not a good guide to market willingness to refinance banks with maturity mismatches, such that the market value of

[2] See BCBS (2015)

equity capital warrants consideration in regulation. This, he argues, supports his proposal for contingent capital ("bail-in") bonds with market value triggers to recapitalise troubled banks.

While reference to a "loss appetite" is the way in which economic capital is generally defined in practice, Elizalde and Repullo (2007, p88) argue that it "should be derived from an underlying objective function such as the maximization of the value of the bank…. as the capital level that bank shareholders would choose in absence of capital regulation". In their modelling[3] it is determined by trading off greater use of more costly equity financing with the risk of losing franchise value due to a "run" and closure of the bank. They find that economic and regulatory capital do not depend on the same underlying variables – with the the latter being based on a prescribed confidence level regarding failure but the former dependent on the intermediation margin and cost of capital. A higher cost of capital reduces economic capital, but the intermediation margin effect depends on the level of competition. A higher margin increases the franchise value (increasing economic capital) but generates profits which serve as a buffer against possible losses (reducing economic capital). The net effect is positive in competitive markets but negative otherwise. While increases in PD and LGD increase regulatory capital, their effect on economic capital is not always positive.

Elizade and Repullo find that the lower is the cost of capital, the more likely it is that economic capital exceeds regulatory capital, while actual capital will generally exceed regulatory capital (if that is larger than economic capital) to provide a buffer against unexpected losses leading to breaching the regulatory requirement. The size of such a buffer will depend upon the severity of regulatory actions if a breach occurs. Using deposit insurance coverage as a (negative) indicator of market discipline, they find that more market discipline generally has minimal effects on increasing economic and actual capital.

There are, of course, a number of complications in analysing economic capital at the aggregate level. One is the fact that the bank will have other forms of "capital" (such as preference shares and hybrids which can absorb losses) in addition to common equity. A second is that the bank will be required to meet regulatory capital requirements. Arguably, until the introduction of Basel 3, regulatory capital was less than economic capital such that it was not a major consideration for bank capital planning. Since Basel 3, higher regulatory capital requirements have probably become a binding constraint for banks – as evidenced by the need for them to increase equity capital in

[3] They assume a bank with a single class of loans, with less than perfectly correlated outcomes, but all with the same PD and LGD, and derive default rates using the single-risk-factor model which underpins the Basel IRB calculations of capital requirements.

response. (While banks have higher equity capital than the regulatory minimum, the difference can be interpreted as the need to have some safety margin to avoid falling below regulatory requirements and invoking regulatory action).

A third complication is that regulatory capital requirements involve subtracting some amount of assets (such as goodwill) from total assets in calculating actual capital, and this divergence between recorded balance sheet equity and eligible regulatory equity needs to be taken into account. More generally, "book" capital is used in regulatory calculations (and in economic capital calculations) and this may be distorted by accounting valuations of assets and liabilities which differ from market/realisable values. The US experience in 2008 when Bear Stearns, Lehman Brothers, Washington Mutual, Wachovia, and Merrill Lynch all failed or were acquired after previously reporting capital ratios all over 12 per cent, illustrates how investors may be unwilling to roll-over short term funding due to concerns about actual solvency.

A fourth complication arises when there are subsidiaries operating offshore which have their own regulatory capital requirements. Home jurisdiction regulators may not allow the value of the parent's equity stake in the subsidiary to count as an asset in calculating eligible capital for the parent. This has been the case in Australia for part ownership of offshore banks, and was one reason for ANZ withdrawing from a number of its overseas joint ventures.

## Capital Management Policy

In determining its aggregate desired economic capital position, bank management will take into account more factors than any loss distribution estimated by its specialists. An important consideration will be the impact of its capital position on the ratings given to the bank by S&P, Moodys, Fitch. (Moody's bank rating criteria are found here). Another will be the share market response to its capital position, as well as the regulatory capital requirements. Banks are required (under Pillar 2 of the Basel requirements) to have an Internal Capital Adequacy Assessment Process (ICAAP) which requires regular assessment of current capital position and future needs. In undertaking its ICAAP a bank will note that expected growth in activity is a fundamental determinant of required growth in capital. McKinsey provides an overview of practical approaches and issues. Such growth is given by Earnings less Dividends plus External Capital Raisings (negative for share buybacks). Notably poor past performance creates difficulties in growing capital - both from internal and external sources.

More generally, capital management policies should include

- determining the overall need for capital and other sources of funds for the business as a whole
- the allocation of financial resources within the business to new business activities

- determining whether existing activities generate an adequate return on capital employed
- pricing and costing of activities to achieve an adequate return
- ensuring that risks of capital loss are appropriately managed.

## 16.8 Allocating Economic Capital

For internal bank management a major challenge is the need to allocate and price equity capital among various business units and activities. By notionally allocating more of its equity to particular business units and assessing performance of the BU by reference to some measure of risk adjusted return achieved on that allocation of equity, incentives to expand particular activities can be generated. One approach could be to allocate economic capital among various activities in proportion to their contribution to required regulatory capital. This would imply an allocation based on the Risk Weighted Assets (RWA) measure arising from those activities. While relatively simple, that would leave allocation of capital in excess of the regulatory requirement still to be allocated, and major banks are also likely to prefer their own assessment of the risk associated with particular activities than simply following regulatory assessments. Nevertheless a Bank of England survey in 2018 found that RWA was an important factor in methods used by many banks in allocation of capital. One explanation for this is that the Basel 3 increases in capital requirements have meant that regulatory capital exceeds the bank's own estimate of economic capital. Complications with reliance on RWA arise from operations in different jurisdictions and determination of the desired overall capital level to take into account other risk considerations such as identified by stress tests. This could lead to an allocation based on some average of a number of risk measures or regulatory requirements.

The expected loss associated with the portfolio of loans is reflected in the pricing of the loans (as was shown in the risk-adjusted-loan-rate determination). Having an allocation of capital to business units facilitates risk adjusted performance measurement such as by calculation of economic profit or EVA (subtracting a cost of economic capital from accounting profits) or risk adjusted rate of return (eg RAROC) relative to some required rate of return. However a fundamental problem is that economic capital calculated using concepts such as VaR is not "sub-additive" (ie the total risk should be less than the sum of individual risks due to less than perfect positive correlation).

There is also the issue of separately calculating economic capital for different types of risk, such as credit and market risk, and then aggregating by summation that may ignore interdependencies between them and lead to an incorrect level of aggregate capital. Breuer et al (JBF, 2010) argue that decomposition of risks of a position (portfolio) into separate credit risk and market risk positions (portfolios) is not necessarily possible. If it were, then (with sub-additive risk measures) the

aggregated risk level would generally be less than that calculated but, if not, the aggregated level would understate the actual level, leading to a shortfall of economic capital from what is needed.[4] (As they note, in practice, matters are even more complicated by market risk and credit risk generally being calculated using different time horizons, such as 10 days and 1 year respectively). Alessandri and Drehmann (2010) address the same issue, but find that the sum of economic capital for banking book credit risk and IRRBB in their model provides an upper bound to what would be derived allowing for interactions between the two risk factors.

Ita (2017) discusses approaches in 2014 of large global banks to economic capital allocation to major business segments and in his Tables 1 and 2 provide information on methods used. Each of the 7 G-SIBs for which information is available uses somewhat different methods, with regulatory capital requirements playing a significant role (including via allocation based on risk-weighted assets). Three allocate economic capital as a percentage (eg 12% based on aggregate target level) of RWA plus deduction items (eg goodwill). Others incorporate (or use exclusively) economic capital calculations done at the business unit level using internal risk-based capital models.

Researchers at the Bank of England have published a report on bank capital allocation based on PRA reviews of bank practices. They describe the] overall process as the bank's strategic plan leading to capital budgeting decisions (identifying which product areas and business lines they wish to expand or contract), allocating (equity) capital accordingly, and measuring performance of business units via comparison of some profit metric against capital allocated. Most commonly, the equity capital allocation involves CET1 capital, although the regulatory measure of that figure may differ from the bank's preferred measure to use. (Regulatory measures and financial accounts measures can vary considerably). In allocating capital to business units, the relevant consideration may be the BU's RWA or contribution to a non-risk-weighted leverage measure, or contribution to stress test outcomes, or some combination of those or other metrics. The PRA review found regulatory capital considerations were the principal drivers of allocations, and that regulatory capital has, since the crisis, tended to exceed banks' own estimates of their economic capital needs.

One approach described was to calculate economic capital based on applying the bank's target CET1 ratio to the RWA of the BU and measure the BU performance by BU profit as a rate of return on

4 Their argument is based on the simple depiction of the value of a position (V) depending on two risk factors (credit and market) of (a) and (e). The typical estimation of credit risk would consider the effect of a change in a holding e constant, and vice versa for market risk. However, the change in the position value between date 0 and 1 is V(a1, e1) – V(a0,e0), which only equals [V(a1, e0) – V(a0, e0)] +[ V(a0,e1) – V(a0,e0)] if V(a,e) = V1(a) + V2(e) which is not necessarily the case. They provide some examples, such as a foreign currency loan.

allocated capital. If, in aggregate target CET1 is greater than that implied by RWA regulatory requirements, some adjustment to BU target returns will be needed to ensure overall targets are met. Some banks may set the same return hurdle rates for different BUs while others may differentiate them.

## Economic capital allocation and FTP

A simple implementation of FTP leads to business units being "match-funded" with a balance sheet with, for example, loans to customers matched by funds lent by the FTP unit. This leaves no room for equity capital. But in aggregate, A = D + E (some part of assets is funded by equity).

One solution is to make "notional allocations" of equity capital to business units and add a "notional" return on that equity capital to the net income of the business unit. Table 2 provides a simple example in which (for ease of exposition) the FTP rate ($r_{FTP}$) is the same for all transactions, and the FTP unit needs to raise \$10 from the wholesale market at rate $r_W$. The bank's equity is allocated to business units A and B based on total assets and a notional income attributed to each by applying a specified return on that equity. It would then be possible to calculate the actual return on allocated capital to compare with required return using either EVA or RAROC or some other performance measure. Both the allocation of equity and the imputed return on equity would affect the performance measure.

**TABLE 2: ECONOMIC CAPITAL AND FTP**

| Unit A | | Unit B | | FTP | | Bank | |
|---|---|---|---|---|---|---|---|
| **A** | **L** | **A** | **L** | **A** | **L** | **A** | **L** |
| Loan 60 | FTP 60 | FTP 60 | Deposit 60 | A&B 100 | A&B 80 | Loans 100 | Deposit 80 |
| FTP 20 | Deposit 20 | Loan 40 | FTP 40 | | Equity 10 | | Equity 10 |
| | | | | | W'Sale 10 | | W'Sale 10 |
| Notional equity 6 | | Notional Equity 4 | | | | | |
| **Net Income** | | **Net Income** | | **Net Income** | | **Net Income** | |
| $60(r_A-r_{FTP})+20(r_{FTP}-r_D)+6r^*$ | | $40(r_A-r_{FTP})+60(r_{FTP}-r_D)+4r^*$ | | $100\ r_{FTP}-80\ r_{FTP}-10r_W-10r^*$ | | $100rA-80rD-10r_W$ | |

An alternative approach would be to adjust the FTP rates to allow for the allocation of equity to the business units. Suppose, for example, that a "pure" FTP rate (reflecting that this was the marginal cost of wholesale funding) was $r_w$, and the BU was allocated equity equivalent to 10% of its loans. If the FTP pricing involved borrowing from the FTP unit (to finance loans) being priced at $0.9r_w$ and lending deposits raised to the FTP being priced at $r_w$ the following would occur. Unit A would have Net Income of $60(r_A - 0.9r_w) + 20\ (r_w - r_D)$. Unit B would have Net Income of $40(r_A - 0.9r_w) + 60\ (r_w - r_D)$. The FTP unit would have Net Income of $100(.9r_w) - 80r_w - 10r_w$ (where the last term is the cost of

funds raised in the wholesale market). Aggregating, the Bank net Income would be $100rA-80rD -10r_W$ as required. Individual BU performance could be calculated as Net Income relative to allocated equity.

The actual process used would affect the allocation of income and performance measures derived.

## CASE STUDY: WESTPAC CHANGES TO FTP and Economic Capital Allocation

In a statement to the ASX in 2012, Westpac outlined changes it had made to its FTP system and economic capital allocation process.

"The need to hold higher and better quality capital levels under Basel III has led to a divergence between the economic capital allocated to divisions and the total capital held by the Westpac Group to meet regulatory requirements. This additional capital was previously treated as a residual and held within the Group Businesses. To ensure the Group achieves an appropriate return on capital employed, the additional capital is now formally allocated to divisions, better aligning divisional capital levels to Group Tangible Equity.

The changes reflect a thorough review of risk and return characteristics across the portfolio, including the experience of the global financial crisis.

Key changes in the approach include:

- Capital allocated to divisions has been calibrated to Group Tangible Equity; and
- Certain portfolios, were regulatory capital is higher than economic capital, now receive an additional regulatory capital loading. These portfolios include: residential mortgages; commercial property lending; structured credit (including securitisation) and wealth management.

Changes in capital allocated to divisions principally impacts economic profit and net interest income as operating divisions effectively earn more on the higher capital balances while the Group Businesses earns less. This change also impacts divisional margins; revenues and tax. As part of the changes, divisional net interest margins are now calculated inclusive of the earnings on capital allocated to divisions.

**Transfer pricing changes**

Changes in funding and liquidity through the global financial crisis have necessitated some changes in how funding and liquidity costs are allocated to products. The prior approach was principally based on average funding costs with overlays applied to reflect the more rapid changes in marginal funding costs.

The new approach embeds a marginal cost approach into the funding cost model."

The effects of the changes are shown in the following tables of divisional results as previously derived and under the new arrangements.

Among the questions raised by this change are the following:

Which divisions gained/lost most from the changes? Why?
How would the "equity charge" be determined?
Why are franking benefits included in the adjusted cash earnings?
How can the net interest income changes and economic profit changes be reconciled?

**As Reported in Interim 2012 ASX – First Half 2012 Economic Profit**

| Six months to 31 March 2012 $m | Westpac Retail & Business Banking | St.George Banking Group | BT Financial Group (Australia) | AFS | Westpac Institutional Bank | New Zealand | Pacific Banking |
|---|---|---|---|---|---|---|---|
| Cash Earnings | 1,049 | 569 | 294 | 1,912 | 663 | 257 | 55 |
| Franking benefit | 316 | 172 | 86 | 574 | 182 | - | - |
| Adjusted Cash Earnings | 1,365 | 741 | 380 | 2,486 | 845 | 257 | 55 |
| Average ordinary equity | 6,721 | 5,603 | 3,486 | 15,810 | 6,277 | 2,439 | 251 |
| Equity charge | (370) | (308) | (192) | (870) | (345) | (134) | (14) |
| Economic profit | 995 | 433 | 188 | 1,616 | 500 | 123 | 41 |

**Restated First Half 2012 Economic Profit**

| Six months to 31 March 2012 $m | Westpac Retail & Business Banking | St.George Banking Group | BT Financial Group (Australia) | AFS | Westpac Institutional Bank | New Zealand | Pacific Banking |
|---|---|---|---|---|---|---|---|
| Cash Earnings | 1,001 | 574 | 301 | 1,876 | 734 | 267 | 55 |
| Franking benefit | 301 | 173 | 89 | 563 | 203 | - | - |
| Adjusted Cash Earnings | 1,302 | 747 | 390 | 2,439 | 937 | 267 | 55 |
| Average ordinary equity | 7,896 | 5,803 | 2,839 | 16,538 | 7,615 | 2,659 | 266 |
| Equity charge | (435) | (319) | (156) | (910) | (419) | (146) | (15) |
| Economic profit | 867 | 428 | 234 | 1,529 | 518 | 121 | 40 |

| | Half Year 2012 Original | Restated |
|---|---|---|
| **Net interest income ($m)** | | |
| Australian Financial Services | 3,938 | 4,270 |
| Westpac Retail & Business Banking | 2,523 | 2,617 |
| St.George Banking Group | 1,301 | 1,444 |
| BT Financial Group | 114 | 209 |
| Westpac Institutional Bank | 626 | 881 |
| New Zealand ($A) | 538 | 601 |
| Pacific Banking | 65 | 72 |
| Group Businesses | 1,056 | 399 |
| **Group total** | 6,223 | 6,223 |
| *New Zealand ($NZ)* | 698 | 779 |
| | | |
| **Interest margin** | | |
| Australian Financial Services | 2.02% | 2.19% |
| Westpac Retail & Business Banking | 2.13% | 2.21% |
| St.George Banking Group | 1.87% | 2.08% |
| BT Financial Group | 1.62% | 2.97% |
| Westpac Institutional Bank | 1.84% | 2.59% |
| New Zealand ($A) | 2.42% | 2.71% |
| Pacific Banking | 4.93% | 5.46% |
| Group Businesses | 3.08% | 1.16% |
| *New Zealand ($NZ)* | 2.43% | 2.71% |

# Further reading on Economic Capital Allocation and Credit Risk

Rasna Bajaj, Andrew Binmore, rupak Dasgupta, and Quynh-Anh Vo "Banks' internal capital markets: how do banks allocate capital internally?" *Bank of England Quarterly Bulletin* 2018 Q2, https://www.bankofengland.co.uk/quarterly-bulletin/2018/2018-q2/banks-internal-capital-markets-how-do-banks-allocate-capital-internally

BCBS (2015) Guidance on credit risk and accounting for expected credit losses http://www.bis.org/bcbs/publ/d350.pdf

BCBS (2006) Sound credit risk assessment and valuation for loans http://www.bis.org/publ/bcbs126.pdf

Joint Forum (2015) Developments in credit risk management across sectors: current practices and recommendations http://www.bis.org/bcbs/publ/joint38.pdf

BCBS (2010) Vendor models for credit risk measurement and management. Observations from a review of selected models http://www.bis.org/publ/bcbs_wp17.pdf

BCBS (2010) Regulatory Consistency Assessment Programme (RCAP) Analysis of risk-weighted assets for credit risk in the banking book http://www.bis.org/publ/bcbs256.pdf

Baer, T., A. Mehta and H Samandari "The use of economic capital in performance management for banks: A perspective" *McKinsey Working Paers on Risk, Number 24, January 2011* www.mckinsey.com/~/media/.../24_The_Use_of_Economic_Capital.ashx

Basel Committee on Banking Supervision "Range of practices and issues in economic capital frameworks" March 2009 http://www.bis.org/publ/bcbs152.pdf

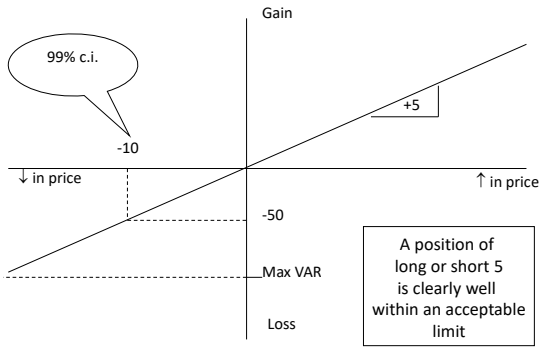
# Appendix: Setting Trading Desk Limits: An Illustration

Dealer trading limits could be related to a VAR model (using a 99 per cent confidence interval for example). For example, the bank determines economic or regulatory capital (= K) to be assigned to a particular activity (eg trading AUD/NZD). Then it is necessary to calculate a VAR* consistent with K which is acceptable. It may be that the bank is happy for the desk to operate at a risk level where VAR* = K, such that 1 per cent of days will see a loss exceeding the capital allocated to absorb the loss. Alternatively it may set VAR* = K/m where m is some multiplication factor (eg 3) such that on 1 per cent of days the loss will exceed 1/3 of the capital allocated.

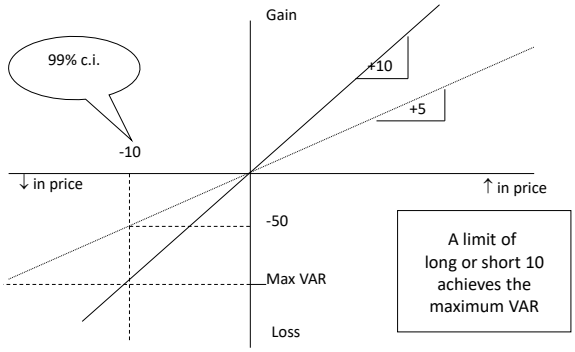
Using the fact that $\Delta$ Value of Position = (Position).($\Delta$ Price), then given volatility of price ($\sigma$) and 99% confidence limit (2.33$\sigma$) it is possible to calculate the maximum open position as

$$\text{Position}^{max} = (K/m)/(2.33\ \sigma)$$

Determining Position Limits




Determining Position Limits




## Numerical Example

Economic (Regulatory) Capital Allocated K = $10 mill

- VAR scaling factor (m) = 4
- Maximum VAR (10 day holding period) = K/m = $2.5 mill
- Price volatility = 10% p.a.
- Vol per 10 days = .10 x$(10/250)^{0.5}$) = .10 x0.2 = 0.02 per 10 days
- Maximum Position = $2.5 mill / (0.02x2.33) = $53.65 mill.

The approach outlined refers to trading limits for an activity such as a swaps or FRA desk.

Two issues

(i) How to determine VAR for range of products involved in that activity – reflecting correlations across activities. Desk will have positions in swaps of different tenors etc. Sum of VARs not equal to total VAR

(ii) How to allocate activity limits among traders

- Perhaps assume that all traders on that desk will have perfectly correlated positions (worst case scenario)?

# 17. Bank Capital Regulation

## Contents

## 17.1 Introduction

The capital requirements imposed by prudential regulators are a major determinant of bank funding (capital structure) decisions. They also affect the attractiveness of different types of lending and investments, since bankers view the cost of equity as being higher than that of deposits or debt. A higher capital requirement for a particular category of loans is perceived as meaning that the cost of funding that category is increased. Different ways of setting capital requirements for different types of institutions can also cause a non-level playing field, if some institutions face higher capital requirements for otherwise similar loans, or their total capital requirement is higher.

While each national prudential regulator will determine its own standards, there are few who do not adhere (with differing degrees of compliance) to the capital requirements set down by the international standard setter known as the Basel Committee on Banking Supervision (BCBS). The capital requirements are not straightforward to understand, and have changed since the initial introduction of Basel 1. While the current setting of capital requirements under what is called Basel 3 is all that matters for understanding how regulation is currently affecting bank capital structure decisions, it is useful to have some knowledge of the historical development of the Basel Accord in order to understand why the regulation takes its current form. That can also help in thinking about what factors might lead to future changes in the Basel standards.

This chapter briefly provides an overview of the history of the Basel Committee and the prior versions of the Basel capital requirements. It then explains the current structure of the Basel 3 capital regulations and their effects.

It is worth bearing in mind that the Basel Committee is concerned about more than just capital standards. Providing guidance on effective bank supervision and improvements in banking practices (such as risk management and governance) are among the many of its activities.

## 17.2 Basel Committee History

It is useful to be familiar with the history of the Basel Committee and its previous approaches to setting bank capital standards in order to appreciate the structure of, and ongoing issues surrounding, the current regulatory standards applying to banks. As at mid 2021, the fundamental

structure of Basel 3 had been put in place – although some changes involve transitions to new levels yet to be achieved. The Covid19 crisis promises to test whether changes made, and reactions to the crisis, will ensure bank solvency and financial stability. The Basel Committee provides an overview and guided tour of the Basel Framework on its website.

Fundamental to the current regulatory approach, and arising from that history are:

- the emphasis on a risk-weighted assets (RWA) measure to determine aggregate capital requirements for different types of risk and complications in setting risk weights;
- a "two-tier" system in which bank internal risk models can be used in conjunction with regulatory determined parameters in determining capital requirements of accredited banks, while other banks are subject to a standardised approach
- lower capital levels for accredited banks relative to "standardised" banks (partly to incentivise improvement in risk modelling and management to achieve accredited status).
- appropriate levels of capital requirements linked to RWA and the acceptability of certain types of non-equity hybrid funding instruments, able to be "bailed in" as regulatory capital
- A change in the focus of bank capital requirements from primarily "micro-prudential" (individual bank safety) to an increased emphasis on "macro-prudential" (systemic stability) issues, including higher regulatory requirements for Systemically Important Banks (SIBs).

The Basel Committee was established at the end of 1974 by Central Bank Governors of the G10 (later expanded to G20) countries as "a forum for regular cooperation between its member countries on banking supervisory matters". (BCBS) It is not a formal supranational supervisory authority, but rather encourages convergence towards common regulatory "best practice" techniques and standards. Recognising the internationalisation and cross border activities of banks, it attempts to ensure that appropriate supervision of foreign banks occurs via agreed protocols between home and host country regulators. (Fundamental to those protocols is that host country regulators supervise foreign bank subsidiaries, while foreign bank branches are supervised by the home country). The Basel Committee meets under the auspices of the Bank for International Settlements, and a brief history is available here.

There was concern in the early 1980s about deteriorating capital ratios of banks, and the committee had the dual objectives of strengthening the international banking system and reducing competitive inequality between internationally active banks. This led to the July 1988 Capital Accord involving a capital requirement for internationally active banks based on risk weighted assets (RWA) for introduction by 1992 by G10 members. This Basel I capital accord (as it has become known) was subsequently adopted by most countries with internationally active banks – and also applied to banks operating domestically.

In Basel 1, risk weighting of assets and off-balance-sheet positions was based on credit risk using a small number of risk weights from zero to unity. The risk weighted capital requirement was set at 8 per cent which was largely based on an average figure across jurisdictions which it was felt was

politically achievable as a minimum requirement – rather than a specific number calculated as "optimal". Allowable regulatory capital was divided into several "Tiers" incorporating some non-equity liabilities (which might absorb losses in a bank failure and help protect depositors) as well as equity. The capital requirement was that total capital was required to exceed 8 per cent of RWA and several restrictions applied to the composition of total capital to limit use of non-equity capital in meeting the requirements.

Subsequent developments have involved:

- In 1993 some attention was given to interest rate risk in the balance sheet book by both the US Federal Reserve and the Basel Committee – but no progress was made on creating regulatory standards at that time.
- In January 1996 an amendment to Basel 1 was made to incorporate capital requirements for market (trading book) risks. This saw the start of a two-tier approach – allowing for both a standardised approach and, for accredited banks, an *internal models* (VAR based) approach in calculating required capital.
- In 1999 a proposal was released for a new Accord (Basel 2) incorporating a "Three Pillars" approach based on capital requirements, supervision, and market discipline as necessary, complementary, ingredients in ensuring bank safety. This also allowed accredited banks to use their internal credit risk models (in conjunction with applying some specified regulatory parameters) for calculating risk weights and required capital. Capital requirements for *operational risk* were also introduced. To encourage banks to improve risk modelling and management, the capital standards provided the opportunity for accredited banks to operate with lower capital than if they had remained under the standardised approach. Capital requirements for interest rate risk in the banking book (IRRBB) were also produced – but as a "Pillar 2" (supervision) option for national regulators to consider for adoption.
- In 2006, Basel 2 was agreed upon, for introduction in (generally) 2008.
- In 2009 significant changes to the Basel 2 risk weights, referred to as Basel 2.5, were introduced following deficiencies identified in existing approaches during the global financial crisis.
- Further substantive changes were made in 2011, sufficient in scale for the Basel Committee to refer to the new standards as Basel 3. These involved requirements for higher and "better quality" capital (to be implemented gradually) as well as risk weight changes. Liquidity requirements were introduced (also for gradual implementation). Basel 3 also saw considerable emphasis placed on "macro-prudential" aspects of bank regulation supplementing an approach which had been primarily "micro-prudential" up until that time.
- Although "counterparty credit risk" (CCR) was included in Basel 1 and 2, in Basel 3 it was made more explicit as a separate category to "credit risk". CCR "is the risk that the counterparty to a transaction could default before the final settlement of the transaction in cases where there is a bilateral risk of loss. The bilateral risk of loss is the key concept on which the definition of counterparty credit risk is based" Basel Committee (Section 51.2) For example, a bank may enter an interest rate swap with a counterparty where it may lose if interest rates move against it, or the counterparty might lose (and the bank gain as long as the counterparty doesn't default) if interest rates move the other way.
- In 2014 and following years a number of further changes were proposed (and some implemented) which many commentators (but not the Basel Committee) referred to as

Basel 4. These include: requiring use of a revised standardised approach for credit risk for a number of asset classes rather than allowing use of the internal models approach (2016 consultative document d362); a fundamental review of the trading book (FRTB) capital requirements; removal of the internal models (advanced management) approach for operational risk capital requirements (2016 consultative document d355). These, and other, changes are summarised in a BCBS December 2017 document accompanying the "Basel iii: Finalising post-crisis reforms" document. The finalised minimum capital requirements for market risk were released in January 2019. Some of these are not due for implementation until 2022 or 2023 (with the previous expected completion dates having been deferred due to the Covid Crisis).

## 17.3 The 1988 Basel Accord (Basel I)

The initial approach was based on the view that a simple leverage ratio requirement (capital/total assets) was inadequate as a regulatory tool because it was not related to bank risk-taking and did not take into account off-balance sheet activities which could also be a source of credit risk. Hence, the approach related required regulatory capital to a bank's (credit) risk, via risk weighting of assets and incorporated off-balance sheet credit exposures. The risk weighting structure also lowered disincentives to holding liquid low risk (but low yielding) assets.

There was some variation between countries in the way Basel 1 was implemented (including joint use of leverage ratio in some countries, particularly the USA). While Basel Committee members and most other OECD countries adopted Basel 1 quickly, take-up throughout the emerging and less developed nations was quite slow.

The fundamental basis of Basel I, which has remained in place through subsequent modifications, is the requirement for banks to have a risk based capital ratio (sometimes referred to as a "Cooke" ratio in reference to the then Chair of the Basel Committee) exceeding the required minimum of 8 per cent. The risk based capital ratio is calculated as Eligible capital base/Total risk weighted exposures, where eligible capital (a) incorporates some non-equity liabilities and (b) involves deduction of some amounts from reported balance sheet figures. Risk weighted exposures were credit (or counterparty) risk arising on-balance sheet (such as from loans and investments) as well as off-balance sheet from non-market related activities (such as provision of guarantees, credit facilities) or market related activities (such as trading book positions in swaps, FRAs, derivatives) where counterparties might default on their obligations to pay. While such OBS activities may involve no current credit risk, there is the potential that a credit risk could emerge over time (from a customer drawing upon a credit facility or a swap position becoming "in the money") and the approach attempted to incorporate such potential exposures as well as actual exposures.

In Australia, APRA applied the risk weights shown in Table 1 to on-balance sheet items (and the lack of "risk sensitivity" involved – such as applying the same risk weight to any corporate or unsecured

personal loan – has been one of the drivers of subsequent changes). Risk weighted assets for on-balance sheet positions were calculated by multiplying dollar amounts in each category by the corresponding risk weight and aggregating.

**TABLE 1: APRA'S BASEL 1 RISK WEIGHTS**

| Asset Category | Risk Weight | Examples |
|---|---|---|
| A1 | 0 | Notes & Coin, Deposits at RBA, CGS, State Govt Debt |
| A2 | 0.2 | Claims on local Govt., claims on banks |
| A3 | 0.5 | Residential mortgage loans, Stockbroking positions |
| A4 | 1 | Claims on non bank private sector, fixed assets |

In addition, credit exposures from OBS items needed to be considered and described in RWA terms to be combined with the on-balance sheet RWA. To do this, types of OBS activities were listed and "credit conversion factors" prescribed to convert the dollar amount of an OBS position into an equivalent on-balance sheet amount, which could then be subsequently converted into a RWA amount by reference to the counterparty. The credit conversion factors for non-market related OBS positions are given in Table 2. Thus, for example a guarantee provided by the bank (a direct credit substitute) for an amount of $1 million would be converted into an on-balance sheet equivalent of $1 million. If it were a guarantee provided over a payment by a local government (in asset category A2), that would then be equivalent to $200,000 RWA, but if it were over a payment by a company (category A4) it would equate to a RWA amount of $1 million.

**TABLE 2: NON-MARKET RELATED (AND BASEL 1 CREDIT CONVERSION FACTORS)**

| Off-Balance-Sheet Activity | Conversion factor |
|---|---|
| Direct Credit substitutes, Assets sold with recourse | 1 |
| Repos, Forward Asset Purchases | 1 |
| Performance related Contingent items | 0.5 |
| Note Issuance and Revolving Underwriting Facilities | 0.5 |
| S-T self-liquidating trade-related contingencies | 0.2 |
| Long term revokable commitments | 0 |

For market related positions in futures, forwards, swaps, options etc on interest rates, FX or commodities etc., the current mark to market value (if positive, such that the bank was owed money

from the position) was the current exposure, and this was supplemented by a procedure for calculating a "potential exposure" amount. As with the non-market-related positions, the identity of the counterparty would determine the risk weight to be applied.

These capital requirements were applied to domestically incorporated ADIs (including subsidiaries of foreign banks), while branches of foreign banks were subject to regulations of their home country as provided for by the Basel Accord. The capital requirements were applied at three levels

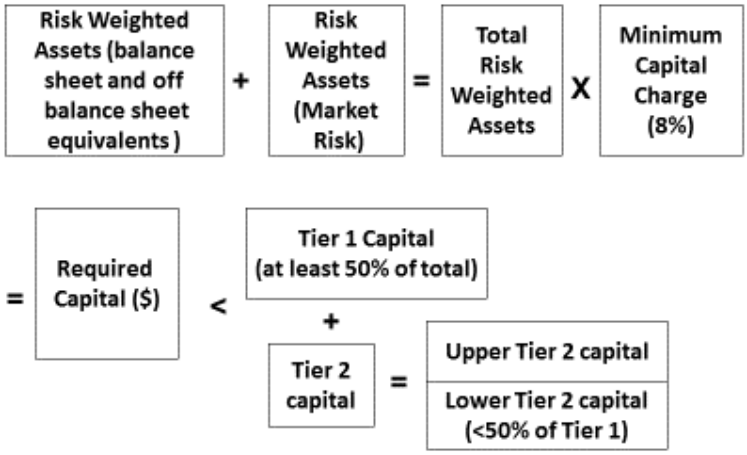
- Level 1: stand alone ADI (and extended licence entities)
- Level 2: consolidated banking group (excludes insurance, funds management / trustee operations, non-financial subsidiaries)
- Level 3: conglomerate groups

The 1996 introduction into Basel 1 of a market risk capital requirement was based on identifying the potential losses which might be suffered from a bank's trading positions and requiring sufficient capital to absorb such losses (to some high level of confidence). As well as incorporating an additional type of risk into the RWA approach to capital requirements, this amendment also introduced the "two tier" approach which has prevailed since in which banks accredited by the regulator would be able to use their internal risk models for calculating the capital required. For those banks a "Capital Charge" (as a dollar amount) was calculated using the Internal Models Approach based on a VaR calculation for a specified holding period and confidence interval, and where banks were required to demonstrate the robustness of their models by "backtesting". For other banks, the "Standardised Approach" provided a template into which positions were slotted and weights applied for calculating the capital charge. To convert this into a RWA equivalent (for ease of combining with the credit risk figure) the capital charge was multiplied by 12.5.[1]

Figure 1 shows the process by which the capital requirement was determined

[1] 12.5 is the inverse of 0.08 which is the capital required per dollar of RWA.

FIGURE 1: CALCULATING THE BASEL I CAPITAL REQUIREMENT




The eligible capital was defined to include both "going concern" and "gone concern" liabilities which could be used to absorb losses and protect depositors. *Tier 1* ("going concern") was meant to have the characteristics of being permanent, unrestricted in use, freely available to absorb losses, with no unavoidable servicing charges, and ranking behind depositors and other creditors. In practice this was the sum of equity, perpetual non-cumulative preference shares etc., less intangibles, future income tax benefits, and some equity investments etc. *Tier 2* ("gone concern") were those liability items which would rank below depositors in the event of a liquidation of the bank. The Upper Tier 2 was essentially permanent items such as mandatory convertible notes etc plus revaluation reserves, general provisions for doubtful debts (<1.25% of RWA) etc. The Lower Tier 2 was non-permanent items such as term subordinated debt with initial life > 5 years (with amount amortised if remaining life < 5 years etc).

Investors in Tier 2 instruments were, according to the Basel approach, expected to bear losses if the bank failed – with this approach enabling banks to economise on use of equity capital as a loss absorbing buffer. The fact that during the GFC, governments felt obliged to "bail out" banks, including by providing guarantees and equity injections which prevented potential failures, and thus did not required Tier 2 capital instrument holders to incur losses, was a major factor in subsequent changes which have required greater use of "higher quality" capital.

## 17.4 Basel II

The Basel II Accord agreed in 2006 had a number of new initiatives. First it expanded the "two tier" system, involving use of an *Internal Models Approach* for accredited banks and a "template" *Standardised Approach* for others, to calculating capital requirements for credit risk. Second, it

introduced capital requirements for *Operational Risk*, and also applied the two tier approach. Third, it emphasized that capital requirements were only one ingredient in ensuring that banks behaved prudently and limited the risk of depositors suffering losses. This is the so called "Three Pillars" approach. As well as capital requirements, effective supervision and market discipline were seen as other pillars fundamental to limiting bank risk-taking.

Underpinning the changes to capital requirements for credit risk were the views that:

- Basel I risk weights did not have sufficient risk-sensitivity and were not appropriately calibrated across asset classes;
- large banks had developed sophisticated internal risk models which were thought to be better able to assess credit (and other) risks and determine appropriate capital levels than regulatory template models; and
- regulatory standards should be set to incentivize banks to improve internal risk models and risk management.

In introducing the new approach, the calibration of overall capital requirements was based on there being no planned change in aggregate capital requirements for the banking sector as a whole. (While credit risk capital charges would decrease, these would be offset by the new capital charges for operational risk). However, to provide Incentives for banks to improve risk measurement and management, there would be lower required capital for accredited banks resulting from use of the internal models approach compared to the standardized approach.

This has had several consequences which have proven to be weaknesses of the two-tier approach. First, accredited banks had scope to "game" the system by internal calculation of risk weights which were low and led to reduced required capital. Subsequent *quantitative studies* by the Basel Committee found quite marked differences between bank assessments of the risk and required capital for specified hypothetical portfolios – not all of which could be adequately explained. A second consequence was the creation of a non-level playing field with banks operating under the standardized approach subject to higher capital requirements and a potential competitive disadvantage.[2]

To some extent the introduction of a "capital floor" for accredited banks specifying that their internally derived required capital could not be less than some specified percentage (eg 80) of what it would have been under Basel 1, limited the extent of these consequences. However, it has not prevented them, and subsequent Basel 3 changes replaced this with an "output floor" in which

[2] However, it should be noted that if the risk modelling and management systems of accredited banks are sufficiently better, any competitive disadvantage of standardised banks could reflect that difference, rather than the lower regulatory capital ratios *per se*.

allowable, internally calculated, RWA could be no less than 72.5% of what would be calculated using the new standardized approaches.

The Basel 2 approach also allowed for capital requirements for interest rate risk in the banking book (IRRBB), but as a "Pillar 2" option for national regulators to consider (and which has been adopted in Australia for accredited banks by APRA). Figure 2 provides an overview of the Basel 2 capital requirements. Within the credit risk capital requirements there is provision for two forms of IRB (Internal Ratings Based) approaches. In the Advanced approach, banks could use their internal models to determine PD and LGD for input into Basel provided formulae for required capital, whereas the Foundation approach does not allow for bank determination of the LGD. Under operational risk, banks which were not accredited to use internal models had a choice between two approaches of differing levels of complexity of calculation.

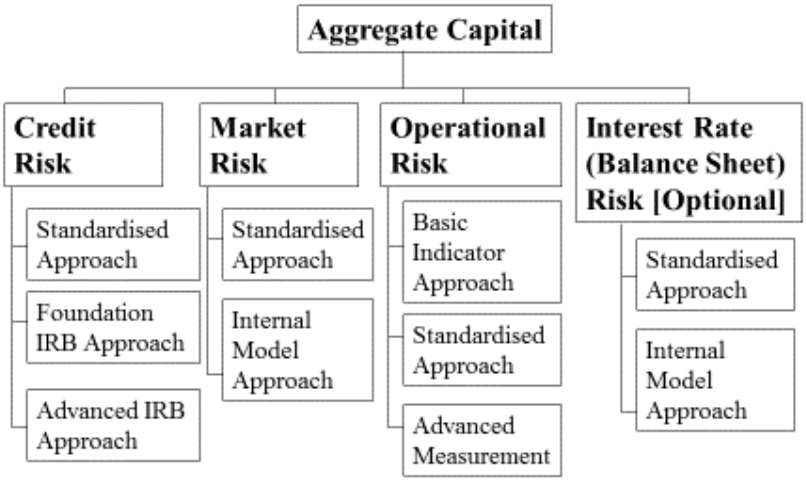



FIGURE 2; BASEL 2 CAPITAL REQUIREMENTS

While the Basel 2 approach was still based around the Risk Weighted Assets (RWA) approach, the mechanics of determining capital requirements is slightly different, because the operational risk calculation and internal model/advanced approaches calculate a dollar capital requirement directly. Then a risk weighted assets (RWA) amount is derived as

$$RWA = \frac{1}{0.08}\left(\sum_i k_i EAD_i + K_{MR} + K_{OR}\right)$$

where $K_{OR}$ and $K_{MR}$ are the required operational and market risk capital respectively, $EAD_i$ is the credit exposure at default of exposure "I" and $k_i$ is the capital requirement for that exposure. (So the first term in brackets is the capital requirement for credit risk)

The changes to the credit risk standardised approach introduced by Basel 2 were quite substantial.

For banks, corporates and sovereigns, risk weights were to be related to external credit assessments by ratings agencies where those were available. Bank risk weights were to be lower than corporate risk weights for equivalent ratings. Risk weights for retail mortgage loans declined from 50% to 35%, while retail exposures (including SMEs) under 1 mill Euro declined from 100% to 75%. For loans past due (> 90 days) there was an increase in risk weight (amount dependent on specific provision made).

In the context of what happened in the global financial crisis which struck before Basel 2 was generally implemented, some of these changes appear anomalous. Credit ratings agencies lost much credibility, exposures to financial institutions were seen to be more of a threat to financial stability than exposures to corporates, and some sovereign exposures appeared to be high risk. Mortgage lending (subprime) became recognised as a potentially significant source of risk.

Pillar 3 of Basel 2 gave emphasis to the role of market discipline in limiting risk taking by banks. Recognising that market discipline requires access by market participants to information about bank activities and conditions, it required that banks should make regular public disclosure of the following information

- Capital structure and components of capital
- Accounting policies including valuation, income recognition, and provisioning
- Information about risk exposures and risk management strategies
- Capital adequacy position and measures of risk exposures
- Analysis of factors affecting capital adequacy position

APRA introduced requirements for such disclosure in APS330 which took effect from 2008 (and subsequent changes were made with the introduction of Basel 3).

## Credit Risk – for banks using the IRB approach

To be accredited to use the IRB approach, banks had to meet a range of conditions. These included not just having acceptable credit risk models, but also having information systems enabling calculation of risk and verification of model robustness, as well as risk management structures deemed suitable by the regulator. For the major Australian banks, the costs of enhancing their systems, practices and processes to gain accreditation were each over a hundred million dollars.

In terms of modelling requirements, different exposure classes such as corporate, sovereigns, banks, retail, had to be identified and credit risk models available for each category. Such models were required to be able to estimate:

- PD – probability of default (1 year horizon)
- LGD – loss given default (% of exposure)
  - For the Foundation approach, LGD = 45% if unsecured, 75% if subordinated

- EAD – exposure at default (e.g. loan size)
- M – maturity
  - For the foundation approach, M was set as 2.5 years

To derive the capital charge and RWA, for each asset category it was necessary to find k = capital/exposure = VAR(99.9%), and convert to RWA = kx12.5xEAD.

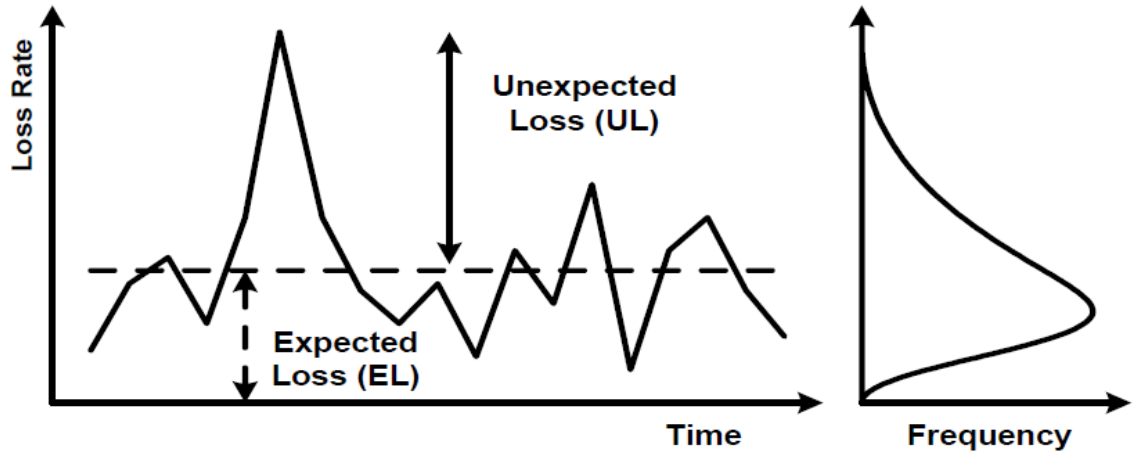



FIGURE 3: BASEL COMMITTEE DEPICTION OF CREDIT LOSS EXPERIENCE (SOURCE: BCBS, 2005)

To calculate K for each portfolio (asset category), formulae were specified by the Basel Committee, and the basis for these is explained in an explanatory note produced by the Basel Committee.3 Figure 3 shows how the concept of a loss probability density function, and a distinction between expected loss (EL) and unexpected loss (UL) forms the basis of the approach.Given a stochastic model which generates such a probability density function, it is possible to estimate how much capital a bank needs to absorb unexpected losses at some probability level (eg 99.9 per cent of the time) for a specified horizon (such as one year). This is a value at risk (VaR) approach as shown in Figure 4. Expected losses are assumed to be met by having provisions and pricing loans such that interest income covers the expected loss. At an aggregate (bank) level, the required (or economic) capital thus relates to achieving a specified maximum probability (eg 0.01 per cent) that the bank could become insolvent over a one year horizon. The complication then is how to link this to the composition of the bank's asset portfolio enabling an aggregation of required capital for each particular credit exposure to give the overall bank capital requirement for credit risk.

[3] In that document (page 2), the Committee makes the following statement that is, at best, misleading and could be interpreted as bank capital as being something held and not used for investments. "Banks have an incentive to minimise the capital they hold, because reducing capital frees up economic resources that can be directed to profitable investments." This only makes economic sense if interpreted to mean that shareholders could withdraw and allocate such capital to other more profitable investments outside of the bank.

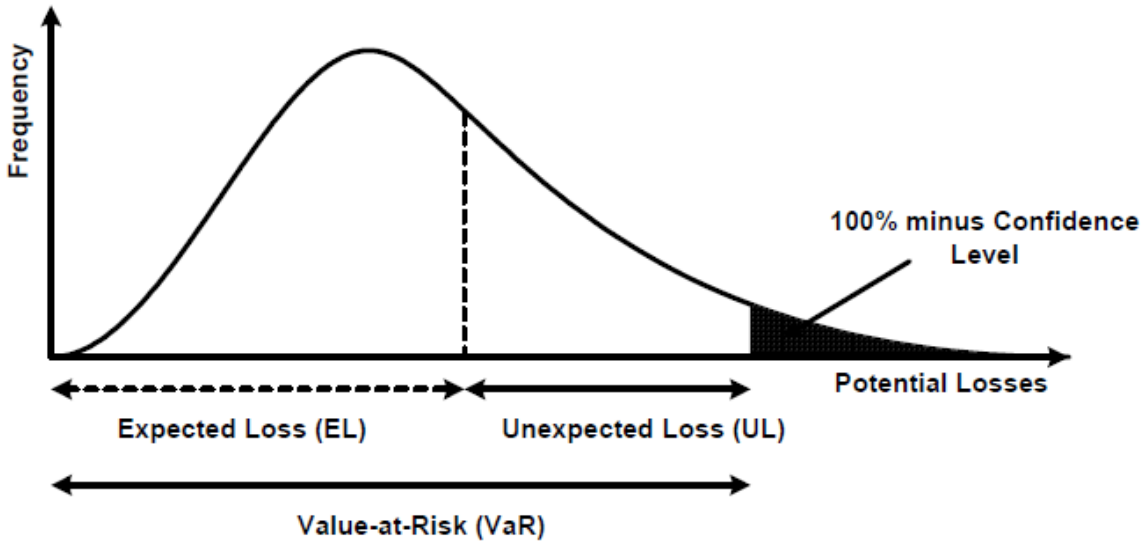



FIGURE 4: BASEL COMMITTEE DEPICTION OF REQUIRED CAPITAL DETERMINATION (SOURCE: BCBS, 2005))

The approach is based on single factor model in which underlying asset values of obligors and thus ultimately default risk are all driven by one common factor and idiosyncratic risk. To ensure that the approach can be applied to any bank irrespective of its portfolio composition, it is assumed that the bank's credit portfolio is sufficiently well diversified such that the contribution of any individual loan to overall risk depends only on its characteristics and not on correlation with the specific features of a bank's (less well diversified) portfolio.[4] (Any consequences arising from lack of diversification are expected to be dealt with by supervisors under Pillar 2). The resulting approach to required capital determination is thus referred to as "ratings based" since it only depends upon particular characteristics of the obligor – specifically the PD, LGD and EAD. Notably, under the asymptotic single risk factor (ASRF) model, these parameters determine both EL and UL. In the formulae below, it can be seen that the principal ingredients are PD and LGD which banks use to determine EL for incorporation in loan pricing formula. (The other elements are a maturity (M) adjustment and a correlation factor (R) applicable to each class of assets). In the formula, it can be noted that the capital requirement involves subtraction of PD*LGD (shaded in red) which is the expected loss amount, such that capital required relates only to unexpected loss.

In the Basel 2 approach, accredited banks calculate average PD's for loans using their own proprietary models and a LGD under the assumption that default occurs in an economic downturn. The Basel use of an ASRF model involves complicated formulae that convert the bank's PD estimates into PD's conditional on some adverse outcome of the single risk factor against which a capital

[4] The analogy with the market's required return of a stock depending only on its beta (covariance with the market portfolio) in the CAPM model and not on its idiosyncratic risk or its covariance with some investor's undiversified portfolio may be helpful for understanding.

requirement is calculated which is assumed appropriate for ensuring (at a high level of confidence) the bank's solvency.

The ASRF model is based on Merton, R. C. (JF, 1974) and Vasicek, O. (RISK, 2002) and developed specifically in Gordy, M. B. (JFI, 2003). It enables calculation, for each specified asset class, of the marginal contribution of any loan to the capital required irrespective of the rest of the bank's exposures. Perhaps the simplest way to interpret the formulae is as follows:

- Assume R = 0 and M = 1, such that the formula becomes simplified to: K = LGD*N[G(PD)+G(0.999)]-PD*LGD.
- From Figure 4, the bank's expected loss is EL = PD*LGD, and the bank's estimate of PD is the area under the curve to the right of EL which is equal to the value of the cumulative standard normal distribution (CSND) function for some particular value of the single risk factor giving rise to that PD. To get that value of the risk factor use the inverse of the CSND (G(.)) and then add to that its value at a 99.9 per cent confidence value. The CSND of that single risk factor value is the probability of loss which multiplied by LGD gives the total loss at that confidence level. For calculating economic capital, which is related to unexpected loss, it is then necessary to subtract the expected loss (PD*LGD).

The degree of correlation (R) between asset values in a particular asset class implies correlation of default probability. Essentially, a high correlation will mean that the loss distribution will have a larger variance around a given expected loss, such that the UL will be higher for a given EL. The formula incorporates a maturity (M) adjustment (relative to an assumed 2.5 years and shaded in gray) reflecting the fact that longer term loans are more risky such that a credit downgrade would have a larger effect on its MtM value. The single factor model has the property that the risk calculation for a particular asset is independent of other components of the portfolio, making the capital required not dependent on the composition of the bank's portfolio and thus applicable across all banks without need for modification.

**IRB Capital Requirement Formula**

$$K = \left[LGD * N\left[(1-R)^{-0.5} * G(PD) + \left(\frac{R}{1-R}\right)^{0.5} * G(0.999)\right] - PD * LGD\right] * \frac{(1+(M-2.5)*b(PD)}{(1-1.5*b(PD)}$$

$$b\,(PD) \;=\; (0.11852 - 0.05478 \times log\,(PD))^2$$

$$\mathrm{R} = \; 0.12 * \left(\frac{1-e^{-50*PD}}{1-e^{-50}} + 0.24 * \left[1 - \frac{1-e^{-50*PD}}{1-e^{-50}}\right]\right.$$

K is capital required as a percentage of EAD (exposure at default) – amount expected to be outstanding (incorporating repayments and drawdowns of limits) if borrower defaults within a year
R is a correlation coefficient – the formula shown is for corporate exposures (ignoring an additional adjustment term for small exposures). For residential mortgages (qualifying revolving retail exposures) correlations of R = 0.15 (0.04) were assumed, while for other retail exposures a similar formula for corporate exposures, but with different parameters is used implying a lower correlation of default.

B(PD) is a smoothing function relating the maturity adjustment to PD
N(.) is cumulative standard normal distribution
G(.) is inverse cumulative standard normal distribution

Figure 5 shows the illustrative Basel 2 risk weights (equal to 12.5*K) in relation to PD's for different asset classes

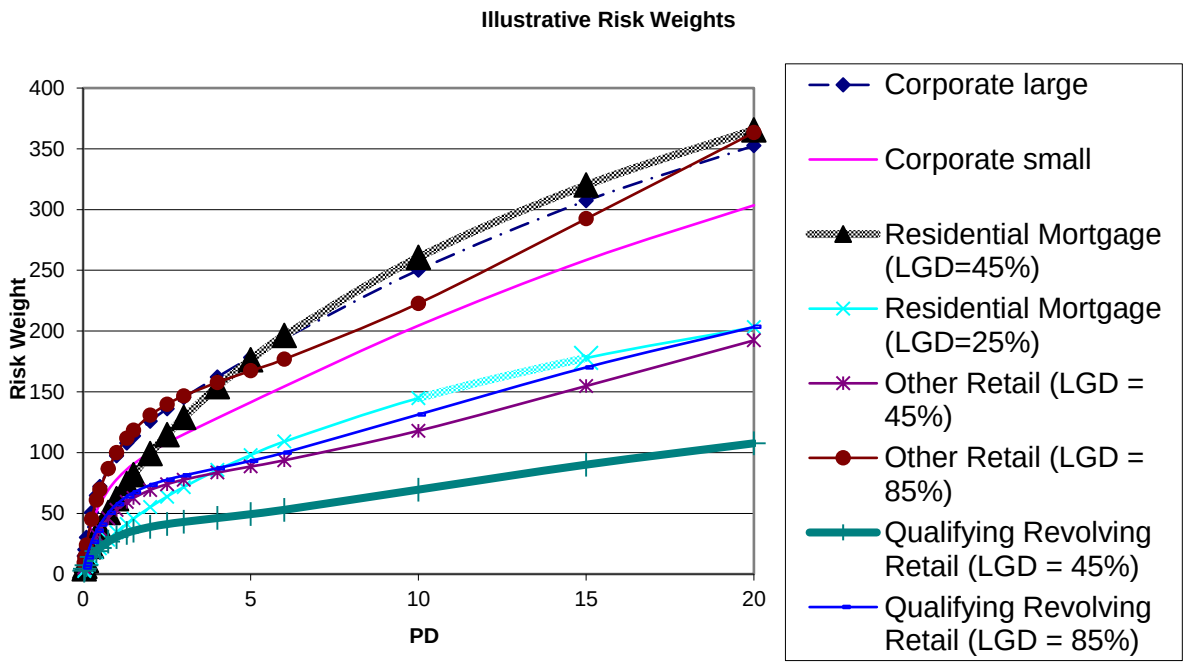



FIGURE 5: BASEL 2 RISK WEIGHTS

## Credit Risk Mitigation

One innovation in Basel 2 was to allow for credit risk mitigation, since there had been significant growth in techniques of credit risk mitigation and advances in credit risk management which created problems for the original Basel Accord approach which ignored this. There are a number of approaches to risk mitigation.

One was provision by a counterparty of financial collateral (such as in borrowing by way of a repo). A simple approach involves substitution of the collateral issuer's risk weight for collateralised part of the loan. The Comprehensive Approach was to apply "haircuts" and get an adjusted exposure or adjusted LGD (in IRB approach). Another form of risk mitigation is by way of netting out offsetting exposures (such as on a trading book of trades with a counterparty). Basel 2 recognised "netting" to some degree. Also counterparty exposures could be mitigated by use of guarantees or purchasing protection via credit derivatives. For the protected part of an exposure, under the Standardised Approach – use risk weight of guarantor, under the IRB (Foundation) approach – use PD of guarantor.

### Basel 2 consequences

In setting Basel 2 Capital Requirements, the stated aim was to maintain the current average capital levels for banking overall – after addition of capital for operational risk. This Implies lower risk weights for credit risk for some counterparties. Consequences were that for banks on the Standardised Approach, the average capital requirement could increase, because of capital concessions for IRB banks. Foundation Approach bank capital ratios were expected to be around 90% of that for standardised approach. Advanced Approach banks would have a lower capital ratio – as low as 80% of standardised approach. (Even if the internal models suggested less, Basel 2 incorporated a "capital floor" which required capital for credit risk to be no less than 80 per cent of what would have been required under Basel 1. In deriving the new metrics, the Basel committee was aiming to provide incentives for banks to improve their risk management capabilities (by way of capital concessions) while limiting impacts on competitive neutrality and overall risk levels in banking.

## 17.5 Some GFC Bank Regulation Lessons and Basel 2.5

Basel 2 had barely been agreed when the GFC struck and the various explanations for its origins prompted a rethink of some of the approaches implied by Basel 2. In that regard however, it needs to be remembered that most banks were still operating under Basel 1, such that some of those causes of the GFC are more correctly directed at inadequacies in Basel 1.

The list of failings included

- Inadequacy of Value at Risk (VAR) – in trading books, VAR based on historical correlation structures proved inadequate as correlations changed in the crisis, and the sizes of losses were in the tail of the distribution were not considered.
- Incorrect risk weights (including securitisation) gave incentives for risk taking (and potentially mispricing of risks)
- Liquidity risks were not adequately captured, since they were not part of the Basel framework. Moreover, some liquidity risks, such as bank support to conduits and SIVs became credit exposures for the bank.
- Asset valuation problems – accounting practices and inadequate recognition of potential losses meant that capital was overstated. More generally mark to market accounting for some investments could exacerbate bank capital problems.
- Significance of collateralised financing
- Systemic problems from complex interdependencies due to bilateral exposures
- Market reactions inhibiting banks taking capital conservation measures – banks in stressed positions were often unwilling to take actions such as cutting dividends or attempting new issues of eequity.
- Inadequacy of core capital – the Basel capital requirements enabled banks to operate with common equity capital as low as 2 per cent of risk weighted assets, which was inadequate to

absorb losses

- Ratings and model inadequacies – ratings of structured products by ratings agencies did not adequately reflect risk.

### Regulatory Risk weight changes: Basel 2.5 (July & Dec 2009)

The first response to the crisis was to introduce a number of risk weight changes in 2009. These involved:

- an increase in the relative counterparty risk weights for financial institutions versus corporates, reflecting the increased concerns about interdependencies in the financial system and systemic risk
- Increased capital requirements for counterparty risk on derivatives, repo and securitization transactions.
- Lower relative risk weights for counterparty derivatives exposures to CCCPs versus bilateral exposures.
- Use of "downturn" PD estimates (and "downturn" LGD)
- Use of "Stressed" VAR in determining capital requirements
- Reduced reliance on ratings agency assessments
- Expected loss provisioning.

## 17.6 Basel 3 (2011)

The most fundamental changes occurred with the introduction of Basel 3 in 2011 which made substantive changes to the quantity and quality of required capital as well as further changes to risk weights. The key changes are shown in Table 3, and a comparison of total equity capital requirements under Basel 3 and Basel 2 shown in Figure 6.

**TABLE 3: BASEL 3 CHANGES**

| | |
|---|---|
| Minimum Requirement | 8% of RWA - *unchanged* |
| Capital Conservation Buffer | Additional common equity (2.5 % of RWA) - constraints on distributions (dividends, bonuses) if capital ratio < 10.5 % of RWA *(new)* |
| Minimum Tier 1 Capital | 6% of RWA *(up from 4%)* |
| Common Equity Tier 1 (CET1) | > 4.5 % of RWA, plus conservation buffer *(new)* |
| Quality of Capital | Fewer acceptable hybrids for Tier 1, greater deductions in calculating common equity. Tier 3 capital instruments eliminated, "bail-in' requirements for additional tier 1 (AT1) and Tier 2. |
| Leverage Ratio | Minimum non-risk weighted ratio of common equity to exposures of, initially, 3% *(new)* |
| Risk Weights | Increased weights for some activities |
| Countercyclical Buffer | Up to 2.5% *(new)* |

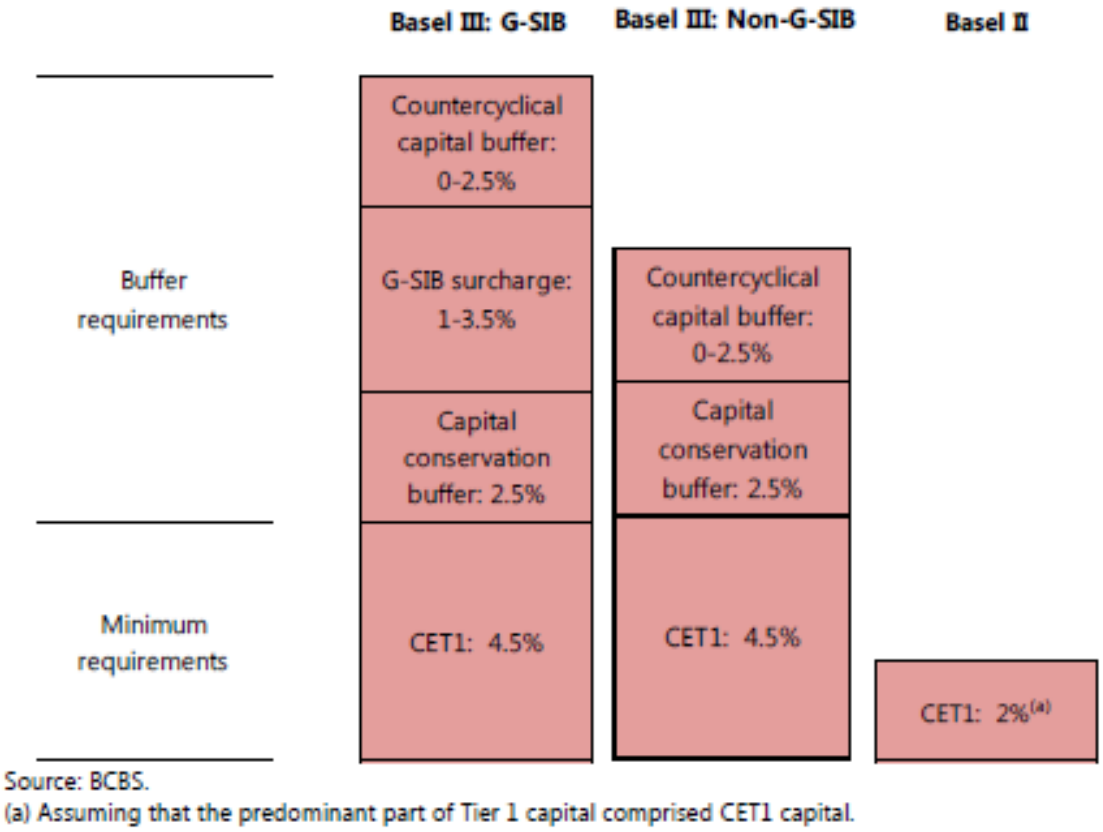



FIGURE 6: BASEL 3 V BASEL 2 CAPITAL CHANGES : SOURCE - BASEL COMMITTEE

## Measuring Capital

Capital is a balance sheet residual equal to the value of assets less value of (some) liabilities, and for regulatory purposes, certain assets will be excluded from the calculation or valuations limited in some way. In this regard, regulatory CET1 is the value of allowed assets less all other liabilities, while regulatory Tier 1 is the value of allowed assets less all liabilities other than CET1 and AT1 instruments. Total capital is allowed assets less liabilities other than CET1, AT1 instruments, and Tier 2 instruments. In calculating capital, however, some part of the AT1 or Tier 2 instruments might be given a "haircut" if, for example they mature within some specified time such as five years. In effect, some part of the amount outstanding is treated as other liabilities rather than capital.

Consequently accounting (valuation) matters, and in recent years there have been a number of significant accounting changes in progress. These include:

- Asset valuation
- Derecognition
- Netting/offsetting
- Impairment and provisioning

A fundamental issue has been International convergence on IFRS and with Basel and particularly a move to expected credit loss (ECL) accounting frameworks by accounting standard setters. This occurred with the introduction of IFRS9 ( See BCBS December 2015) for BCBS of the need for change).

## Higher Quality Capital

Basel 3 imposed requirements for "higher quality" capital, requiring: Tier 1 > 6% of RWA; Common equity > 4.5% of RWA; greater required deductions (of things like deferred tax assets, equity investments, goodwill etc) in calculating common equity; "bail-in" and other design requirements for non-common Tier 1(AT1) and Tier 2 instruments. The rationale for higher quality capital reflected the following considerations:

- Basel II could be met with equity/assets of 2 %
- Relevance of preference/hybrid instruments as a loss buffer irrelevant if TBTF means that is never used.
- Macro-prudential considerations
  - Higher ranking instruments create an impediment to raising new equity
    - Benefits accrue mainly to holders of those instruments

## Procyclicality of capital requirements and countercyclical capital buffers

There is inherent procyclicality in banking. In a downturn, loan losses reduce capital and prompt lending restraint, and PD's increase unless a "through the cycle" approach is applied. Asset bubbles increase measured collateral and thus lower estimated LGD

Basel 3 introduced the possibility of reducing procyclicality via a countercyclical capital buffer (CCyB) requirement, involving – at the discretion of the regulator - higher minimum (CET1) capital requirements in upswing and lower in downswing. In good times there would be a build up of capital buffers for use in poor times (when they could be reduced to reduce disincentives to credit expansion).

A difficult issue is how countercyclical buffers should be implemented – should there be specific rules, or should regulator discretion be applied. Basel 3 suggests basing decisions on (*et al*) deviation of credit/GDP from trend). There has been much subsequent discussion on potential indicators to use (see for example Tolo et al (IJCB, 2018). In practice, regulators may be hesitant to reduce required capital ratios in a downturn when bank strength might be weakening.

In Australia, the CCyB has, to date, been set at zero. However, with the advent of the Covid Crisis, APRA signaled to banks that some reduction in the buffers they maintained against minimum requirements and "exceptionally strong" targets would not be viewed askance.

## Capital Conservation Buffers (CCB)

A feature of the GFC was that many banks continued to make distributions to shareholders and pay

bonuses to staff at a time when their capital positions were weakening and they were unwilling or unable to raise new equity capital. The Basel 3 response has been to introduce capital conservation requirements which require that a ratio of Common equity/RWA > 7 % is needed to sustain dividend payout ratios. As CET1 ratios decline below that figure, the maximum allowable distribution rate falls and no discretionary distributions (dividends, bonuses etc) are permitted if the ratio falls to 5.125 per cent.[5] Figure 7 illustrates and shows that maintenance of pre-Covid Crisis dividend payout ratios for Australian banks require CET1 ratios in excess of 7 per cent. These changes took full effect in 2019 after a transition period (which commenced in 2016). If the countercyclical buffer is in operation the required CET1 ratios would be higher.

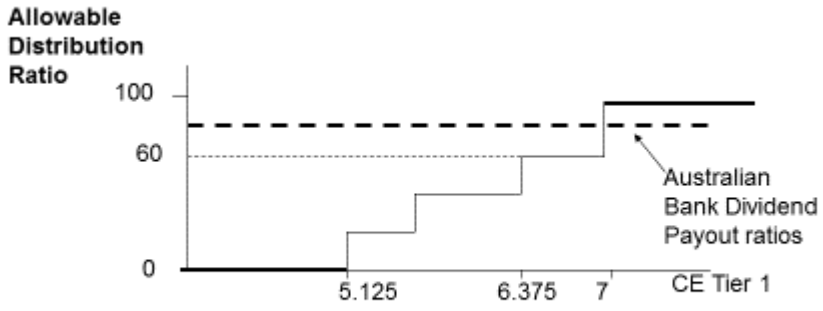



**FIGURE 7: CAPITAL CONSERVATION BUFFERS AND PRE-COVID DIVIDEND PAYOUT RATES**

## Leverage Ratio

Basel 3 also introduced a *Leverage Ratio* as a "backstop" to the risk weighted capital ratio. The rationale was (a) to constrain leverage and risk of a destabilizing leverage process (a macro prudential concern); (b) as an additional check against model risk and measurement error (non-risk based "backstop")

The suggested minimum requirement was a ratio of Tier 1 Capital/Exposures > 3 % with a trial period of 2013-2015 prior to formal introduction. In calculating the ratio, Tier 1 deductions are also made for exposures, and there is a complicated measurement of exposures which might be described as Accounting and "Basel+" where for example there is a Credit conversion factor (CCF) of 100% for some OBS items applied).

Leverage ratios have been used in a number of jurisdictions such as the USA, Canada, Switzerland in conjunction with the risk weighted approach. In some cases, such as the USA, the leverage ratio has

[5] The minimum CET1 ratio is 4.5 so 5.125 involves a decline of ¾ of the gap between the 7 percent figure and 4.5 figure.

been a binding constraint on banks rather than the risk weighted capital ratio. There is much ongoing debate about the merits of a leverage ratio and where it should be set relative to the risk weighted ratio. There have been a number of studies which suggest that the leverage ratio may have had more effect in constraining bank behavior, and that in the GFC counterparties paid more attention to leverage ratios than to risk weighted capital positions. One issue in interpreting that information is, however, that the comparison involves the Basel 1 ratios which were not very risk sensitive.

The problems with a leverage ratio requirement are that it does not adequately deal with off-balance sheet activities, does not explicitly incorporate market and operational risk, and downgrades the role of risk weighting. Australian banks and regulators were not generally supporters of a leverage ratio requirement other than as a "backstop".

Leverage Ratio Calibration - calculation of how a specific value would relate to a risk weighted capital ratio is difficult due to accounting, exposure measurement, market/operational risk factors. Large Australian banks have been reporting their Basel leverage ratios since 2015, and the major banks currently have ratios in the order of 5 per cent or more. When the leverage ratio requirement was first mooted, Australian banks had lower levels of capital and a leverage ratio of around 3.5 per cent could have been a binding constraint. Figure 8 shows how the average risk weight is a key determinant of which capital ratio is the binding minimum. APRA set the minimum leverage ratio at 3.5 per cent for IRB ADIs (and 3.0 for standardised ADIs in a draft APS 110 issued in November 2019, but in March 2020 announced deferral of its implementation (under APS 110) until January 2023 as part of the Covid Crisis response. The major Australian banks have for several years been operating with leverage ratios of 5 per cent or more.

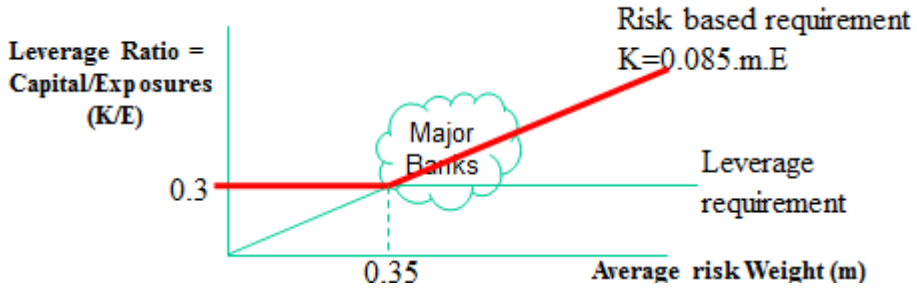



FIGURE 8: LEVERAGE AND RISK BASED CAPITAL COMPARISON

## International comparisons

There is much debate over the stringency of capital standards imposed by regulators from difference jurisdictions, with comparisons clouded by different regulatory standards including :

- Different definitions/ rules re eligible Tier 1 capital
- Different risk weights
- Different deductions (such as for goodwill, equity interests in subsidiaries) from assets in calculation capital
- Different capital limits/ transitional floors

APRA Chair Wayne Byres in a speech in 2020 indicated that the aggregate CET1 ratio for the four major banks was 11.3% under APRA /Basel 3 rules, but in the order of 16% if measured using internationally comparable Basel 3 rules.

Australian banks have complained often about APRA's Basel III rules making them appear less strongly capitalized than overseas banks, asserting that this has adverse effects on their ability to raise capital. Sceptics respond by noting that skilled bank analysts should be able to estimate the effects of different rules and make appropriate cross-jurisdictional comparisons.

## Bank Funding/Intermediation Costs

There has been much debate about the effect on higher capital ratios on bank funding costs and thus potential implications for loan interest rates. The effects, however, are not as large as often implied (and would be much less if an MM perspective were adopted).

A ballpark estimates of the cost of an increase in equity/RWA ratio is 4bp for each percentage point. To see this consider an increase from 8 to 9 per cent in the required risk weighted capital ratio(and that required returns do not change). Assume that:

- RWA/Assets = 0.5
- Cost of equity = 15% p.a.
- Cost of Debt/Deposits = 7% p.a. (this includes associated operational costs)
- Assets = $100

At an 8% ratio, equity = $4, deposits = $96, and the average cost of funds = 4x0.15+96x0.07 =7.32%

At a 9% ratio, equity =$4.5, deposits = $95.5 and the average cost = 4.5x0.15 + 9.5x0.07 = 7.36%

## Increased capital levels

While there has been general agreement on a need for higher levels relative to pre GFC, an unanswered question is: how high?

Greenspan (2010) gives ballpark estimate of 14 per cent equity/assets ratio required for US Banks, which is based on CDS spread sensitivity to leverage (at 14 per cent, there is little sensitivity). Miles et al (Economic Journal, March 2012) attempt a social cost-benefit analysis and suggest minimum requirements of around 20% of RWA. Switzerland moved early to a 19% (risk weighted) requirement. In the UK, the Vickers Report suggested 17-20% for banks with RWA > 3% of GDP. BCBS (WP 30) summarises some studies.

Ambrocio et al (2020) provide a summary of leading academic researcher's views on whether the

level of capital requirement is set optimally. On average, their views are for significantly higher capital requirements than implied by the Basel standards. Many would support incorporation of a "market-based" capital requirement (ie based on the market value of the bank's equity).

## TLAC Total Loss Absorption Capacity

An important development has been the introduction of TLAC requirements by the FSB & Basel Committee, who in November 2014 issued a consultative document & terms sheet and in October 2016 BCBS issued a final standard for G-SIBs to take effect on January 1 2019 to complement the FSB's standard issued in November 2015. These requirements are applicable to SIFIs (but not those headquartered in EMEs). They required a minimum TLAC from 2019 of the minimum of 16% of RWA or 6 per cent of the Basel III leverage ratio denominator, with both figures increasing in 2022 to 18% and 6.75% respectively. Contingent capital debt instruments are eligible, and there are requirements on placement of TLAC among the various entities within a G-SIB group.

Figure 9 shows NAB's assessment of the effects of loss absorbing capacity requirement changes.

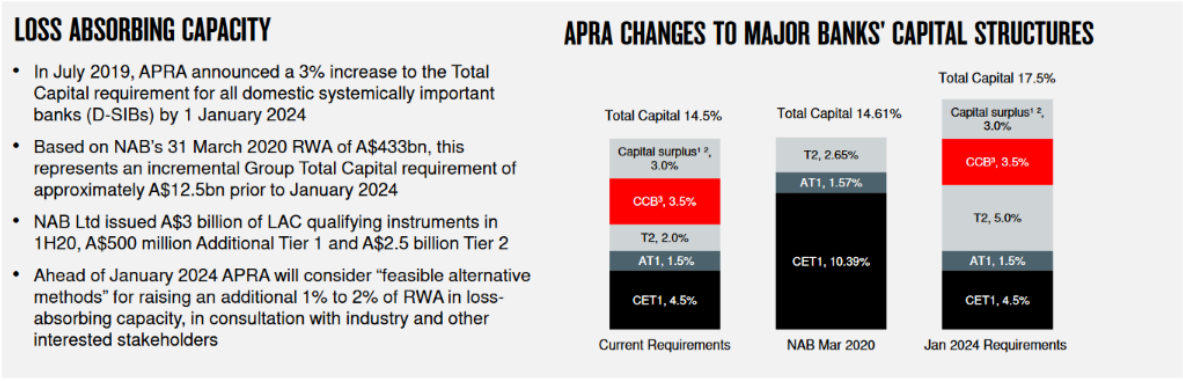



**FIGURE 9: NAB DEPICTION OF EFFECTS OF LOSS ABSORBING CAPACITY CHANGES**

## A "bigness" capital charge

Reflecting concerns over (a) – TBTF implications for competitive advantage and taxpayer subsidies and (b) – systemic risk concerns (large institutions (SIFIs) create systemic externalities due to risk concentration since their failure involves many counterparties and a scramble for liquidity creates pecuniary externalities) SIFIs have been subject to an additional capital charge.

A methodology for identifying G-SIFIs was introduced 2011, and revised in 2013, involving multiple indicators reflecting: size of banks; Interconnectedness; lack of readily available substitutes or financial institution infrastructure for the services they provide; global (cross-jurisdictional) activity; Complexity. A higher LAC (CET1/RWA) requirement applies ranging from 1.0 – 3.5% for the currently 29 G-SIBs. APRA applies a 1% requirement to D-SIBs

### Contingent (bail-in) capital

Basel 3 has introduced requirements for hybrid securities to be eligible for inclusion as regulatory capital (and TLAC) including automatic conversion into equity or write-off if some "trigger point" is reached. (See Chapter 18 for more detailed information).

### The change in emphasis

In Basel I the principal focus was on individual bank solvency. Basel III adds a system stability focus involving:

- Countercyclical capital buffers
- Incentives for use of CCCP's
- Higher capital for financial sector exposures
- G-SIBs

There is arguably less confidence in risk weighting approaches and this is reflected in a number of recent and proposed changes which commentators (but not the Basel Committee have referred to as Basel 4)

## 17.7 The Finalisation of Basel 3 (or Basel 4?)

The major changes under discussion for several years were finally agreed by early 2017 and summarised in the BCBS paper released in December 2017. In February 2018, APRA released a discussion paper outlining its proposed regulatory changes and their relationship to the BCBS changes. It also released another paper on its approach to implementation of a leverage ratio requirement.

### Operational Risk

Changes announced in 2016 (BCBS, ) removed the "advanced management approach" (AMA), based around bank modelling of operational risk, in favour of a Standardised Measurement Approach (SMA).[6] This also replaced three alternative approaches which were available under the standardised approach. To many analysts, the demise of the "sophisticated" approach was hardly surprising given the complexities of reliably modelling the likelihood and scale of a wide range of operational events. And while "risk sensitive" capital requirements might induce management actions to mitigate such risks, the extent to which this would occur is unclear.

[6] The SMA approach is built around a relatively simple concept of a Business Indicator (BI) whereby financial statement information about the mix of business and perceived operational risks of different business activities is combined with historical loss experience information of the bank. While formulaic, the approach is hardly non-complex (and the method of incorporation of historical experience hardly non-controversial), but is clearly simpler than the AMA reliance on complex statistical models!

## Credit Risk

A second change is the planned removal of certain asset portfolios from eligibility for the advanced internal models approach for credit risk, announced in http://www.bis.org/bcbs/publ/d362.htm. The internal models approach was seen to lead to significant differences between large banks in their assessment of risk (and thus capital requirements) of similar portfolios. Although some such differences were explicable, concerns arose about the veracity of relying on the robustness of reliance on bank internal models for determination of capital adequacy. This has prompted the introduction of constraints on model characteristics, and disallowance of model use for some types of risk.

Specifically, the BCBS has determined that capital requirements for credit exposures to banks, financials, large corporates, and equity portfolios will no longer be determined under the internal models approach, but must now use either the Foundation-IRB or the Revised Standardised Approach (and on the Standardised Approach for Equity portfolios). There are new constraints on use of internal models for specialised lending.

## Market Risk

In 2012 and 2013 the BCBS released consultative documents on a "Fundamental Review of the Trading Book", which included increased risk sensitivity of the standardised approach. One key component of changes to the internal models approach was a move away from a Value at Risk (VaR) approach to use of an Expected Shortfall (ES) approach. VaR had been widely criticised as: not providing an estimate of how large the losses from extreme events might be; involving significant potential for mis-estimation (particularly if correlations change in extreme events); and not meeting the desirable statistical property of "sub-additivity". These changes could be interpreted as primarily improving on the complex models being used, rather than moving towards simpler approaches. A major concern was that the existing regulatory framework did not adequately capture all the risks in the trading book.

In January 2016, the revised standards for market risk were published. Securitisation exposures in the trading book are to be treated under the revised standardised approach. Under the IMA approach, capital requirements based on ES involve add-ons related to a default risk charge (DRC) and a stressed capital add-on (SES).

The decision to permit regulators to approve or disallow IRB status at a trading desk level rather than at the bank level, is suggestive of concerns that risk modelling may be of variable quality for different types of exposures of individual banks. In June 2017, a consultative document was released proposing a simplified alternative to the market risk standardised approach, suitable for banks other than large, internationally active banks.

Two further changes to the Basel arrangements also involve simplified approaches. One is the introduction of a non-risk weighted CET1 leverage ratio as a backstop to the RWA approach. Although not yet finalised the indicative minimum requirement of 3 or 3.5 per cent means that it is unlikely to be binding for most banks.[7] The other development has been the proposal for application of "capital floors" to IRB banks set at an expected 70-75 per cent of the capital requirement the bank would face under the revised standardised approach.[8] The ultimate outcome was 72.5 per cent.

In general, these rules can be interpreted as conservative overlays, reflecting both concerns about the reliability of bank internal models due to potential regulatory arbitrage and ability of models based on historical data and relationships to perform adequately in future unknown crisis scenarios. The debate in this regard is about how much conservatism should be involved although some commentators have argued for the risk weighting approach to be largely abandoned.

Another important development has been the increased reliance on stress testing for regulatory purposes. Again, this provides a backstop to complex capital and liquidity regulation, and could be interpreted as less willingness to rely solely on complex rules-based regulation which, despite its complexity, is unable to adequately capture stresses in the financial system to which banks are exposed. Again, some commentators have argued that stress tests should become a "frontstop" rather than a "backstop".

Accompanying these changes have been the introduction of macroprudential controls in a number of countries which have tended to be very simple, blunt, instruments such as minimum loan to valuation ratios (LVRs) or "speed limits" on certain types of lending.

Overall, this brief review of recent Basel changes suggests that there has been some shift away from reliance on complex regulatory approaches under Basel's Pillar 1, although it has been selective. Some areas of risk assessment have been identified as unsuited to reliance on complex models, while concerns about the robustness of such models in dealing with unexpected financial stresses or being subject to potential manipulation, have led to use of "simple" supplementary regulatory measures as backstops or conservative overlays.

## APRA's Recent Basel Changes

In June 2019 APRA released proposed changes to its Basel 3 implementation.

[7] The Total Loss Absorbing Capacity (TLAC) requirements for G-SIBs also require eligible TLAC liabilities to exceed both a non-risk weighted benchmark (eventually 6.75 per cent of the leverage ratio denominator) and a risk-weighted benchmark (eventually 18 per cent of risk weighted assets). See FSB (2015).

[8] It has been suggested that these would have virtually no impact on Australian, US or Asian banks, but could require some EU banks to raise further capital.

- Objectives: "unquestionably strong"; addressing structural concentration in residential mortgages; better relationship between IRB and standardised capital outcomes; improving transparency
- Target of 150 (50) bp increase in capital ratios for IRB (standardised) banks.
- Draft versions of:
  - APS 112; (Standardised mortgage risk weights between 20 – 100 based on type and LVR)
  - residential mortgages section of APS 113,
  - APS 115 (Op Risk) adopting Standardised Measurement Approach (SMA) based on Business Indicator Component (BIC)
- Simplified framework for smaller, less complex ADIs
  - Op risk, Counterparty Credit risk, Leverage ratio, Disclosure

In March 2020 APRA announced defer of its planned implementation of Changes to Basel 3 reforms by one year due to the Covid19 crisis (see Figure 10). The proposed changes would have had little effect on aggregate capital requirements but more effect on allocation of regulatory capital across various portfolios.

**REGULATORY CHANGE DATES**

| Change | Original date | Amended date |
|---|---|---|
| APS 110 Capital Adequacy | 1 Jan 2022 | 1 Jan 2023 |
| APS 111 Measurement of Capital | 1 Jan 2021 | No change |
| APS 112 Capital Adequacy: Standardised Approach to Credit Risk | 1 Jan 2022 | 1 Jan 2023 |
| APS 113 Capital Adequacy: Internal Ratings-based Approach to Credit Risk | 1 Jan 2022 | 1 Jan 2023 |
| APS 115 Capital Adequacy: Standardised Measurement Approach to Operational Risk | 1 Jan 2021 (AMA banks) | 1 Jan 2023 |
| APS 116 Capital Adequacy: Market Risk | 1 Jan 2023 | 1 Jan 2024 |
| APS 117 Capital Adequacy: Interest Rate Risk in the Banking Book | 1 Jan 2022 | 1 Jan 2023 |
| APS 330 Public Disclosures | 1 Jan 2022 | 1 Jan 2023 |
| Loss Absorbing Capacity | 1 Jan 2024 | No change |

FIGURE 10: APRA'S IMPLEMENTATION TIMETABLE (SOURCE: NAB MARCH 2020 INVESTOR PRESENTATION)

# 18. Bank Capital Structure

## Contents

## 18.1 Introduction

Scholars have attempted to apply capital structure theories, found in the corporate finance literature to banks, despite the significant differences between banks and non-financial companies. Those differences include: high leverage of banks; debt funding taking primarily the form of deposits with quite different characteristics to other forms of debt; quite different assets held (portfolios of loans and securities etc., compared to real assets); capital regulation applied to banks. Another is that banks approach the capital structure decision using the concept of "economic capital" which, as discussed in Chapter 16, is based on risk considerations. Although that may be consistent with a maximisation of firm-value approach assumed in corporate finance, the relationship is not a simple one.

Underpinning the application of corporate finance theories is a desire to answer a number of important questions. First, why is bank leverage so high (equity/assets well below 10 per cent) compared to other companies (with equity/assets typically 40 per cent plus)? Second, does capital regulation prevent banks from achieving their optimal capital structure? Third, if so, what are the consequences for the cost of bank funding and loan interest rates charged by banks? Fourth, how do banks determine their actual capital structure and adjust it over time?

It is worth emphasizing that the corporate finance approach typically examines capital structure in terms of market values of equity and debt (or assets), whereas discussion of bank capital structures focus upon book value magnitudes. To the extent that banks have a ratio of market value/book value ($MV_E/BV_E$) near unity, this may not matter too much. But often (as for major Australian banks) the ratio can differ quite substantially from unity and over time.

In this chapter, a brief history of bank capital structure is first given, emphasising the large fall in capital ratios over the century or so leading up to the GFC (and which has since been somewhat reversed due to Basel 3). The evolution of Australian regulatory views on appropriate bank capital structure is also briefly outlined. Then the applicability of corporate finance capital structure theory to banks is considered. This is followed by consideration of several studies which attempt to determine empirically whether factors that determine capital structure of non-financial companies are also relevant for banks. Then, the magnitude of the effect of capital regulation on bank funding costs and loan interest rate setting is considered. That question is often posed in the form of asking what would be the impact of a specified increase in the regulatory capital ratio requirement?

The analysis then considers bank decisions about accessing external equity finance versus reliance on internally generated funds in achieving a preferred capital position, and the speed with which banks will adjust towards their preferred capital positions. The Basel requirements have had some

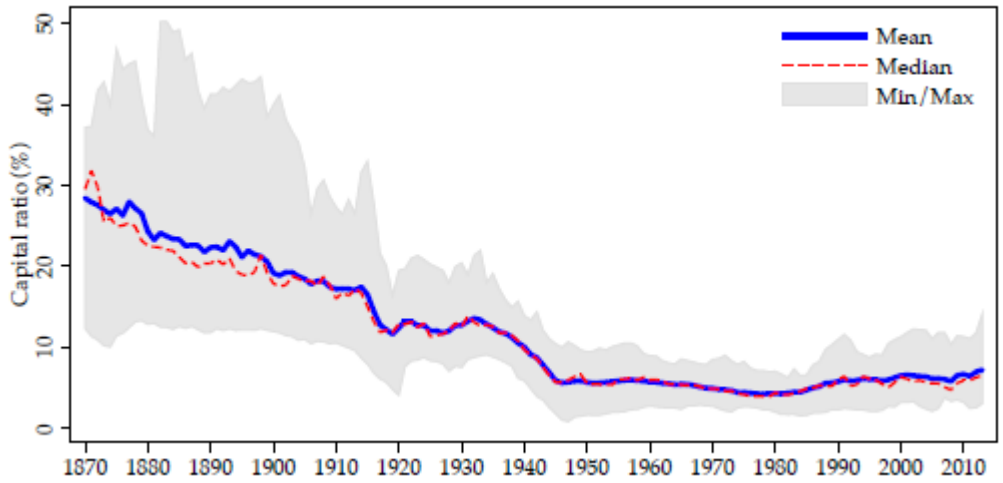
significant effects which make the empirical analysis of bank capital decision-making more complex. One is the extent to which banks feel the need to have a "buffer" of capital in excess of regulatory minimum requirements (and determinants of the size of that buffer). A second is the concern that the nature of the Basel arrangements can lead to pro-cyclicality in bank capital positions, which can aggravate business cycles. Another is requirements for documented capital planning arrangements in banks, and the use of non-equity forms of financing for satisfying part of regulatory capital requirements. Particularly relevant here is the growth of "bail-in" capital instruments – which is discussed in the final section.

## 18.2 A Brief History of Bank Capital[1]

### Some Historical Facts

Capital ratios were generally very high before the 20th Century. Banks (worldwide) generally operated with equity/asset ratios of 20 per cent plus – and owners were often subject to double or unlimited liability. Jorda et al (2021) have recently created an historical global database of bank leverage stretching back to the late 1800's (for 17 (current) OECD economies) and a summary of that is shown in Figure 1.

**FIGURE 1: CAPITAL RATIO, AVERAGES BY YEAR FOR 17 COUNTRIES. *SOURCE: JORDA ET AL 2021***




Nowadays, economic capital modelling is used to suggest that equity/asset ratios of 4 or 5 per cent (or less) are consistent with a probability of failure of (say) 0.1% p.a (ie a failure once in 1000 years) or less. A quick glance at the historical record might call the robustness of that statistical modelling into question – and, in any event, the historical failure record reflects the risk management benefits

[1] See also Kevin Davis (2012).

provided to banks through government and central bank support mechanisms. In particular, implicit guarantees and central bank liquidity facilities provided by the State enable private banks to profit by "riding the yield curve" and with lower leverage at much less risk of depositor runs and costly fire sales of assets than would otherwise occur.

The similar experience for Australia is shown in Figure 2 (splicing together data from two RBA sources – with obvious concerns about strict comparability). Since other industries have equity/assets at a minimum generally of 30-40%, an important question is why bank capitalization is so low, and why it declined so much over the long run. There are a number of competing hypotheses, prominent among which is the view that the introduction of deposit insurance and implicit government support (including stronger oversight by supervisors) has (a) reduced creditor concerns about such high leverage and (b) induced greater risk-taking (via higher leverage) by bank owners.

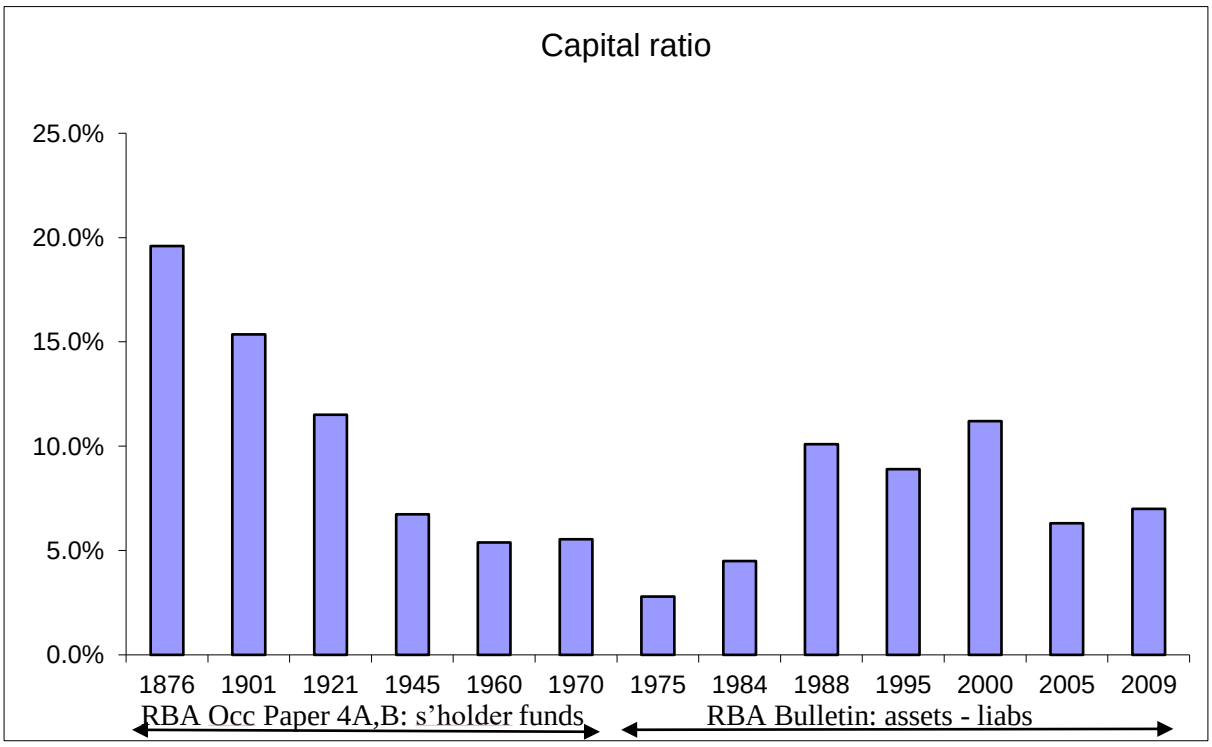



**FIGURE 2: AUSTRALIAN BANK CAPITAL RATIOS (EQUITY/ASSETS)**

Until the Basel capital requirements in 1988 popularised the notion of Risk Weighted Assets (RWA) bank capital was usually calculated using the ratio of equity/assets, which is generally referred to as a "leverage ratio", based on book value of equity and assets. However, it was not necessarily a major issue of focus until deregulation of banking occurred in the 1980s, and accounting practices had often allowed banks to disguise their capital position via having substantial "hidden reserves".

## 18.3 Historical Australian views on the importance of bank capital

The Australian Royal Commission on the Monetary and Banking System of Australia of 1937 commented (para 296) "while the ratio of shareholders' funds to total liabilities is some indication as to whether a bank is overtrading, too much reliance must not be placed upon it". It argued that bank solvency depended more on its liquidity and soundness of its advances than on such a capital ratio.

In its Interim Report (1980) The Campbell (Australian Financial System) Inquiry noted (p286) that "While the Reserve Bank does not have specific powers to determine benchmarks or guidelines for the adequacy of banks' capital resources relative to the liabilities that they underpin or might be called upon to underpin, it does monitor the capital gearing of all banks subject to the Banking Act."

In its 1981 Final Report the Inquiry did "not seek to specify precisely appropriate minimum capital requirements", but argued that any new bank needed to have substantial paid-up capital and that shareholders should be in a position to contribute additional capital if need. While it did specify (para 19.68) that "banks should in future be subject to capital adequacy requirements specified by the Reserve Bank", it was not prescriptive on how those might be determined – although it did not favour the recently introduced UK "risk asset" ratio approach (which could be seen as a forerunner to the subsequent Basel approach).

The Wallis Inquiry gave little attention to bank capital requirements in its 1997 Final Report, noting that the introduction of the Basel capital requirements in 1988 and their application in Australia by the RBA had led to a strengthening of bank capital positions.

The Murray Inquiry Final Report (2014) drawing on the experiences of the GFC had as its first recommendation: "Set capital standards such that Australian authorised deposit-taking institution capital ratios are unquestionably strong". Exactly what constituted "unquestionably strong" was left to the discretion of the regulator, although guidance that Australian banks should have capital ratios which placed them in the top quartile of international peers, which was not currently the case, was indicated. To facilitate that, it was also recommended that measures should be taken to improve cross-country comparability of capital positions. This also addressed concerns expressed by Australian banks that APRA's approach to implementing the Basel standards meant that reported capital ratios were biased downwards relative to calculation using standards applied in other countries.

## 18.4 Bank Capital and the GFC

Figure 3 and Figure 4 provide a recent perspective, showing what happened to the market value of bank equity capital (market capitalization) for a number of major global banks and Australian banks during the GFC. For some of the leading US and European banks, their market capitalization (ie their share prices) fell by over 70 per cent. Some part of this reflected the losses on loans and securities

which were known, but also uncertainties about other potential exposures. Over the period 2007-10 loan loss rates for UK and US banks were around 7-8% (and somewhat less for Euro area). Several major US and European Banks experienced near- death experiences (as reflected in the market capitalization declines in Figure 3) and some others did, in fact die. (The subsequent rebounds in market capitalisation reflect both price changes and the raising of new equity capital). The major Australian banks suffered substantial (around 50 per cent) equity price declines reflected in the market capitalization figures shown in Figure 4, but nowhere near the magnitude experienced by northern hemisphere banks. This GFC experience prompted the massive tightening of Basel capital regulation discussed in Chapter 17.

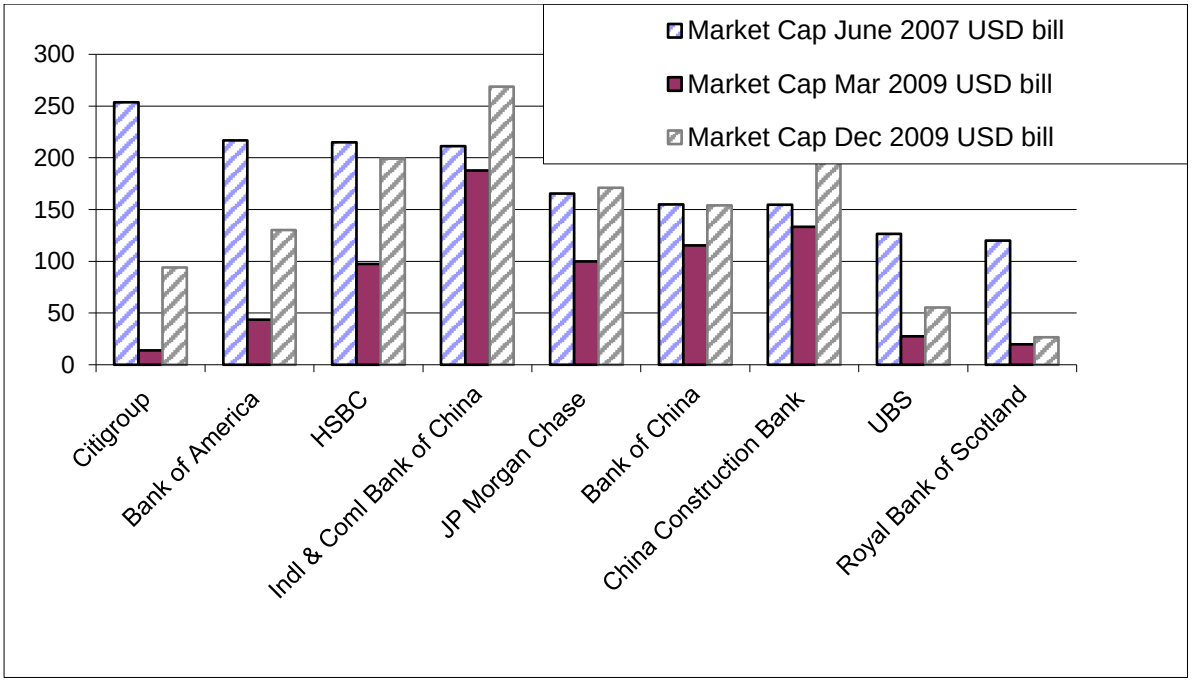



**FIGURE 3: GFC BANK CAPITAL EXPERIENCES (SOURCE: FINANCIAL TIMES)**

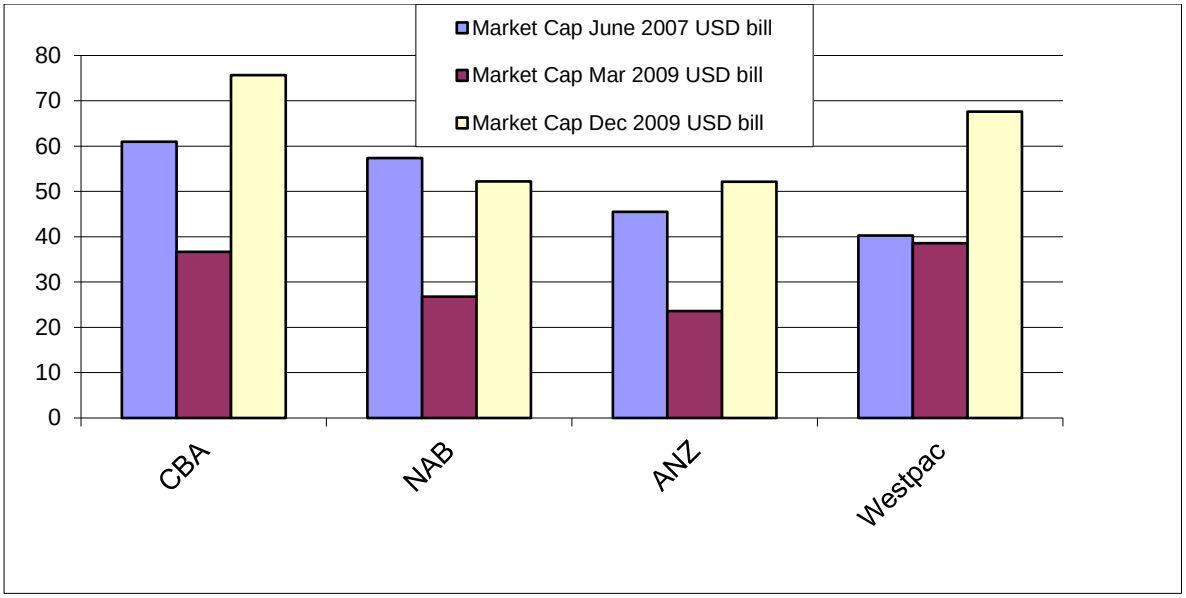



**FIGURE 4: AUSTRALIAN BANK GFC CAPITAL EXPERIENCES (SOURCE: FINANCIAL TIMES)**

## 18.5 Capital Structure Theory: MM and Banking

Bankers (both in Australia and overseas) generally claim that higher capital requirements will significantly increase the cost of bank funding with adverse effects for the economy.[2] This view arises because bankers: (a) assume that debt is cheaper than equity – although note that there is no readily observable cost of equity (which is the required return of shareholders); (b) ignore the possibility that lower leverage will reduce the cost of (both existing and new) equity (because of lower risk to equity), which could mean no, or only a small, increase in the overall cost of bank funding.

A well known theorem in finance (the Modigliani-Miller (MM) capital structure irrelevance theorem) presents conditions under which overall cost of funding will be unaffected by leverage (such that there is no optimal capital structure). Those conditions (essentially an assumption of perfect markets) include: no costs of financial distress, no tax distortions to financing, perfect information, and ability of investors to "undo" corporate leverage decisions by personal leverage.[3]

While the required conditions don't hold generally, (a) there are good reasons to believe that there is a substantial "MM" offset effect – such that the overall effect of higher capital requirements is much less than often claimed, and (b) understanding why MM may not work helps identify whether

[2] See Admati, A., Hellwig, M (2013) (This is related to their book: Admati, A., Hellwig, M., 2013. The Bankers' New Clothes. Princeton University Press. Princeton, NJ).
[3] Miller, M., (JBF,1995). Mark J. Flannery (ARFE, 2012), section 3-5

higher capital requirements actually involve a social cost (rather than a private cost to bank shareholders).

One reason why MM may not work is that depositors/ debt holders[4] do not demand appropriately higher rates of return from higher leveraged (more risky) banks, because of perceptions of government implicit or explicit guarantees, or lack of knowledge of risk involved.[5] Higher leverage then provides private gains to bank shareholders at the expense of taxpayers or depositors. A second is that deposit/debt finance may be tax-advantaged (under "classical" tax systems) relative to equity. There are then private benefits to bank shareholders from higher leverage – but no social benefits. There may be some other market imperfections giving a bias towards deposit/debt finance (more managerial discipline from having "runnable" deposits/debt), but it is arguable that extremely high leverage levels are needed to achieve this.[6]

Does an "MM" effect operate? Answering this question is complicated by the fact that the cost of equity capital is unobservable (and refers to the rate of return required by shareholders on the market value of equity holdings, whereas bankers operate to targets for an accounting return on equity based on the book value of equity). But there have been some studies, including one from the Bank of England (summarized in the box below), which imply that only relatively small increases in bank funding costs would follow from large increases in capital requirements – and that the social benefits of reduced risk of financial crises outweigh those costs. [7]

> "… even proportionally large increases in bank capital are likely to result in a small long-run impact on the borrowing costs faced by bank customers. Even if the amount of bank capital doubles our estimates suggest that the average cost of bank funding will increase by only around 10–40 basis points (bps) (a doubling in capital from current levels would still mean that most banks were financing more than 90% of their assets with debt.) But substantially higher capital requirements could create very large benefits by reducing the probability of systemic banking crises." Miles et al (2013)

[4] Deposits differ from debt in a number of ways including seniority and issuance/redemption arrangements. They also generally pay lower interest rates, but create operational costs for the bank due to services provided. Flannery (2012) notes that empirical evidence supports the intuition that banks will use debt as a marginal source of finance – once the full marginal cost (interest plus operating costs) of deposits equals the marginal cost of debt. Hence, no distinction is made in this discussion.

[5] Note that banks can raise "debt" funds in the form of deposits – which provide liquidity services as well as explicit interest to depositors. If, for example, depositors value those liquidity services more than the operational (and risk management) costs the banks incur in providing them, the total costs of deposits (interest and related operational costs) to the bank may be less than the cost of equity or straight debt borrowing costs to either the bank or shareholders.

[6] It can also be argued that high leverage, such as banks operate with, is not consistent with the risk exposure created for stakeholders other than equity holders (who benefit from risk taking but gain protection of their other wealth from limited liability structures).

[7] Admati and Hellwig (2012) provide a robust attack on bankers' views about costs of being required to use more equity financing because of higher capital ratios. They also stress the point (appropriately) that common use of the term "hold more capital" induces misperceptions of what is involved – which is solely a change in the mix of funding of assets.

There is no strong argument or evidence supporting the view that bank capital ratios as low as currently exist (even after recent regulatory increases) are socially optimal, nor arguments to show that any social costs (of possibly marginally higher bank funding costs) from higher capital ratios would not be outweighed by social gains from greater financial stability. It is not even clear that higher capital ratios would involve a private cost to bank shareholders whose required returns would fall because of lower risk of bank equity, such that they would be content with lower bank roe's.[8]

Bank management prefer lower capital ratios perhaps, partly, because they are exposed to less market discipline in raising deposit and debt funds compared to equity raisings.

## Taxation

Under a classical tax system, increasing leverage reduces the total government tax receipts from a given level of business activity. The reason is that interest on debt is deductible in calculating income for corporate tax purposes, and equity holders are taxed on dividends paid to them from after-corporate-tax earnings. There is thus "double taxation" of firm income distributed as dividends on equity but single taxation of interest on debt (often referred to as the "interest tax shield"). De Mooij R and Keen, M. (JMCB, 2016) examine the effect of debt on bank capital structures globally and find that the sensitivity of bank leverage to corporate tax rates is similar to that for other companies. They find that removing the tax distortion associated with a corporate tax rate of 25 per cent (by removing interest deductibility) would suggest a doubling of bank capital ratios for all but the largest banks – whose capital structures appear to be less sensitive to taxation.[9]

But the tax shield argument as a motive for higher leverage has substantially reduced significance in Australia where a dividend imputation tax system applies. If all shares in a company earning income in Australia are held by Australian residents and where there is a 100 per cent dividend payout rate, corporate tax payments are completely "washed out" by lower personal tax payments due, as a result of franking credits attached to dividends. In practice, banks have some overseas income, some non-resident shareholders and less than 100 per cent payout rates partially reducing the "washout" effect. Nevertheless, tax incentives for higher leverage are significantly reduced by the dividend imputation tax system. One consequence is that the "tax" cost to Australian banks of higher equity ratios is much less than for the majority of banks globally who are not subject to such integrated tax systems. (The resulting consequences of high dividend payout rates reducing bank retention of

[8] Although note that Baker and Wurgler (AER, 2015) argue that there is evidence of a "low risk anomaly" in equity returns generally, whereby lower risk stocks have higher actual (and by implication required) returns which also applies to banks. If so, stricter capital requirements may reduce risk but increase required equity returns.

[9] Schepens, Glenn. (JFE, 2016) examines the effect of a tax change in Belgium, finding that a more equal tax treatment of debt and equity led a significant increase in bank capital ratios.

capital and impeding balance sheet growth, can be overcome partly via dividend reinvestment schemes – and is otherwise only an issue of significance if there is some economic rationale for owner (rather than manager) preference for financing growth by internal finance (retained earnings) rather than externally provided equity finance).[10]

### Practical Limits to Leverage

If there is such a tax advantage to leverage, what inhibits firms from becoming almost entirely debt financed? While there is a lot of variability, the debt-assets ratios of non-financial businesses tend to average around the 0.3 – 0.5 mark. Banks, aggregating deposits with other debt securities on issue, have debt-assets ratios typically around the 0.95 mark or higher. Why is that so?

The main market imperfection generally perceived to inhibit excessive leverage is the cost of financial distress. Higher leverage and risk of failure increases the probability that available resources will need to be used to deal with such risks or that customers (particularly where long term implicit or explicit contracts are involved) may be less willing to deal with a company with higher risk of failure. That is, at some level of leverage there is some reduction in the expected future free cash flows generated by the company which are available to provide returns to providers of finance.

Where the marginal costs and benefits of increased leverage cancel out to determine the optimal leverage for a firm depends on a number of factors. Among those factors are firm characteristics such as the volatility of product demand and tangibility of assets (and thus potential recovery rates of creditors in the event of firm failure). [11]

## Optimal Bank Leverage

Why should banks have such high leverage relative to other types of businesses? One possibility may be that deposits are different from debt. And indeed they are – particularly at call deposits.[12] One (academic) argument as to why banks finance themselves with deposits rather than debt is that the balance sheet fragility created by using withdrawable deposits / short term debt acts as a mechanism for ensuring bank management is incentivised in managing the asset side of the balance sheet (loans). But that is an argument related to use of deposits (and short term debt) rather than long term debt, and does not explain why leverage should be so high.

[10] A large literature exists on the topic of this "pecking order" theory of capital structure.

[11] There are some studies that argue that there is no optimal leverage – rather it is the product of historical factors such as availability of, and preference for, internal financing or historical managerial choices of raising equity or debt to "time the market" conditions for favourable cost conditions. Even though there is some evidence to suggest that these arguments are relevant, it remains the case that there is some "clustering" of leverage ratios for different industries and particular characteristics of firms.

[12] While deposits generally pay lower interest rates than debt, this (at least partly) reflects the associated operating costs from providing deposit facilities etc.

Another such argument is that high leverage enables bank managers to own a larger share of the bank's equity and thus aligns their incentives with those of owners. Perhaps this is relevant for a (very) small bank, but unlikely to be relevant for large banks – which can also design managerial remuneration contracts to provide alignment. Goetz, et al (2020) find that for US banks, insider ownership can be relatively high (an average of around 30 per cent) for their sample, and that high inside ownership can inhibit external issues of equity.

A third academic argument is that because assessing bank risk-taking is difficult for outsiders, issuing debt with fixed payoffs which are insensitive to risk (except in the low probability event of bankruptcy) is a better way to overcome this information asymmetry problem than using equity financing. (Flannery, 1994, discusses these theories, and Gropp and Heider (2010) find that a range of variables found relevant for explaining capital structure differences in non-financial firms also apply in the case of large European and US banks).

Another possible reason is that the nature of bank business is low risk. If, for example, their only activity was to take depositor funds and invest them in (particularly short-term) government securities (and cash and deposits at the Reserve Bank), there would be little reason not to be highly levered. Even if the assets held are a diversified portfolio of loans to different businesses and individuals, the diversification reduces the overall risk of changes in the value of that asset portfolio. But variability in the value of the bank's assets (due to default and market risk) at some high level of leverage creates risk of insolvency. (And leverage – use of deposit funding – also creates liquidity risk for banks arising from the mismatch of asset maturity and deposit maturity. A bank which was 100 per cent equity financed would have no liquidity risk!)

There is ongoing debate about what are the determinants of bank optimal capital ratios and whether decisions based on private costs and benefits are socially optimal. Specifically, do banks tend to operate with levels of equity which are "too low" from a social perspective, giving rise to a risk of failure which is excessive. Underpinning those concerns are the social costs of failure of an individual bank and the potential for spillover effects (externalities) causing disruption throughout the financial system. "Contagion" and runs on other banks are one such possible effect, as are "fire-sales" of assets by troubled banks which by depressing asset prices involve pecuniary externalities for others.

It is clear that banks operate with dramatically higher levels of leverage than do firms in other industries. So one question of interest is why is that? Does it reflect some unique characteristic of banking which makes high leverage, and associated financial fragility, optimal? Or does it reflect some market distortion, such as expectations of government support of troubled banks, which leads to private decisions generating bank leverage higher than some socially optimal level.

A second question is: what is a socially optimal level of bank leverage? If regulations are required to achieve such a level, how are they best designed?

In July 2017 APRA released its policy on capital requirements necessary to make Australian banks "unquestionably strong" as recommended by the Australian Financial System (Murray) Inquiry Final Report (and endorsed by the Government in its response to that report).

### Determinants of Optimal Bank Capital

Prior to the GFC there was relatively little attention paid to the determinants of optimal bank capital structure. Various authors addressed the topic from the traditional approach to corporate capital structure, de-emphasising the fundamental differences between deposits and debt. Others focused on the nature of bank intermediation and the opacity involved to argue that financial fragility was an inherent feature of banking structure needed to deal with agency problems and imperfect information.

## 18.6 Determinants of Optimal Bank Capital Strcture

There have been many recent papers which have examined whether the factors that have been found empirically to determine corporate capital structure are also relevant in explaining bank capital structure. Berg and Gider (JFQA, 2017) argue that asset risk explains up to 90 per cent of the difference in the equity/assets ratio (of around 9% for banks versus 50% for non-bank commercial companies). Bank assets are diversified portfolio of non-bank debt etc which is less risky than assets of borrowers (such as non-bank commercial companies). Similar explanatory variables to those used in empirical corporate finance studies of capital structure (excluding banks) help explain bank capital structure. Gropp and Heider (RF,2010) also find bank leverage can be explained by standard corporate finance variables and time-invariant unobserved firm fixed effects. But while the marginal effects of those variables are similar, the constant term in bank regressions is much higher than that for non-banks, implying a higher, unexplained, level of leverage (although perhaps indicative of the effects of implicit government guarantees).

### Identifying the Socially Optimal Leverage of Banks

There have been a number of studies which have tried to undertake cost-benefit analyses of imposing higher capital requirements on banks in order to identify a socially optimal level for bank capital requirements. Most adopt a similar perspective. Higher capital involves a cost for society if the cost of bank equity funding is higher than the cost of deposit/debt funding (and Modigliani-Miller capital structure irrelevance issues need to be addressed in this context). Then, higher loan

interest rates will result and reduce aggregate physical investment and real output costs. The benefits are from the potential for less financial crises.

There are numerous complications and assumptions required in undertaking such a study. First, some private costs of higher capital (such as less use of interest tax shields or reduced value from implied guarantees) are not necessarily a social cost. Second, it is unrealistic to assume that other forms of intermediation will not adapt – and could affect both costs and benefits. Third, how will banks react to higher capital requirements in terms of pricing and output decisions and thus how will the effects flow through the economy? Fourth, will the costs be of the form of a one-off lower reduction of output level, or a change in the growth rate of output? Fifth, how can the change in probability of a crisis be estimated as well as the economic benefit arising from a lower probability (or severity). Sixth, should the analysis be done in terms of a non-risk-weighted leverage ratio or on a risk-weighted basis.

There is a large literature on the determinants of bank leverage – here are a few references

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## 18.7 Empirical Evidence on Bank Value and Bank Capital

Until recently there have been relatively few articles which empirically test whether higher bank capital ratios add or reduce value for bank shareholders and/or for society. Even if there were, the problem exists that any finding that value falls with higher capital ratios could be due simply to the existence of implied or under-priced deposit insurance or government guarantees.

One study (Mehran and Thakor, 2011) which attempts to examine this question does so by considering whether the acquisition price paid in US bank takeovers increases more than one-for-one with the capital position of the target bank. (The price and capital position are both deflated by the target bank's assets to enable comparability, and other potential determinants of the acquisition price are controlled for). The results indicate that an increase in the capital/assets ratio of 0.01 leads to approximately a 0.014 increase in the acquisition price/assets ratio. The implication is that higher capital has a more than one for one effect in increasing the market value of the bank. Interestingly, the Chairman of UBS, Axel Weber was recently quoted as saying that "banks that had adopted the Basel III capital rules ahead of schedule – such as Australian and Swiss banks – were being rewarded by the market with higher valuations" (The Australian, February 22, 2014)

A study by Miles et al (EJ, 2013) from the Bank of England uses historical data on British bank equity returns and leverage to assess how higher capital ratios affect bank cost of funding and to estimate an optimal capital ratio for banks. They find that while the MM effect doesn't operate fully, there is a significant partial effect, such that a doubling of equity ratios (eg from 8 to 16 per cent of assets) would increase the overall cost of bank funding by only around 40 basis points. (The figure derived varies somewhat when different assumptions are used, but not dramatically).

Berger et al (JBF, 1995) finds that for US Banks in the 1980s higher capital ratios led to higher subsequent ROE (and that ROE also contributed to subsequent higher capital). Jordan et al (JBF, 2011) find in a study of the effect of the TARP on US banks following the financial crisis, that bank market/book ratios were positively related to tier one equity capital ratios.

Using US data, a working paper by Baker and Wurgler (SSRN, 2013) "confirm that bank equity risk is sharply increasing in leverage" but note that this has not historically been translated into higher equity returns. They interpret this as implying that required equity returns have not increased substantially when higher leverage is used (basing their argument partly on the failure of the simple CAPM to explain historical equity returns). They suggest that a proposal to increase required capital ratios by 10 percentage points (eg from say 5 to 15 per cent) could lead to an increase in the weighted average cost of capital (and lending spreads over the risk free rate) of between 60 -90 basis points. They note that this is large (compared to an historical estimate of bank funding costs of around 40 basis points over the risk free rate), that it could increase the competitiveness of shadow

banks, but that whether it is a socially beneficial adjustment in response to other issues is an open question.

A similar result can be obtained relatively simply by noting that if required equity returns are not affected by leverage (and ignoring taxes), a one percentage point increase in equity/assets (and consequent equivalent decrease in deposits/assets) increases funding costs per dollar of assets by $0.01(r_e - r_d)$. If, for example, the required return on equity ($r_e$) is 0.15 and deposit cost ($r_d$) is 0.05, this gives an increase of 0.001 or 10 basis points per each percentage point increase in the equity ratio.

Gimber and Rajan (BoE, 2019) estimate equations indicating how the historical returns on equity and senior and junior debt for banks depend on the banks' funding mix and other control variables. They use these to examine the extent to which MM "offsets" occur in the risk premia for particular components of bank funding by examining the implied effects arising from substitutions between equity, senior and junior debt funding. They find significant effects.

## 18.8 Bank Capital Planning and Adjustment

Bank capital planning is significantly affected by capital regulation.[13] Thus it is to be expected that theories of optimal capital structure used in corporate finance require some adaptation in application to banking. If regulatory required capital is below what the bank would have chosen anyway (ie is non-binding), there may be little adaptation of the theory is needed – although the exceptionally high leverage of banks suggests other factors are likely to be relevant. (These include the fact that liabilities are (predominantly) deposits, many of which are withdrawable on demand, and thus stochastic in nature, as well as debt, and the diversified asset portfolio of financial (rather than real) assets). But if regulatory capital requirements are binding it may be appropriate to focus instead on the "capital buffer" (capital in excess of the regulatory requirement) chosen by the bank. Such a buffer is required to avoid the potential regulatory costs associated with falling below the regulatory requirement.

In Australia, a large buffer is involved in banks meeting APRA's expectation of an "unquestionably strong" capital position of a CET1 ratio of 10.5 per cent (compared to the Basel 3 minimum requirement of 4.5 per cent plus specified buffers of 2-4 per cent, or 6.5-8.5 per cent in total). During the Covid-19 Crisis, APRA advised banks that it would not be concerned if the unquestionably strong

[13] Lewis (ANZ BlueNotes, 2020) provides an excellent overview of how a bank such as ANZ goes about its capital planning.

expectation was not met temporarily due to needs to provide adequate credit for economic recovery.

Regardless of whether a total capital or "buffer" approach is considered, there are fundamental differences with the standard corporate finance approach which focuses upon optimal capital structure in terms of market values. While, in principle, banks might determine optimal capital structure in terms of market values, regulatory requirements are expressed in book value terms. Moreover, those book value terms incorporate regulatory adjustments (disallowances) such that eligible regulatory capital is not the same as book value of equity (even ignoring the fact that some non-common-equity amounts might be acceptable for regulatory purposes).

As a result, there is a mix of academic studies which focus on either or both of book and market leverage. In general, most studies adopt an optimal capital structure framework rather than the "pecking order" hypothesis associated with Myers (JoF, 1984), or a market timing approach popularized by Baker and Wurgler (JoF, 2002).

In that framework, optimal leverage reflects cost, risk, information, and tax issues, and some special considerations relevant for banks including:

- Un- or under-priced government guarantees to other stakeholders (policy holders / depositors) etc. gives incentive to increase leverage and/ or risk of activities. There is thus a potential trade-off; higher leverage increases the value of the government safety net but reduces the probability of continuation of quasi-rents (value of bank charter).
- The imposition of risk-related capital ratios mean that capital relative to RWA might be as much of a consideration for bank managers as capital relative to total assets
- Regulatory requirements and pressure from regulators may affect the speed at which banks adjust towards their desired capital structure – and the way in which this occurs (such as by external issues of equity, retention of earnings, setting interest rates etc to affect the size and composition of deposits and/or assets, transactions in debt markets etc).

## 18.9 Capital Planning – ICAAP Requirements

In addition to good management practice which would suggest that banks plan ahead for their capital needs, they are subject to regulatory ICAAP (Internal Capital Adequacy Assessment Program) requirements. APRA sets out requirements for an ICAAP for ADIs in APS 110 and guidance in CPG110. Boards are required to have ownership of an ICAAP which needs to address consistency of the capital position with its risk appetite and a strategy for setting capital targets, with the detail involved proportional to the size and complexity of the ADI. Forward planning should consider potential changes in the operating environment etc. APRA expects that capital targets will take into account: risk appetite, regulatory capital requirements, business plans and strategy, profit and capital surplus volatility, dividend policy, external ratings and ability to access additional capital. For

larger ADIs, explicit economic models and stress tests are relevant ingredients of the process. "Triggers" identifying when explicit action related to the capital position might be needed, and consideration of alternative types of action, are expected. Reflecting its risk focus, the ICAAP is also expected to consider how the bank's estimate of economic capital and regulatory capital might differ, and allocation processes for economic capital. It does not directly address the issue of "optimal capital" in the sense of a capital structure which would maximize firm value (or minimize WACC).

In banking circles, the capital discussion often refers to the "capital stack" which reflects the Basel approach of allowing for different forms of liabilities to be incorporated in capital requirements depending on their loss-absorbing characteristics. Common equity is at the bottom of the stack (in the sense of having the highest level of loss absorbency). On top of that comes AT1 and then AT2 instruments. The mix of these is affected by the Basel requirements and bank preferences.

## 18.10 Ratings Considerations

An important consideration in bank capital planning is the determination of ratings given the bank and its debt, and hybrid, securities by the ratings agencies (Moodys, S&P, Fitch). Each of the ratings agencies has its own proprietary method of calculating capital ratios and determining what values of those ratios (in conjunction with other relevant factors) lead to different ratings. Among those other factors, the "sovereign" credit rating of the nation is an upper bound on the rating of any Australian institution, and changes in the sovereign rating can be expected to be mirrored in bank ratings.

For example, S&P determine a "stand-alone credit profile" (SACP) and an "issuer credit rating" (ICR) for banks which incorporates any upgrade dependent upon the degree of government or other (parent or investors in ALAC instruments) support expected to be available to a bank in financial difficulty. S&P commence with an assessment of economic and industry risk at a country level to obtain a "Banking Industry Country Risk Assement" (BICRA) which forms a starting point for individual bank ratings. The SACP for an institution then takes into account specific features such as business position, capital and earnings, risk position, funding and liquidity. There may also be a "comparable ratings analysis" CRA adjustment which takes other relevant factors into account. S&P (and other ratings agencies) focus on current financial metrics (and qualitative information) and their expectations over the next year or so.. Figure 5 illustrates the process.

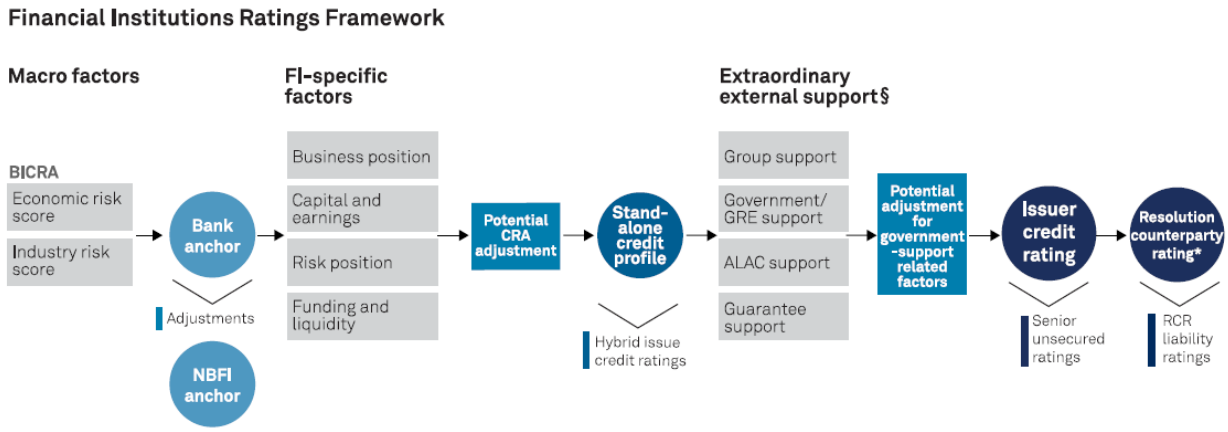



FIGURE 5: S&P RATINGS APPROACH: SOURCE S&P

The rating is thus an assessment based on more than some capital ratio But there is a high degree of correlation between the agency ratings and regulatory calculations of capital ratios, such that banks will focus heavily on the regulatory calculation. Nevertheless, the judgement of the ratings agencies are relevant and, for example, the CBA states that it "targets an 'AA' credit rating band and the maintenance of the Bank's credit rating is paramount".

The major Australian banks have typically received high credit ratings from the ratings agencies in recent decades. In general, the major banks usually all receive the same rating which has been as high as found for any banks elsewhere in the world. For example, in 2021, the majors were rated AA- by S&P, and with similar ratings (but different symbols) from Moody's and Fitch. The other larger Australian banks were one or two notches lower and the mutual banks generally rated as investment grade (BBB) – which given that their capital ratios exceed those of the major banks indicates the role of factors other than simply capital ratios. An illustration of a ratings report by S&P on Macquarie Bank (a subsidiary of the Macquarie Group) in early 2021 can be found here. It's A+ rating involves a judgement of Sovereign (crisis) support (but not Group support) which boosts its SACP (Stand Alone Credit Profile) by two notches.

## 18.11 Organic Capital Growth

For any entity (not just banks) an important question is that of whether internal generation of shareholder equity will be adequate given anticipated growth or whether raising external equity capital will be necessary. The expected growth in activity (ie size) determines required growth in capital if, for example, leverage is to remain constant. The profit rate (ROA denoted by ρ) determines a natural growth rate if the capital ratio (k = E/A) (where E is equity and A is assets) is to be held constant and no external capital is to be raised (or dividends paid). The change in equity can be written as:

$$E_{t+1} = \rho_{t,t+1} A_t + E_t$$

If g is the asset growth rate, then

$$E_{t+1} / A_{t+1} = \rho_{t,t+1} A_t / A_{t+1} + (E_t / A_t).(A_t / A_{t+1})$$

$k_{t+1} = \rho_{t,t+1}/(1+g) + k_t/(1+g)$ and rearranging gives:

$$\Delta k_{t,t+1} = \rho_{t,t+1} /(1+g) – k_t\, g/(1+g)$$

For k to be constant at say k* ie ($\Delta k = 0$) then:

Required ROA = $\rho^* = g.k^*$.

Equivalently noting that roe = $\rho(A/E) = \rho/k$, then roe = g is an alternative way of stating the natural (organic) growth rate relationship. To grow at a rate faster than the roe and maintain a constant capital ratio requires accessing external equity. (It is possible to restate these relationships using a capital/risk-weighted-assets ratio, and assuming a constant average risk weight. In that case, rather than raising external equity, another option is to shift into lower risk weighted assets).

Actual growth in capital is equal to earnings less dividends (ie retained earnings) plus external capital raisings (which could be negative if share buy-backs are used).

A number of implications follow:

- poor past performance creates difficulties in growing capital both internally and externally. Negative profits directly reduce shareholders equity and the likely consequence of losses leading to a poor share price inhibits new share issuance.
  - This was a problem faced by ANZ and Westpac at the start of the 1990s, and led to the issuance of an innovative form of equity capital in the form of Converting Preference Shares. (These had a basic structure that provided investors with a stream of coupons for an initial period, of around five years, and subsequent, mandatory, conversion into a fixed value of equity with the number of shares received being determined by reference to the then prevailing share price). They were aimed at investors wanting a fixed -interest like investment, but provided permanent equity via the mandatory conversion, and potentially avoided dilution of existing shareholders which would have happened if common equity had been issued instead. A complication was the potential for downward pressure on the share price at the conversion time if the investors did not want to hold the bank shares received on conversion and sold those shares in the market.
- Dividend policy is an important determinant of capital growth. The major Australian banks have typically adopted a high dividend payout ratio (in the order of 80 per cent) reflecting the attraction of franked dividends to local shareholders. While dividend re-investment schemes can partly offset the negative impact on equity (and cash-flow) the typical participation rate has been under 10 per cent. In many cases the banks obtained the shares needed to provide to participants by on-market buybacks rather than by issuance of new shares, thereby not conserving cash and not adding to the bank's capital position.

  - In July 2020 APRA took the unusual step of advising banks to defer or reduce their dividend payments (to less than half of earnings) because of the potential negative effects of the Covid Crisis on bank earnings. While banks may have adopted that strategy anyway, the APRA recommendation made such a step easier to take given the expectations of shareholders that dividends would generally be "sticky".
  - The major Australian banks were also affected by the RBNZ's decision in April 2020 to prohibit payment of dividends by the country's banks which, for the major banks would have flowed to their Australian parents. (While the non-payment of dividends would have increased the shareholder's funds in the NZ subsidiaries, the regulatory treatment of investments in subsidiaries for capital purposes meant that non-payment of dividends adversely affected regulatory capital positions of the Australian majors). The restrictions have since been eased.

- Mutual organisations are generally restricted in accessing external equity capital, by virtue of their mutual status, and hence have generally had to rely on internally generated surpluses (profits) for growth in equity. While some forms of securities could be available to them to raise funds which could count as regulatory capital, these have faced regulatory impediments.
  - A requirement that capital be permanent makes start-up of new mutual ADIs virtually impossible, since member shares (of a nominal amount each) are withdrawable on leaving the mutual.
  - Under the bail-in requirements, APRA has approved "Mutual Equity Interests" (MEIs) which could be issued, but which are not generally economically feasible or in the best interests of members. (The rate of return which investors would require on MEIs given likely secondary market liquidity is likely higher than the net returns a mutual could earn on use of those funds, and the relatively small scale of any such issue would make issuance costs relatively expensive.
  - Reliance on generating equity internally via profits implies that to keep the capitalratio constant in a faster-growing mutual, a larger profit rate is required such as by a higher net interest margin. That, involving for example higher loan interest rates and lower deposit interest rates, is not obviously in the best interests of current members, and will also tend to choke off growth.

## 18.12 Capital Adjustment Processes

Assuming that a bank's optimal capital ratio is known, if the actual ratio differs from that how does adjustment to the desired ratio occur and how long does it take?

There have been a large number of empirical studies addressing this issue. To illustrate the basic approach:

- First it is necessary to assume bank has a desired (albeit unknown to the researcher) capital ratio (which could be a risk-weighted ratio or not, could be in terms of market or book value, could be for the level 1 entity or level 2 (including subsidiaries involved in banking) entity)).
- Second, assume the desired ratio is determined by some set of explanatory variables such as specific characteristics of the bank and/or economic conditions.

For this illustration assume there is a desired (optimal) risk weighted book-value ratio (CAP/RWA)* where:

$$(\frac{CAP}{RWA})^* = \beta_0 + \beta_1 X_1 + \cdots \ldots + \beta_n X_n + \varepsilon$$

Here $X_1 \ldots X_n$ represent bank specific factors or market factors.

If the actual ratio differs from the desired, adjustment to desired could occur via changing either or both of the numerator (CAP) or denominator (RWA). The adjustment mechanism and speed could differ depending on whether the actual ratio is above or below the desired ratio, but ignore that complication for the moment. Assuming that the bank adjusts towards its desired ratio proportionally but with a random error, we have:

$$\Delta(\frac{CAP}{RWA})_t = \alpha[(\frac{CAP}{RWA})^* - (\frac{CAP}{RWA})_{t-1}] + u_t$$

Substituting the determinants of the optimal capital ratio for (CAP/RWA)* generates an estimating equation which is typically estimated on panel data, assuming a constant adjustment speed (α) for all banks in the sample. (In this equation $X_{i,j,t}$ represents the value of factor j for bank I at time t).

$$\Delta(\frac{CAP}{RWA})_{i,t} = \alpha[\left(\beta_0 + \beta_1 X_{i,1,t} + \cdots \ldots + \beta_n X_{i,n,t} - \left(\frac{CAP}{RWA}\right)_{i,t-1}\right] + u_{i,t}$$

One of the earliest studies in this literature was by Shrieves and Dahl (JBF, 1992), and a variety of similar approaches have been used subsequently. They assumed separate adjustment processes for capital and risk positions which both reflected a planned component and a random shock. In their approach the average risk weight was used as one measure of risk, and the concurrent change in risk was included as a determinant of desired capital level and vice-versa – along with other determinants of CAP* and RWA*. This provided an interrelationship between the capital and risk adjustment processes. Their final specification was a simultaneous equation system of the form

- $\Delta CAP_t = \alpha(CAP^* - CAP_{t-1}) + u_t$
- $\Delta RWA_t = \alpha(RWA^* - RWA_{t-1}) + v_t$

in which the determinants of the desired values (CAP* and RWA*) were substituted to produce an estimable equation.

Other related studies include Jacques and Nigro (JEB, 1997), Aggarwal and Jacques (JBF, 2001), Jokipi and Milne (JFS, 2011), Cohen and Scatigna (JBF, 2016), Bakkar et al (JBF, 2019).

Flannery and Rangan (RF, 2008) estimated an adjustment equation for the equity/assets (capital) ratio using the market (rather than the book) value of equity and incorporating regulatory (book value) constraints. Their measure of risk was asset volatility (derived from equity volatility) which

was assumed to have a positive impact on the desired capital ratio. In turn the actual capital ratio was assumed to be a determinant of asset volatility. Because they were using market values of equity, it was also necessary to make allowance for the effects of changes in the bank stock price on that ratio, by assuming a lagged managerial adjustment of the capital ratio to such changes.

Brown and Davis (JBF, 2009) apply a variant of these approaches to examine Australian Credit Union capital adjustment (over 1992-2004) incorporating the important considerations of no access to outside equity and no market value of capital for mutual organisations. There is thus no stock market discipline to penalize maintenance of a sub-optimal capital ratio. In an environment of managerial entrenchment this could lead to capital decisions reflecting a trade-off between growth and size (prestige) and safety (maintenance of managerial quasi-rent/perquisites) – and quite disparate target capital ratios. Also particularly important is that achieving a faster increase of capital requires the credit union to target a higher NIM and profit rate to generate capital internally. This is not to the benefit of current members and will likely adversely affect asset/deposit growth. Consequently, they are able to reframe the capital adjustment process in terms of managerial targeting of, and adjustment towards, a desired ROA. The speed of adjustment will balance costs of disequilibrium (not being at the target) and adjustment costs which will be related to the speed of adjustment. They find relatively slow adjustment of capital, no evidence of changes in risk as being part of the equilibration process, and no tendency for capital ratios to converge to some common level.

## 18.13 Bail-In Securities

"Bail-in" securities (often referred to as contingent capital) are hybrid securities issued by banks as an eligible component of Additional Tier 1 or Tier 2 regulatory capital in meeting total regulatory capital requirements. Eligibility requires that if certain "trigger" conditions (indicating risk of failure of a bank) occur, the securities are either converted into common equity or written down, such that the bank is recapitalised (in the sense of having an increase in common equity).

This effect is shown in Table 1 where the initial position of the bank which triggers the bail-in involves is assumed to be it having common equity equal to 2 per cent of total assets. Where the Bail-in securities are converted into equity (the top panel) the bank now has common equity/total assets of 10 per cent. (In the table, it is assumed that the holders of the bail-in securities (new equity) get a pro rata share of the ownership of the bank. In practice, the conversion terms could involve a differential allocation – and it should be noted that these are accounting (book value) numbers whereas the bail—in announcement could have significant (negative) effects on the market value of the bank's equity).

In the lower panel, writing off the bail-in securities means that all the benefit accrues to the original equity holders of the bank. (One consequence is that if investors expect that any future possible bail-in will occur via write-down rather than conversion, they would require a higher promised rate of return on the bail-in securities).

In both these cases, the bank has had an increase in its CET1 capital ratio (from 2 to 10 per cent if it is assumed the assets have a risk weighting of unity). However, it is possible that the bank's total capital ratio is below the required minimum. For example if the average risk weight of assets was 0.5 then the total capital ratio is 5 per cent, below the required 8 per cent. The bank would therefore need to raise new capital if it is to continue operations – and it could be extremely difficult to raise either new common equity or issue new bail-in securities given that a bail-in is bound to be perceived by the market as bad news.

**TABLE 1: BAIL-IN EFFECT ON BANK CAPITAL**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Bail-in conversion** | | | | | | | |
| *Initial* | | | | | *After* | | |
| Assets | | Liabilities | | | Assets | Liabilities | |
| Loans | 100 | Deposits | 90 | | Loans 100 | Deposits | 90 |
| | | Bail-in Secs | 8 | | | new equity | 8 |
| | | Equity | 2 | | | old equity | 2 |
| **Bail-in write-off** | | | | | | | |
| *Initial* | | | | | *After* | | |
| Assets | | Liabilities | | | Assets | Liabilities | |
| Loans | 100 | Deposits | 90 | | Loans 100 | Deposits | 90 |
| | | Bail-in Secs | 8 | | | Bail-in Secs | 0 |
| | | Equity | 2 | | | Old Equity | 10 |

## Objectives of the "Bail-in" regime

The objectives of this security design feature which can be inferred from the Basel 2011 consultation document are:

- to avoid the need for taxpayer bail-outs of failing banks (by "bailing-in" holders of these securities);
- by recapitalising a troubled bank, enabling it to continue operations;
- to facilitate bank supervisors in resolving a troubled bank; and
- enhance market discipline of issuing banks through investor monitoring of bank condition, and resulting price movements of the securities.

In that consultation document (page 11), the Basel Committee also argues that the contingent capital proposal "could significantly level the playing field between small and big banks". The argument appears to be that the market will expect small banks to be allowed to fail without triggering an explicit bail-in, such that such securities issued by small banks will have a cost similar to that of subordinated debt, rather than a bail-in risk premium (a BIRP). Whereas large banks may have previously been able to raise hybrid capital at a lower cost due to market perceptions of public sector support, this cost advantage will no longer exist. However, the inability of smaller banks to issue such securities into public markets means that, to the extent that the cost of such funding is cheaper than common equity funding, they would suffer a competitive disadvantage in meeting total regulatory capital requirements through having to rely on common equity.

While the introduction of "bail-in" requirements for eligibility of non-common-equity instruments as regulatory capital are appealing in theory, there are a number of question marks about whether the approach will work in practice (which are considered later).

Also relevant is the complex nature of the design of these securities which involves "uncertainty" rather than "risk" which can be modelled probabilistically. As a result (as discussed later), there is no solid foundation available for pricing such securities and determining the yield premium which is appropriate for that uncertainty. Markets do, obviously, generate prices for such securities but the uncertainty associated with future outcomes raises the potential of significant fluctuations in price unrelated to "fundamentals". Perhaps even more concerning, these complex securities are, in Australia and elsewhere, being marketed *inter alia* to retail investors who are particularly at risk of not fully understanding the uncertainty involved and what yield premium is warranted.

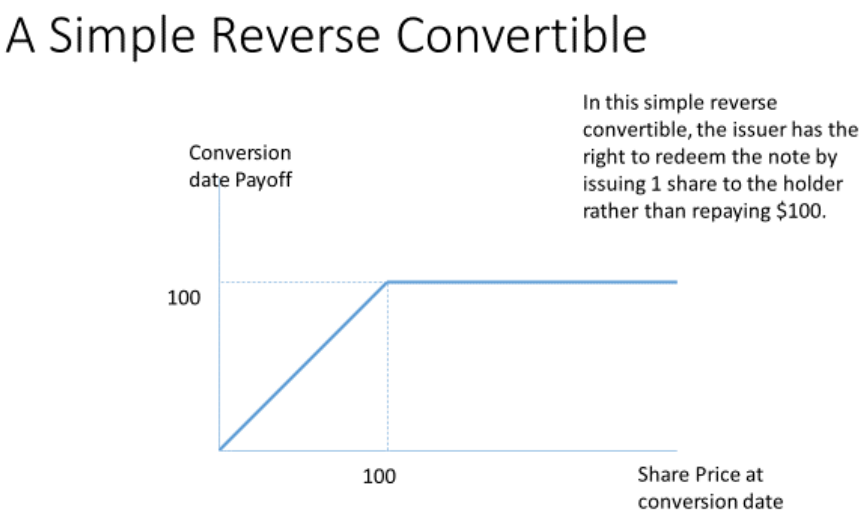
In the following section, more detail is provided on the background to and characteristics of bail-in securities. Then, an overview of the growth of this market both in Australia and elsewhere is provided, demonstrating that these securities have quickly become a significant component of capital markets. That raises the question of the merits of their design (which has been driven by regulation) and the subsequent section argues that their design is unsuitable, both as a bank resolution device and for sale to unsophisticated retail investors. One aspect of that unsuitability relates to the problems in determining an appropriate price for such securities. This raises issues about their (hoped for) role in providing price signals which impose market discipline on banks (or information for regulators) as well as financial consumer protection issues.

## Academic Approaches to Bail-In

Underpinning the bail-in securities is the notion of reverse-convertible securities as depicted in the figure below. In such a case, if the issuer is experiencing difficult times, such that its share price is

below the security's strike price, the conversion into equity will improve the issuer's position by essentially writing down the outstanding debt by converting it into a lesser value of equity. Losses are clearly imposed on the holder of the security, to the benefit of the equity holders. This security is replicated by investor buying a risk-free bond and writing a put option (to the bond issuer) over one share at strike of $100. The coupon interest rate on the security incorporates the option premium and hence will be greater than risk free rate. Conversion reduces leverage of the issuer which has less debt and more equity on issue. Could some variant of this be a way to recapitalise troubled banks and prevent their failure?

The academic literature on bail-in securities as a solution to bank recapitalisation and avoiding bail-out commenced with Flannery (SSRN, 1992) who suggested a form of Reverse Convertible Debentures




(RCDs) where conversion (a "bail-in") would be triggered if the market value (or share price) of the bank fell below some specified ratio to the value of bank assets. But, unlike the simple reverse convertible, where bank equity holders gained from conversion and the convertible holders lost, Flannery proposed that conversion be into a value of equity equal to the convertible's face value. Only sufficient of the convertibles would be bailed-in to restore the equity/assets ratio to the specified level. Unless the deficiency of equity/assets was sufficiently large, convertible holders would not lose from the conversion but existing equity holders would be diluted. (If the deficiency was so large that the sum of equity value and convertibles was below the specified level, when all convertibles would need to be converted, holders of convertibles would incur losses).

Flannery argued that bank capital regulations should include a requirement for banks to have on issue some specified amount of RCDs, and that should a conversion (bail-in) occur (to restore the equity/assets ratio) new RCDs would need to be issued to restore the required level of RCDs on

issue. Whether a new issue would be feasible in these circumstances (following a bail-in) is an issue which is also relevant for the, differently designed, bail-in securities of the Basel 3 regime.

Flannery's proposal, being based on stock market prices has had appeal to many academic economists, since option pricing techniques can be applied in valuing and analysing the impact of such securities.[14] The Basel 3 bail-in securities are instead designed using accounting/regulatory data, and thus less amenable to use of such techniques – although many researchers and analysts have assumed specific linkages between those accounting values and market prices enabling them to find ways to apply various models of derivatives.

## Bail-In Securities: Evolution and Design

Since the introduction of the Basel 1 capital standards in 1988, a range of hybrid securities issued by banks have been allowed to supplement common equity as regulatory capital, on the grounds that they provided a "gone concern" buffer to absorb losses and protect depositors. The experience of the Global Financial Crisis demonstrated that hybrid securities permitted as part of bank regulatory capital did not effectively fulfil their intended role of loss-absorbency to protect depositors in the event of bank failure.[15] Instead, governments intervened to protect depositors (beyond the levels required by explicit deposit insurance schemes) and ensure the survival of "too big to fail" (TBTF) banks and associated financial sector disruption. These "bail-outs" meant that investors in such hybrid securities were not exposed to losses from default which would otherwise have occurred, and which instead fell upon taxpayers. Looking ahead, perceptions of implicit guarantees by governments being exercised in similar circumstances meant that these forms of regulatory capital would not be likely to absorb losses as required unless specific requirements were put in place to prevent bail-outs, either completely, or without some prior absorption of losses by providers of regulatory capital.

To offset this concern, the Basel 3 standards (BCBS 2011a) now specify that securities other than common equity must meet specified "loss absorbency" requirements if they are to count towards regulatory capital requirements. In essence, a requirement that they should also provide a "going concern" loss absorbing buffer is now required. For securities to classify as Additional Tier 1 (AT1) capital, which is described as "going concern" capital, they must have a mandatory "bail-in"

[14] Flannery (ARFE, 2014) provides a review.

[15] Indeed, even if failure occurred, unless there was legislated depositor preference (seniority) such hybrid securities unless specifically subordinated, would not necessarily provide a buffer to protect depositors. It should be noted, however, that there were some instances in which coupon payments on such securities were suspended thus providing some form of loss absorption. The Covid-19 crisis and calls for banks to suspend dividends has raised questions about how AT1 and Tier 2 securities will perform in the crisis.

requirement. In the original Basel 3 proposals, for securities to qualify as Tier 2 ("gone concern") capital, a bail-in requirement was not necessary, but revisions to the framework in mid 2011 introduced such a requirement. In addition to Basel 3 capital requirements, additional TLAC requirements for G-SIBs can be met by issuance of bail-in securities.[16]

"Bail in" means that if a "trigger", reflecting some measure of financial weakness of the bank involved is hit, some or all of the eligible securities must be converted into equity or written down (partially or fully) thus achieving a recapitalisation of the bank.[17], Depending on the nature and terms of the bail-in, shareholders (via dilution of their interests) and/or investors in the bail-in securities may experience losses (beyond those already incurred from a reduced value of assets).[18] In a write down situation, holders of the bail-in securities bear the loss (although in some cases they may be entitled to recovery of value lost at some later date if the bank returns to good health).

The Basel standards allow for two types of "triggers" which might prompt mandatory bail-in. In the original version of the standards an undefined but "objective" pre-specified trigger was a requirement for those AT1 securities which are classified by accounting standards as liabilities (BCBS, 2011, p11). Such a trigger is a specified minimum risk-weighted CET1 (Common Equity Tier 1) ratio being reached, which is set in a number of jurisdictions at 5.125 per cent.[19] Subsequently (BCBS, 2011) the minimum requirement for both AT1 and Tier 2 securities has been deemed to be inclusion in the contract terms of a "subjective" point of non-viability (PONV) trigger requirement (unless the national laws independently provide the regulator with powers to force a write down). A declaration by the regulator that the bank is at a PONV could be expected to occur at a CET1 ratio above any specified objective trigger (such as 5.125 per cent) unless the ratio had unexpectedly declined below that value prior to the regulator becoming aware of the situation.[20]

Consequently, most AT1 securities will involve both an objective capital ratio trigger and a PONV trigger. For securities to be eligible for inclusion as Tier 2 capital, only the PONV trigger is required.

[16] To reduce systemic risks, the Basel committee issued a TLAC holdings standard in October 2016 requiring investments by banks in bail-in securities issued by G-SIBs or other banks involving deductions from that bank's regulatory capital.
[17] The theoretical academic literature on contingent capital securities surveyed in Flannery (2014) focuses on securities with a stock market price trigger, which is quite distinct from the contingent capital securities issued by banks to meet regulatory capital standards, which have triggers based on accounting ratios or regulatory determinations
[18] The terms may, for example, require that a $100 security converts into greater or less than $100 worth of shares (at current market value) affecting dilution of existing shareholders.
[19] The figure of 5.125 represents the situation where the bank has reached a capital conservation buffer of only 25 per cent of the 2.5 per cent applied on top of a 4.5 per cent CET1 minimum (and at which no distributions are permitted).
[20] That could happen if, for example, a significant proportion of loans were suddenly written down or off as bad debts.

Bail-in of AT1 securities should occur, in principle, prior to any bail-in of Tier 2 securities. Whether all of a class of securities would be bailed-in, or only sufficient of them to achieve some desired CET1 ratio is potentially at the discretion of the regulator (or may be specified contractually).

Other design requirements (which vary slightly between AT1 and Tier 2 instruments) are specified for eligibility. These include such characteristics as: subordination to other liabilities; unsecured status; perpetual for AT1 (but not Tier 2) instruments, with no incentives for redemption, but possibly callable (with regulatory approval and requirement to replace with at least equivalent quality capital) after five years; cancellable dividends/coupons which are not linked to the bank's credit standing, minimum term at issue (five years) before the bank has any option to call (redeem) the securities (and replace with new issues).[21]

National regulators thus have some discretion in the requirements they apply for AT1 and Tier 2 eligibility. Also, issuers can design preference share securities in ways which determine whether they are classed as liabilities under accounting standards or not, and thus whether an objective trigger needs to be specified.[22] Complications also exist for the design of bail-in securities for mutual/cooperative banks where absence of traded equity typically leads (in overseas markets) to inclusion of only a write down, rather than conversion, feature.[23] Similarly, for government owned banks, conversion would involve part privatisation and regulators may face political impediments to "pulling the trigger".

## The "Bail-In" Market: Australia and Overseas

Issuance of bail-in securities has been significant globally. Throughout Asia, larger banks (over the equivalent of AUD assets of 30 billion for example) have been significant issuers, with the large Chinese and Japanese banks being substantial issuers. As at February 2017, Chinese banks had made over 80 issues in a range of currencies which at that time had a USD total issue value of USD 182 billion.[24] Japanese banks had made over 40 issues with a February 2017 value of over USD 43 billion

[21] In Australia, many bail-in securities involve a date (often around 8 years after issue) for mandatory conversion into equity (if not called prior, and subject to certain conditions being met). This is generally expected by analysts to lead to banks' exercising the call option (often specified as around 6 years after issue), leading investors and analysts treat the securities as having an expected life of that term.

[22] IAS 32 provides an illustration "If an entity issues preference (preferred) shares that pay a fixed rate of dividend and that have a mandatory redemption feature at a future date, the substance is that they are a contractual obligation to deliver cash and, therefore, should be recognised as a liability. [IAS 32.18(a)] In contrast, preference shares that do not have a fixed maturity, and where the issuer does not have a contractual obligation to make any payment are equity. In this example even though both instruments are legally termed preference shares they have different contractual terms and one is a financial liability while the other is equity."

[23] APRA has previously proposed that "mutual equity interests' could be created by mutuals which would satisfy the bail-in requirement, but the logic and practicality of the concept is far from clear. The Hammond Review considered options for capital instruments for mutual financial institutions.

[24] This has been approximated by using the total value of AT1 and Tier 2 securities which have been issued after January 1, 2012.

while Korean banks had made 47 issues with value of over USD 14 billion. A notable feature of Asian bail-in structures is that the most likely form of bail-in is via write-down of the value of the securities rather than conversion into equity.

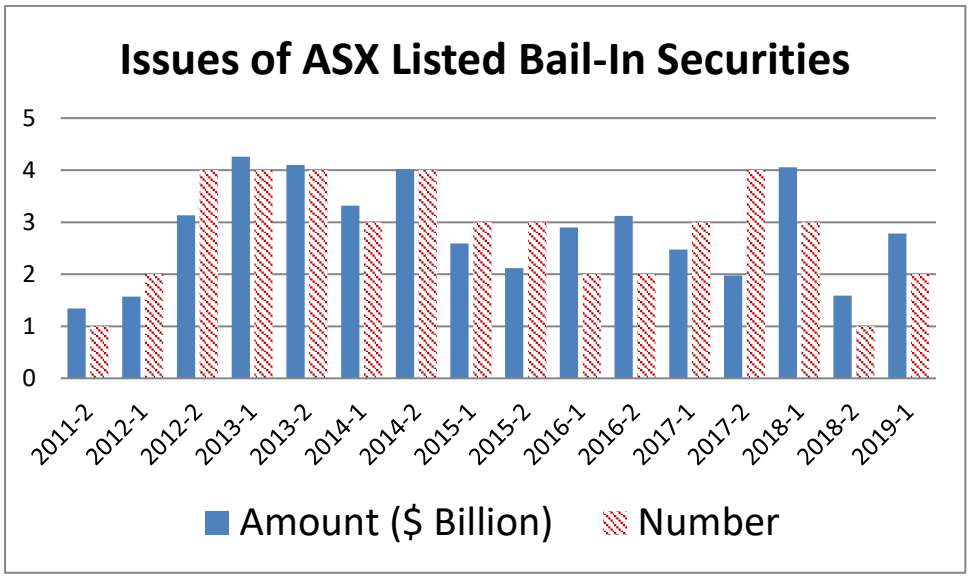
European banks have also been significant issuers of bail-in securities. In the three years to early 2016, European banks had issued over USD 100 billion of AT1 bail-in instruments. Notably US banks have not been issuers of bail-in securities, reflecting the fact that regulators have resolution powers to achieve a similar outcome of allocating losses to subordinated security holders. (The fact that the binding capital constraint is a leverage ratio (based on equity) rather than the Basel risk weighted assets approach which incorporates other non-equity regulatory capital is also relevant).

Figure 6 shows the size and development of the ASX-listed Bail-In Securities market from inception in 2011 to mid 2019. There have generally been between two to four issues per half year by banks and insurers with an average aggregate issue value of about $3 billion per half year, giving a total amount on issue at mid 2017 of around $36 billion. The issues by the major banks have typically been of more than $1 billion each while those of the smaller banks and insurers have been less such that the average issue size has been around $1 billion.

There have also been substantial unlisted issues, of similar order of magnitude, into wholesale markets – mostly being Tier 2 capital instruments (with unfranked distributions). For example, at mid 2017 ANZ Bank had 12 Tier 2, Basel compliant[25], securities on issue in a variety of currencies contributing $6.3 billion of regulatory capital. It had 6 AT1 instruments contributing $7.1 billion of regulatory capital.

[25] Some additional older Tier 2 instruments without bail-in features are counted towards regulatory capital via grandfathering over a transition period until they are no longer eligible.

FIGURE 6: BAIL-IN ISSUANCE IN AUSTRALIA




All Australian domestic listed issues to date have been floating rate securities (with quarterly or semi-annual resets) typically paying a franked coupon amount of (BBSW + margin)*(1-t) where t is the corporate tax rate. (For example, if BBSW = 4.00 per cent, the margin is 1.5 per cent, and the corporate tax rate is 0.3, the cash distribution rate would be 3.85 per cent p.a. on the face value amount, and the investor would receive imputed income and tax credits of 1.65 per cent).[26] Foreign investors, who are unable to use the tax credits are thus generally not participants in this market.

While most of the ASX listed securities are perpetual, but with a mandatory conversion date (subject to the bank meeting some specified conditions) it is conventional wisdom that the issuer will exercise its option to redeem the securities at face value at a specified date typically around six years after issue. Consequently, most analysts treat them as if they are a floating rate security with a fixed maturity date which is subject to a bail-in risk.

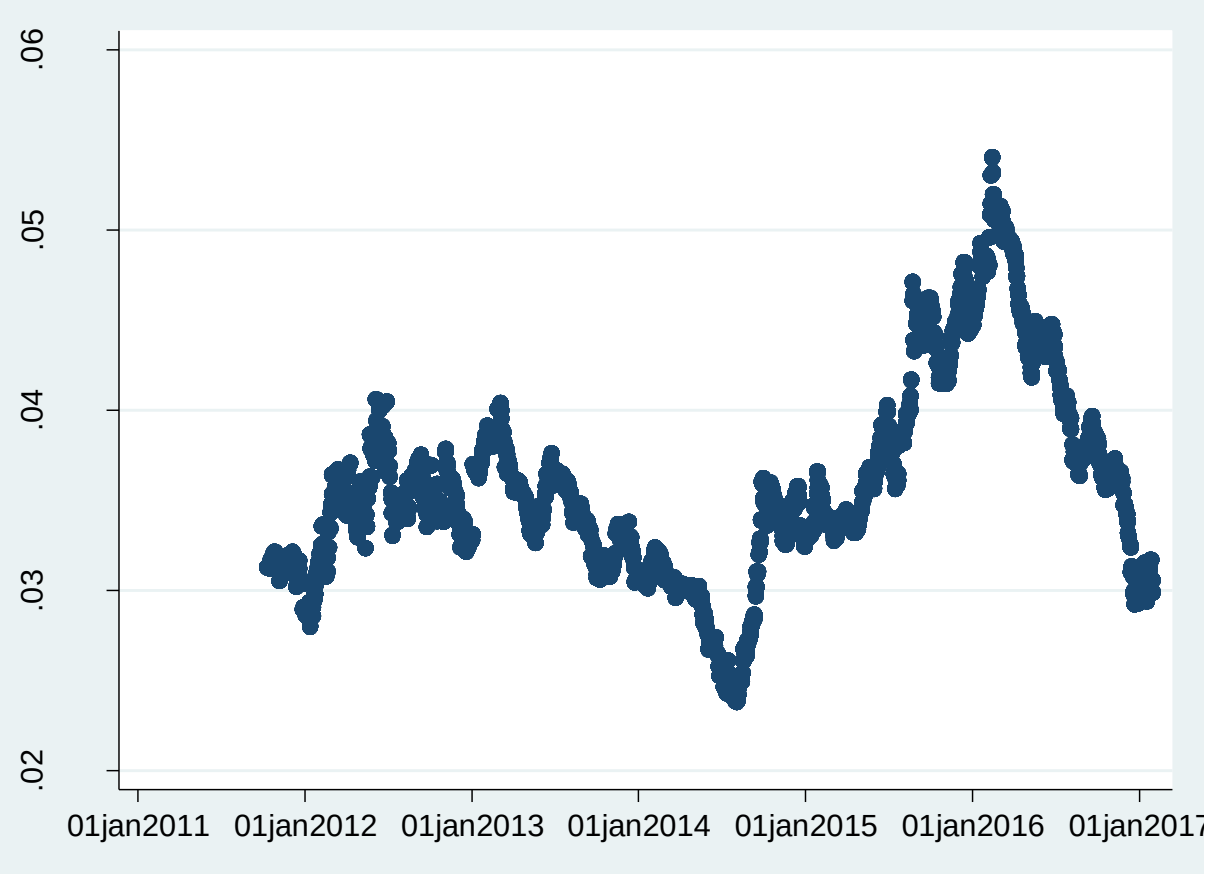
The nature of bail-in conversion is generally that a $100 security will convert into $100 of common equity with the number of shares received given by $100/$S_T$ where $S_T$ is the VWAP share price over the five days before the bail-in.[27] Of course, the announcement of a bail-in can be expected to lead to a share price decline to (probably well) below the VWAP, such that the current market value of shares received will be less than $100.

The ASX-listed bail-in securities have been popular with retail investors, and many issues have been oversubscribed. On average between 50-60 per cent of the issue has been purchased by investors

[26] There are some cases where the distribution is partially franked or unfranked, implying a different tax adjustment factor.
[27] There is also generally a condition that if the current share price is less than 20 per cent of the issue date share price, there is a maximum number of shares received.

subscribing less than $500,000. In many cases, the banks have restricted the issue to existing security holders, other than the component which has been allocated to stock-brokers for offerings to clients. The issue margin (over BBSW) has been determined by a book-build process for an amount offered to institutional investors and issue margins have varied substantially since 2011 when these securities were first issued. For the first few years, issue margins for the major banks were in the order of 3 – 3.5 per cent (but higher for smaller banks). In 2016, they spiked to around 5 per cent, but recent issues in 2017 have had margins of around 4 per cent. (These figures are the "grossed-up" margins inclusive of franking credits, which correspond to the "margin" specified in the issue documentation for the coupon payment. For domestic investors who can use franking credits, this figure is thus directly comparable to unfranked interest payments on other securities).

FIGURE 7: AVERAGE MARGIN ON ASX LISTED BAIL-IN SECURITIES




Secondary market trading (where dollar prices are generally converted by analysts into a "trade margin to call date")[28] has been at yields which have varied in a similar fashion. Figure 7 illustrates. This raises the question of what factors have been driving the pricing of these securities over time,

[28] If, for example, a security with a margin over BBSW of "m"(which was fixed at issued date) sells for a price of P, the trade margin is essentially found by calculating the value "tm" such that P is the present value of future cash flows when discounted by (BBSW+tm).

and whether the fluctuations (and cross-sectional differences in yields between different banks) are indicative of changing perceptions of bail-in, or other risks. From the perspective of bank management, the important question is the relative cost of funding of bail-in versus other forms of funding and the appropriate use of bail-in securities in meeting capital requirements. Before considering these questions, the following section addresses the problem of how the design of bail-in securities creates significant complexities for determining their value and whether the design is suited for achieving the objectives driving their introduction.

## Deficiencies of Bail-In Securities

Even without the bail-in conditions, the design of bail-in securities issued to date is complex such that risks and value are hard to assess.[29] Assessing the impact of the bail-in conditions is extremely complicated because they involve substantial uncertainty over and above the type of stochastic risks that financial engineers typically model and work with. The uncertainty involved is that it is not feasible to realistically estimate either the probability of bail-in occurring at some future date nor the consequences of a bail-in on the value of the investor's position.

Assessing the probability of bail-in is stymied by the specification of the bail-in triggers. The CET1 ratio trigger depends upon accounting data which is publicly available at best on a quarterly basis with a lag of 6-7 weeks. The PONV trigger creates even greater problems since regulators have given no guidance on what situation would be likely to lead to making such a declaration. In both cases, it is uncertain what proportion of which bail-in securities on issue would be bailed-in.

Assessing the likely loss which would be incurred by investors if a bail-in occurs is also problematic, because the announcement of a bail-in could be expected to precipitate a significant decline in the bank share price and thus the value of shares received under the bail in. While, for example, a $100 bail-in security might convert to $100 worth of shares valued at the average share price of the previous 5 days, the "bad news" of the bail-in would undoubtedly mean that their subsequent market value would be much less.

Hence, valuation of such securities is hindered by the significant "uncertainties" or "unknowns" involved regarding future outcomes. These uncertainties are not like probabilistic risks which are amenable to financial valuation techniques. There is something anomalous about regulators giving banks incentives to issue very complex securities, and allowing them to be issued to unsophisticated

[29] Features of bail-in securities can be found in the regulatory capital instruments disclosures made by banks, such as is found here for ANZ Bank.

retail investors, a point emphasised in comments to the AFR by the then ASIC Chief Commissioner Greg Medcraft.

A more general issue is whether such securities will, when put to the test, achieve the outcomes desired. One such issue is the willingness of governments to permit bail-in when the effect would be to impose significant losses on retail investors (such as self managed super funds in Australia).[30] But also particularly relevant are the likely consequences from "pulling the bail-in trigger". This is likely to destroy market confidence, creating a "run" on the bank, even though it has been recapitalised. Thus, the objective of ensuring an orderly resolution process which enables the bank's essential operations to continue or be transferred to another entity would be threatened. Either a blanket government guarantee would be required, or it would be necessary to effect an immediate sale of the troubled bank to a healthy competitor. The latter outcome occurred in the only instance of a significant bail-in to date, where the Spanish regulator bailed in investors in Banco Populare in 2017 and simultaneously sold the bank to Santander for a nominal sum (one Euro).[31] In Russia, the Central Bank in its rescue (taking 75 per cent ownership) of the fourth largest bank, Otkritie Bank, in August 2017 "chose not to use a recently established mechanism to "bail in" other creditors" (The Economist, September 2, 2017, p58). One explanation for that may be that the events prompting the rescue were the beginnings of a run of depositors (18 per cent had been withdrawn in June and July) which a bail in would be unlikely to mitigate.

While bail-in securities might have significant potential hurdles involved in their fulfilling desired outcomes in dealing with a troubled bank, their existence might generate a new form of market discipline by introducing a new set of stakeholders exposed to significant potential losses. Thus it is worth examining the determinants of prices of bail-in securities, how the required returns of investors are related to those on other funding sources for banks, and thus whether movements in these prices can provide a form of market discipline.

## Bail-In Securities Pricing, bank capital management and market discipline

[30] One complication in Australia is that AT1 bail-in securities have generally been bought by retail investors while Tier 2 securities have been bought by wholesale and overseas investors. The priority ranking implies that AT1 securities should be bailed in prior to Tier2, which could be expected to lead to significant political issues.

[31] Bank of Portugal wrote down 5 tranches (EUR 1.94 billion) of Novo Banco senior bonds (out of 52 senior bonds) on Dec 29, 2015. Instructed notes be moved to lender's bad bank predecessor Espirito Santo (BES) before it is wound up. Was only bonds originally issued to institutional investors, but retail investors had bought in secondary market. BES was restructured in mid 2014 and Novo Banco was bridge bank with BES's surviving assets and liabilities. (Novo Banco must be sold within two years of its creation). (IFLR, Jan 14, 2016)

Figure 7 illustrated the significant variation in bail-in security traded margins since they were first issued in 2011 (where the traded margin is the spread over the bank bill swap rate which generates a discount rate that makes the present value of future cash flows until the first call date equal to the traded price).

Those margins give a coupon yield which is significantly above the yield to maturity on senior debt securities issued by the major banks, and the fluctuations over time are not explained by changes in yields on such debt securities. Figure 8 illustrates[32] and suggests that bail-in securities of the major banks have had a yield in general in the order of 200 - 400 basis points over senior debt.

In considering bank capital management, the question is what factors would lead to a bank preferring to issue a bail-in security rather than senior debt or equity? The attraction over senior debt is two-fold. First, bail-in securities are included in regulatory capital whereas senior debt is not, and this may offset the higher cost of funds using the former. Second, however, the spread shown in Figure 8 compares the "grossed up" yield (cash plus franking credits) of bail-in securities with the cash yield of senior debt, which is the appropriate comparison for Australian investors. However, for the bank, the cash component of the bail-in margin could be as much as 200 basis points below the grossed up yield, making the spread substantially less when considered in "cash terms". For the bank, the question then becomes whether the distribution of the franking credits is a cost to it. If the bank has surplus franking credits which it is unlikely to be able to distributed so shareholders with dividends, there may be relatively little perceived cost.

In practice, the relevant comparison is not just between AT1 instruments and senior debt, because the bank can also issue Tier 2 instruments. These have generally been issued into international wholesale markets in a range of currencies and have paid unfranked distributions. For the major banks, the amounts of Tier 2 and AT1 bail-in securities issued are of similar magnitudes. Direct comparison of relative costs is complicated by differences in call dates and issue dates and other features.

However, to illustrate relativities, ANZ Bank issued in June 2014 AUD 750 million of Subordinated Notes due in 2024 with a call date in June 2019 with a coupon of BBSW90 +1.93. In March 2014 it issued AUD 1.61 billion of AT1 securities (ASX code ANZPE) with a call date in March 2022 with a grossed up coupon of BBSW180 + 3.25. At that time, BBSW was around 2.70 per cent, which meant that the cash component of the AT1 security distribution was around 150 basis points above BBSW,

[32] It is very much an approximation since: (a) it is not possible to get exactly equal senior debt maturity dates and bail-in call dates; (b) it reflects spreads for differing maturities since the time to maturity of the securities involved is decreasing over time; and (c) it compares the bail-in margins over BBSW with the senior debt margins over government securities.

making it cheaper in "cash" terms than the Tier 2 security with a cash margin over BBSW of 193 basis points. Provided that the bank had unused franking credits which would otherwise be "wasted" by not being distributed with share dividends, the availability of those franking credits enabled the bank to raise AT1 capital cheaper (in cash obligation terms) than Tier 2 capital – despite the latter having greater seniority.

The other element of the capital management decision which the bank needs to make is the comparison of the cost of AT1 and Tier 2 regulatory capital. While each bank will have a specific view on the required return of bank shareholders, a ballpark estimate might be calculated in the following way. If the bank has a CAPM beta of unity, then the required return in excess of the risk free rate ($r_f$) will be the market risk premium (MRP). If it is assumed that the MRP is 6 per cent p.a. in grossed up terms (ie including franking credits) then each $1 of new equity raised will require the bank to be able to generate pre-company tax earnings of ($r_f$ + 6) per cent to meet shareholder expectations. If instead AT1 capital can be raised paying (say) a grossed up dividend of ($r_f$ + 4) per cent, then that is a cheaper form of regulatory capital.

There are, of course, a range of other considerations which will be taken into account by the bank in making this capital structure decision, but consistent with the illustrative numbers used above, banks do appear to regard bail-in securities as a cheaper form of regulatory capital than common equity. Given that they are more senior in the capital structure, this is hardly unexpected, but it does raise a question about the Basel Committee's contention that their inclusion as regulatory capital will help level the playing field between small and big banks. If both have to meet the same overall minimum capital requirement, but only larger banks are able to issue bail-in securities (due to scale of offerings required in public markets) then they have a funding cost advantage because of that.

Another contention of the Basel Committee is that the existence of bail-in securities will enhance market discipline, through monitoring by investors and consequent price signals. However, for that to occur there are several conditions needed – neither of which would appear to be met. First, investors need to be able to value these securities, however as argued earlier the securities are characterised by "uncertainty" rather than "risk" making risk-based modelling problematic. While analysts and investors may apply risk based models, the absence of any firm foundation for determining "fundamental values" means that prices may not provide useful signals of bank risk. This is perhaps likely to be more relevant to the time series of bail-in margins, which has displayed significant unexplained variability, rather than the cross-section of differences in bank margins where pricing may be done on a "relative" basis of benchmarking bail-in securities against each other. The second problem is that in general, despite the Basel 3 capital and risk disclosures, investors (in Australia at least) still have very limited real-time information on bank conditions to

enable confident valuations. In any event, the question which needs to be asked is whether allowing use of bail-in securities to meet regulatory capital requirements increases the quantity and quality of market discipline relative to the alternative of only allowing equity as regulatory capital.

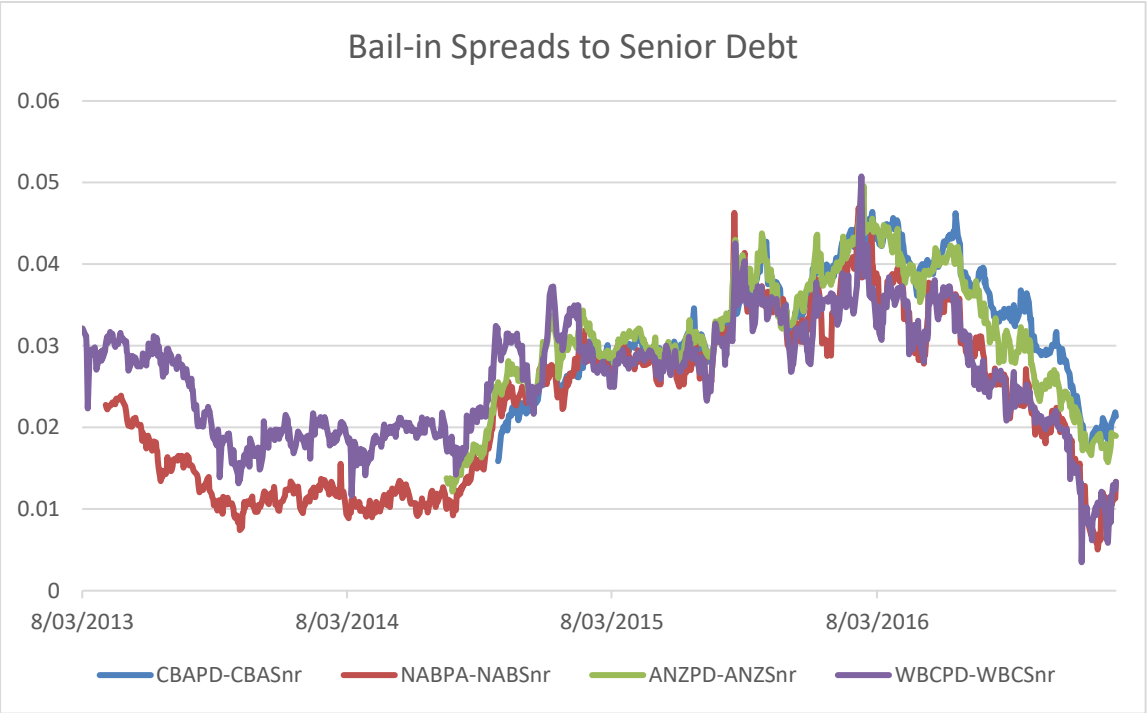



**FIGURE 8: MAJOR BANK COMPARATIVE YIELDS**

# 19 Liquidity Management and Regulation

## Contents

Liquidity's a mystery; it's very rarely seen,
It strikes and then is gone again, its getaway is clean,
And despite forensic evidence and great deductive flair,
The conclusion's inescapable, Liquidity's not there!

Liquidity, Liquidity, there's nothing like liquidity,
Its presence gives you confidence, its absence gives timidity,
You own perhaps a property, you own perhaps a share,
But once you've lost your credit card, Liquidity's not there!

Your understated opulence inheres in what you wear,
But in the end, you face the fact, Liquidity's not there!"
*extract from "Liquidity, The Accounting Cat" by John Clarke*

## 19.1 Introduction

"Liquidity is the ability to fund increases in assets and meet obligations as they come due. Within this definition is an assumption that obligations will be able to be met "at reasonable cost"." http://www.bis.org/publ/bcbs136.pdf.

Liquidity risk has always been an important issue for banks, but the problems experienced in the GFC by major banks (and financial markets) brought it into greater prominence and led to the introduction of new regulation as part of Basel 3.[1] But it is not just banks that face and need to manage liquidity risk, and so the following section considers the pervasiveness of liquidity risk. The following session outlines some of the lessons learnt from the GFC about liquidity risk and its

[1] The Basel Committee had issued a liquidity management sound practices guide in 2000 (updated in 2008).

management. This is followed by a consideration of how liquidity risk arises in banks, including an exposition of the Diamond-Dybvig model which explains how the nature of bank deposits can lead to the extreme liquidity risk event of a bank "run". Principles and practices of liquidity management are then considered. Because banks play a special role in the financial sector and rely on access to deposits at the Central Bank for ultimate liquidity, the role of Central Bank liquidity management is then considered. Last, but by no means least, the liquidity regulations introduced in Basel 3 are outlined, and some of their consequences discussed.

## 19.2 The Pervasiveness of Liquidity Risk

Banks are generally viewed as the financial institutions most subject to liquidity risk as a result of taking short term and at call deposits and making longer term illiquid loans. But liquidity risk arises for many other types of financial institutions.

### Mutual Funds and Liquidity Risk

An *open-end mutual fund* which invests in illiquid assets such as property or mortgage securities and allows investors to redeem their investments at short notice (next day) at the Net Asset Value has significant liquidity risk. The inability to sell those assets quickly without losses implies a need to maintain some adequate level of liquid assets to deal with withdrawals. Unfortunately this principle has not always been adhered to, and such funds have had to impose a freeze on withdrawals in times of stress. In Australia, this occurred in the early 1990s for property trusts and mortgage trusts[2] and this was repeated in the Global Financial Crisis when many such trusts had to freeze redemptions – with those freezes lasting quite some years. ASIC provides information on frozen funds here.

A 2020 *FRB FEDs Notes* paper by Aramonte et al makes the point that mutual funds create liquidity by providing investors with next day access to funds even though the underlying assets may not be easily saleable with rapid settlement. Investors expecting large outflows to occur from mutual funds, requiring forced asset sales (due to low liquid asset holdings) which depress net asset values may run in order to be first in line and avoid losses. They estimate the sensitivity of fund NAVs to measures of aggregate market liquidity and find that there were marked changes in this sensitivity for high-yield bond and bank-loan funds following the onset of the Covid-19 crisis. This suggests that

[2] Estate Mortgage Trust was a high profile example. Its promoters (subsequently jailed) had wrongly claimed to be able to provide high returns for investors from investing in low risk mortgages. This Nov 9, 2002 AFR article provides an overview of the whole sorry tale, involving investors losing over half of their investments.

such funds would be particularly vulnerable to adverse shocks in market liquidity, potentially transmitting those shocks into the asset markets in which they have investments.

International Standard Setters have produced guidance on liquidity management requirements for mutual funds. In 2013, IOSCO set out principles for liquidity risk management in collective investment schemes, and in 2017 the Financial Stability Board addressed liquidity concerns as one item in its consideration of structural vulnerabilities in asset management activities.

To operate an open-ended scheme giving investors a right to withdraw at any time the provisions of the Corporations Act (Section 601) essentially require that the scheme be "liquid". This is defined as having at least 80 per cent of its assets in bank deposits, bank bills, marketable securities or "prescribed property", or property where the RE reasonably expects realisation at its market value can be achieved within some specified period. MIS which invest in listed equities, bonds or money market instruments will generally meet this requirement. But where investments are in structured products or unlisted securities, where markets may become illiquid, the requirement is less clear. The legislation also provides for schemes not offering continuous withdrawal rights the ability to offer members a right to withdraw from time to time.

Of course, managed investment schemes listed on the ASX (which are "closed-end funds" do not have the same liquidity requirements. If investors wish to liquidate part or all of their investment that can be done by sale to other investors via the ASX. One consequence, however, is that prices of units in the scheme can differ (sometimes quite substantially) from the value of the underlying assets held by the scheme. ETFs were developed as a solution to this problem.

## Superannuation Funds

In principle, liquidity risk for superannuation funds should be very low. The only members with a right to redeem super balances for cash are (generally) those in retirement (or more specifically those above the preservation age – which ranges between 55 and 60 depending on date of birth). For individuals below the preservation age, balances can be transferred to another fund – but this is not a very common occurrence.

So, particularly given the ongoing influx of cash from regular super contributions from employers, the need for holding cash to meet possible member withdrawals is relatively low – unless the fund has a high proportion of retired members. Nevertheless, super fund managers argue that liquidity management is important because of the possibility of members changing their investment options and thus requiring the fund to sell some types of assets and buy others.

Of course, there can be unexpected shocks, such as during the Covid crisis when the Government allowed individuals suffering financial hardship to withdraw up to $20,000 from their accounts.

While some expected that this would cause liquidity problems for the funds, there was no evidence of that happening, although APRA has identified areas for improvement in liquidity risk management.

### Conduits and SIVs and liquidity risk spillovers

In the GFC, liquidity problems arose with ABCP conduits which held long term assets, such as RMBS or CDOs, financed by issuance of short term (eg 90 day) commercial paper. Inability to replace maturing paper at reasonable cost at a time when selling the assets held to meet maturing liabilities would have involved major losses and thus led to default on meeting those obligations. Many banks who were sponsors of such conduits were, or felt, obliged to provide support to the conduits, transferring the losses from falling asset values back onto bank balance sheets. (Indeed, the provision of a liquidity facility by a bank will generally be needed to convince investors in CP that the issuer will be able to meet repayments in the event that new CP investors cannot be attracted to replace maturing paper).

## 19.3 Liquidity disruptions: Lessons from the GFC

The GFC brought liquidity risk management into sharp focus, and prompted significant regulatory change and increased recognition of how interrelationships between financial institutions and capital markets could generate liquidity crises threatening stability of the financial system.

The possibility that financial markets could “freeze” due to widespread increased uncertainty about asset quality was not generally considered, but was evidenced in the GFC with closure of ABS commercial paper markets, closure of securitization markets, delays in loan syndication completions and underwriting exposures, and interbank market disruptions. Banks faced liquidity problems because of exposures to off balance sheet SIVs/conduits which they had sposored arising from various types of liquidity or credit guarantees (or sometimes providing support due to reputational concerns).

As noted by the U.S. FDIC (August 2008) “Increased use of liability-based and off-balance sheet strategies has elevated the liquidity risk profile...” “Some institutions have underestimated the difficulty of obtaining or retaining funding sources during times of financial stress.”

This was reflected in the fragility of collateralized funding mechanisms such as use of Repos, margin lending, securities lending. Repo financing of asset holdings, involving purchasing securities and pledging them as security for short term funding, in particular created problems with asset price declines causing liquidity problems. This occurred via margin calls prompting asset sales into

depressed markets and interconnectedness though re-use of securities as collateral transmits system liquidity problems

Significant liquidity creation had occurred prior to the GFC in "shadow banking", such as Asset Backed Commercial Paper (ABCP) issued by SPVs (SIVs, conduits) etc. These suffered "Funding liquidity risk" in the form of an inability to roll-over maturing short term funding. In some cases there was a failure of untested liquidity management arrangements such as Extendible Commercial Paper (XCP)

Within the regulated banking sector there were disruptions to interbank markets for liquidity. There was significant unwillingness to lend and hoarding of liquidity due to uncertainty about counterparty risk. This was a "typical" imperfect information induced credit rationing response, reflecting Inability to distinguish good from bad risks.

For banks, a number of lessons became apparent. First, banks' Internal Funds Transfer Pricing Systems did not adequately price the cost of liquidity provision to business units. Second, contingent liquidity support for SPVs was not adequately reflected in liquidity planning. Third, reputational risk is a source of liquidity and solvency risk which can arise in both wholesale and retail markets.

For the authorities, while Central Banks provided facilities for access to liquidity, there was in some countries, a reluctance to access official liquidity support due to concerns about being tainted as institutions-at-risk.

## 19.4 Bank Liquidity Creation and Liquidity Risk

Liquidity creation is one of the core features of banking, best exemplified by the taking of short term deposits and making of longer term loans. (At September 2016, for example, ANZ had only $155 billion out of $675 billion of assets maturing within one year, while $627 billion of liabilities matured within one year).[3] Relying on the "law of large numbers" the risk that one depositor will withdraw funds on any day is hopefully balanced by the possibility that another depositor will provide funds, enabling the bank to maintain its holdings of longer term assets, and meet any net outflows from:

(a) small holdings of cash (often referred to as liquid asset reserve management)
(b) proceeds of sales of marketable securities (market liquidity)
(c) funds raised by borrowings in wholesale markets (funding liquidity).

Liquidity creation by banks occurs in a range of other ways, summarised below. An important one is the provision of lines of credit (loan commitments, overdrafts) to customers, enabling them to access funds should they be needed. (Such facilities may be on a committed basis, or a "best efforts"

[3] ANZ 2016 Annual Report p136

basis – which poses greater risk (of non-availability) for the customer). Credit card limits also fall into this category. Short term loans also provide liquidity for customers – for example repurchase agreements enable bank counterparties to finance holdings of long term assets by using those as collateral for short term loans. (Banks may also use repos to borrow short term to fund their own holdings of long term securities).

Sources of Bank Liquidity Risk

(a) Liquidity creation via asset- deposit liability maturity mismatch.
(b) Interbank settlements as part of the payments process
(c) Customers drawing on liquidity facilities (overdrafts, loans approved but not yet drawndown, credit cards, lines of credit, CP liquidity backstop guarantees),
(d) variations in loan repayments from expected (based on pre-payment experience)
(e) Reliance on ability to roll-over capital markets funding / volatility of short term money market funding
(f) Default on expected repayments
(g) Collateral /margin call demands
(h) Unexpected payments due to counterparty exercise of derivative contracts
(i) Lags or inability to on-sell underwritten securities
(j) Market "freezing" for complex securities held and thought to be marketable
(k) Cross-border / FX transactions

Some examples of the way in which banks could create liquidity risk include:

- Writing a put option on shares in company XYZ
- Providing a customer with a credit card
- Creating a Special Purpose Vehicle which issues Asset Backed Commercial Paper backed by mortgages originated by the bank
- Taking a long futures position on an organized exchange
- Transacting in OTC derivatives where collateral agreements have been put in place to mitigate credit risk

Some academics[4] have argued that it is natural for banks to combine the granting of loan commitments with taking transactions deposits because doing so may reduce the costs of managing overall liquidity risk (via holding of low yielding cash) if the risks of outflows associated with each are not perfectly correlated. KRS's counterfactual is a situation where each of the functions (of liquidity insurance to customers) are provided by separate institutions, and is thus partly advanced as an explanation for why deposit taking and lending are combined in one institution (a bank). They argue that historically, customer access to cash via lines of credit (overdrafts) and via deposits were viewed as very similar. In a closed system, if one customer drew on a line of credit to make a payment to another individual who deposited the proceeds the bank would have no change in its cash holdings.

[4] Kashyap et al (2002), Gatev and Strahan (JFE 2009)

Kashyap et al (2002) argue that imperfect correlation between usage of lines of credit and deposit withdrawals mean that banks can save on liquid asset holdings (reducing the foregone higher returns available from less liquid assets) relative to deposits and commitments being provided by separate institutions.

They test this by looking at cross sectional correlation of unused commitments and transactions deposits for banks in the USA, and find a positive correlation. Gatev and Strahan examine whether having higher commitments reduces the riskiness of banks with high levels of transaction deposits, using bank stock-return as their measure of risk. They find this to be so, and that for banks with low transactions deposits, more unused commitments increases risk.

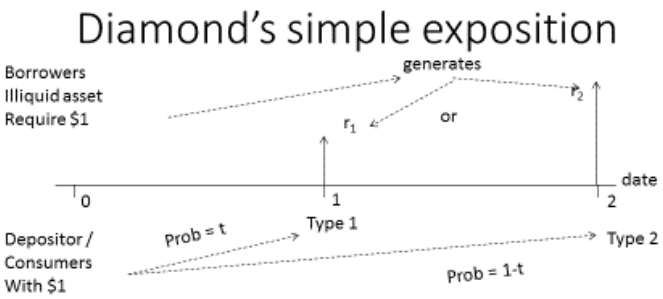
## 19.5 The Diamond & Dybvig (and other) Models

Diamond and Dybvig. (JPE, 1983) developed a model of the rationale for, and consequences of, bank liquidity creation. Fundamental to this is the "sequential service" (first come first served) nature of bank deposit liabilities which leads to the possibility of bank "runs" not due to "fundamentals". They discuss measures to prevent or deal with runs including deposit insurance and bank "holidays" (closing the doors).

The intuition underpinning the model is as follows:

- Investors (depositors) desire liquidity, entrepreneurs have projects that are illiquid and require longer term loans
- Banks, provide liquidity insurance to investors while making illiquid loans (which can be liquidated at a cost to meet liquidity demands)
- "First come first served" nature of deposits means that if a depositor believes there is excessive liquidity demand of others and consequent loan liquidations which may lead to losses and inability to get full value of deposit at later date, she should withdraw deposit (even if funds not wanted till later date).

Diamond (FRBR, 2007) provides a simplified exposition of the model as follows.




- Type 1,2 require cash at date 1, 2. Don't know type at date 0 but probability (t) is known. (set t = ¼)
- Asset early liquidation at date 1 recoups less

Individual depositors have utility given by $U(c_1)$ or $U(c_2)$ depending on whether they turn out to need date 1 or date 2 consumption with probabilities t and 1-t. Assume t = 0.25, a discount rate of zero, and form of the utility function of U(c) = 1 – (1/c).

Direct holding of the illiquid (entrepreneur's project) asset gives an expected utility of $tU(r_1) + (1-t)U(r_2)$ where $r_1$ and $r_2$ are returns from liquidating the asset at date 1 and date 2 respectively.

Assume the illiquid asset generates $r_1 = 1$ at date 1 or $r_2 = R = 2$ at date 2 and is the only asset available to investors. Banks however are able to create a liquid asset (to be shown) which generates $r_1 > 1$ or $r_2 < R$. Assume the returns on the bank liquid asset are $r_1 = 1.28$, $r_2 = 1.813$)

Investor expected utility from the illiquid asset = 0.375

(= 0.25*(1-1/1) +0.75*91-1/2) = 0.25 x 0 + 0.75 x (1/2).)

Expected utility from the liquid asset (bank deposit)

= (0.25)x(1-1/1.28) +0.75x (1-1/1.813) = 0.391 > 0.375.

This is preferred due to risk aversion (and less dispersion of outcomes $r_1$, $r_2$)

The bank liquidity creation ability arises from the following. It invests in the illiquid asset (with $r_1 = 1$ or $r_2 = 2$), it offers withdrawable deposits with $r_1 = 1.28$ or $r_2 = 1.813$. It will need to liquidate some of assets at date 1 to meet Type 1 cash needs (the proportion is t = 0.25). Thus it will liquidate 32 of 100 to get $32 and pay 25 x$1.28 = $32. There are 68 illiquid assets left which will generate 68x$2 which is just sufficient to pay 75 x $1.813 to remaining depositors at t=2.

This is a (Nash) equilibrium. If all believe 25% will withdraw at date 1, the bank can meet promises and only Type 1's will withdraw (Even if a storage asset exists giving $1 at next date, then if illiquid

asset date 1 liquidation gives 1-τ <1, the bank can hold some of storage asset and liquidate less of illiquid asset. Individuals can't do as well as this since they have an all or nothing date 1 liquidity need).

Bank runs can arise for the following reason. It is assumed that depositor type is unknown at date 0 and non-verifiable at date 1, so that banks and customers can't design a contract based on outcome of depositor type. Also, the bank can't prevent Type 2's withdrawing at date 1.

Suppose f % withdraw at date 1. The payout is $r_1 f$ and $1-r_1 f$ illiquid assets are left, which generate $(1-r_1 f)R$ at date 2 for (1-f) type 2 depositors remaining. If f>t, it is optimal for Type 2's to withdraw $r_1$ at date 1 and store if $r_2(f) < r_1$. If f* is forecast of f, good equilibrium is f* = t. However, suppose f* ≥ 0.79, the bank needs to liquidate all investments to honour $r_1 = 1.28$, so that zero is left at date 2. If all individuals believe f* = 0.79 or greater they will all withdraw, such that f* = f = 1 is "run" equilibrium – self fulfilling prophecy.

There are thus two equilibria which are locally stable. The first, f* a little above t =0.25, doesn't induce type 2 to withdraw early and there are still enough illiquid assets left to mean that the date 2 outcome is better than withdraw and store.

The second is where $r_1 > r_2(f^*) = [1-(f^*.r_1)]R/(1-f^*)$ which induces type 2 withdrawal. For R =2, $r_1 = 1.28$, the critical f* = 0.5625.

Hence runs require a significant shift in beliefs, but can be prompted by anything which induces large change in f*. D&D refer to this a "sunspot" equilibrium (reflecting ancient beliefs that these presage some significant event).

Extensions and Qualifications

D&D's simplified model makes a number of assumptions, some of which have been challenged by subsequent literature, others of which are of minor import to the model's results. These include:

- No uncertainty about date 2 illiquid asset payoff
- No agency /hold-up problems involving entrepreneur effort
- Why sequential service feature?
- Why banks – why can't consumers invest directly and transact via capital market to obtain liquidity?
- Information assumptions (Green & Lin argue that if there is sequential service and agents know position in queue, backward induction implies no incentive to misrepresent type and thus no run)

## Preventing Bank Runs

D&D discuss a number of ways in which bank runs have been prevented

Historically one approach was a temporary suspension of convertibility of deposits into cash, by for example closing the doors of the bank. They suggest that a credible threat to suspend convertibility may prevent runs because, in the context of their model, date 2 promised amount not then threatened.

Since the 1930s another approach has been the provision by governments of deposit insurance. In the context of the D&D model, this removes risk of the date 2 promised amount. They argue this is preferable to suspension of convertibility if the proportion of type 1's stochastic (otherwise closing of doors creates hardship for type 1's and bank is able to undertake greater maturity transformation).

A third approach has been Central Bank liquidity provision to banks which are (believed) solvent but illiquid. This is generally referred to as the Lender of Last Resort (LOLR) role of the Central Bank. In general the maxim here has been that attributed to Walter Bagehot in his 1873 book "Lombard Street: A Description of the Money Market", which can be summarised as "central banks should lend early and freely to solvent but illiquid banks, against good collateral and at high rates".

Note that both deposit insurance and Central Bank liquidity facilities have the potential to create moral hazard.

## Other Theoretical Models

There are many academic papers focusing on features of banking related to liquidity. Here are some comments on a few of them

Calomiris & Khan (AER, 1991) - They ask, why is there use of a sequential service model? Sequential service gives depositor incentive to collect info and monitor and exit first if likely failure. Hence enables bankers to commit to a promised set of payoffs

Diamond and Rajan, (JPE, 2001) – They note that bank fragility is due to demand deposits. This enables banks to credibly commit to using loan monitoring skills and expertise (acquired knowledge) to overcome the borrower hold-up problem (since the bank can take over the borrower's project at date 1 and continue to date 2 with less reduction in outcome than if individual depositors were to do so).

Brunnermeier and Oehmke (JOF, 2013) -They argue that financial institutions may use excessive short term finance, as a result of a "maturity rat race". The argument is that banks, for example, can borrow from multiple counterparties at different maturities to fund long term investments. Equilibrium involves inefficiently short maturity with excessive maturity mismatch, unnecessary rollover risk, and possibility of creditor runs. Why does this occur? Shorter term creditors can redeem funds earlier if negative information arises, or demand higher roll-over rate – these dilute

longer term claims, ie there is a form of externality. Hence shorter term creditors will accept a lower interest rate and if positive news arrives, the bank can roll-over at a better rate. There is thus an incentive for the bank to attract shorter term debt.

Note that this "rat-race" is not based on competition between banks – it is the outcome of a bank dealing with its creditors (depositors). Important to their model is that (a) banks cannot commit to a particular maturity structure of liabilities when dealing with potential creditors and (b) creditors are not able to observe the bank's maturity structure.

Acharya, Shim, Yorulmazer (RFS, 2011) – They focus on strategic liquidity management – having cash to buy fire-sale assets (failed banks), means an increase liquidity in crisis times. This has merit since fire sale prices are below fundamentals due to "cash in the market pricing" (see Allen and Gale (JEEA, 2005)). In contrast a bias towards low liquidity in good times given a belief that high yielding risky assets can be used as collateral. They consider that the design of LOLR policy (lend to insolvent banks v lend to solvent banks v lend to solvent banks conditional on liquid asset holdings) will affect bank liquidity policy (both directly, but also by affecting fire sale opportunities).

Brunnermeier and Pedersen (RFS, 2009) – They note that financiers fund speculators, via collateralised loans, who provide liquidity in asset markets. The speculator constraint is that their capital (NW) must exceed margins required. Financiers set margins based on VAR (or some other risk calculation). Market illiquidity arises from a gap of price from fundamental value. If financiers know prices < (>) fundamental value and expect it to return, they reduce margins on long (short) positions which is stabilising behaviour. If financiers don't know the fundamental value, margins increase with price volatility, and can increase with market illiquidity. An asset demand shock can lead to fragility and spirals – the Price (Loss) - Margin Spiral.

## 19.6 Managing Liquidity Risks

The global sub-prime crisis of 2007-8 emphasized the importance of liquidity management in banking (and other organizations) and the potentially disastrous risks which exist. The Basel Committee has issued (June 2008) its "Principles for Sound Liquidity Management and Supervision".[5]

Banks face three main liquidity management issues reflecting different planning horizons

- day to day liquidity management of transactions arising through the payments system and other cash flows

[5] In February 2008 it published "Liquidity Risk Management and Supervisory Challenges"

    - ensuring adequate "cash" is available at customer outlets (branches, ATMs) to meet withdrawals;
    - Having sufficient settlement account balances at the Central Bank to meet anticipated settlements – with the development of Real Time Gross Settlements (RTGS) this has changed from previous times when the focus was on overnight settlement balances;
- short term funding issues and dealing with imbalances and crises
    - Projecting likely net withdrawals/inflows (due to maturing deposits, loan drawdowns, customer transactions etc) on future dates such that actions can be taken to ensure the availability of adequate liquidity as these dates approach.
- longer term balance sheet funding issues
    - As the time horizon involved gets longer, liquidity management morphs into "funding" and capital management arrangements.

There are a range of techniques available for these purposes, but an important component is that of "stress testing". One such test which most regulators will require is for financial institutions to demonstrate that they are able to survive a "name crisis" in which their ability to access key sources of funds dries up for a number of days.

Typically a bank will forecast future expected cash flows – over range of horizons from daily to years (funding needs). For short term horizons the bank will need to ensure that expected outflows < expected inflows + available marketable assets + discretionary access to external sources of funds. Use stress tests/scenario planning to ensure sufficient safety margin. Perhaps set limits on cumulative cashflow mismatches (net funding requirement) over various horizons.

Generally some form of "maturity ladder" is used – map expected future cash inflows and outflows against future dates to determine expected net position. Complications include: treatment of at-call deposits, expected loan approvals and timing of loan drawdowns, seasonal effects on loan/deposit balances etc. Conservatism suggests using latest possible date for discretionary loan repayments, earlier dates for discretionary cash inflows, conservative roll-over assumptions etc.

Liquidity management involves financial institutions implementing strategies of "self-insurance" or "purchased insurance" against shortfalls of cash required to meet current and forthcoming obligations in a variety of ways. These are sometimes referred to as asset liquidity management and liability management approaches respectively. In the former the bank will hold sufficient liquid assets relative to total assets to act as a buffer (but give reduced weight to assets with high price volatility). In the latter the bank relies on access to funds via the interbank/wholesale market (and possible sales of less liquid securities). The optimal mix will reflect the relative costs incurred in using each approach and the risks associated with each.

Table 1 provides information on possible assumptions which might be required in stress testing, and which illustrate ways in which liquidity problems might arise.

**TABLE 1: STRESS TESTING LIQUIDITY RISK: POSSIBLE ASSUMPTIONS**

| |
|---|
| asset market illiquidity and the erosion in the value of liquid assets |
| the run-off of retail funding |
| the (un)availability of secured and unsecured wholesale funding sources |
| the correlation between funding markets or the effectiveness of diversification across sources of funding |
| additional margin calls and collateral requirements |
| funding tenors |
| contingent claims and more specifically, potential draws on committed lines extended to third parties or the bank's subsidiaries, branches or head office |
| the liquidity absorbed by off-balance sheet vehicles and activities (including conduit financing) |
| the availability of contingent lines extended to the bank |
| liquidity drains associated with complex products/transactions |
| the impact of credit rating triggers |
| FX convertibility and access to foreign exchange markets |
| the ability to transfer liquidity across entities, sectors and borders taking into account legal, regulatory, operational and time zone restrictions and constraints |
| the access to central bank facilities |
| the operational ability of the bank to monetise assets |
| the bank's remedial actions and the availability of the necessary documentation and operational expertise and experience to execute them, taking into account the potential reputational impact when executing these actions |
| estimates of future balance sheet growth. |
| *Source: Basel Committee:* BCBS144 |

Potential sources of liquidity include the following:

- Holding "cash" or near-cash assets. This is generally perceived to be expensive, one reason being that rates of return on liquid assets are lower than on illiquid assets. In theory, that should not be a problem, but providers of funds to the institution do not adjust downwards their required rates of return sufficiently to reflect the lower risk associated with higher liquidity. As financial markets have developed, cash holdings have fallen as a form of liquidity management – although there has been clear evidence of a flight to cash (such as Central Bank deposits) during the uncertain times of the sub-prime crisis.
- Holding readily marketable securities (financial assets). The sub-prime crisis has exposed the shortcomings in such a strategy for coping with market wide liquidity crises. It involves taking on market risk (due to volatility in the market prices of those assets), with the risk of having to sell into a depressed market. In a time of crisis, when many organizations are pursuing the same strategy, the cost can be significant – and particularly so if markets freeze up as has happened during the crisis.
- Holding securities which can be pledged as collateral for short term borrowings. The repurchase (repo) market, in which securities are sold and simultaneously repurchased for delivery at a future date, has become an important tool for liquidity management of this sort.

- Having in place lines of credit or other arranged borrowing facilities. The ability to draw on a committed line of credit or overdraft facility from another institution will typically involve incurring some cost for establishment and maintenance of that facility in addition to the cost of borrowing. Another option is to have facilities in place which enable the organization to issue securities (such as commercial paper) into the capital market. In some cases this may also be achieved by having an option attached to existing securities on issue which enables the issuer to extend their maturity.
- Having at-call or short term loans outstanding to other entities which can be called to provide cash when needed. The risk here is that such loans involve counterparty risk – and calling such loans may increase the likelihood of default if there is widespread stress in the financial market. Often, such loans may be collateralized by marketable securities pledged by the borrower against the loan (such as via a loan made as a reverse repo). This reduces the risk of the borrower defaulting, but leads to potential exposure to market risk if default occurs and the value of the security has declined. Consequently, ensuring that margin requirements are continually met and the value of collateral maintained above the loan value becomes an important operational requirement.
- Having sufficient credit rating and standing with potential counterparties to be able to borrow at short notice in inter-bank markets. This is an important component of daily liquidity management in which banks with projected surpluses and deficits in their desired settlement account balances at the Central Bank trade with each other to correct those imbalances.
- For banks, the ability to access "Lender of Last Resort" loans or use discount window facilities at Central Banks provide further potential, albeit costly, sources of liquidity.
- Table 2 provides more detail on potential sources of "funding liquidity"

**TABLE 2: POSSIBLE SOURCES OF FUNDING LIQUIDITY**

- deposit growth
- the lengthening of maturities of liabilities
- new issues of short- and long-term debt instruments
- intra-group fund transfers, new capital issues, the sale of subsidiaries or lines of business
- asset securitisation
- the sale or repo of unencumbered, highly liquid assets
- drawing-down committed facilities
- borrowing from the central bank's marginal lending facilities.

*Source: Basel Committee: BCBS144*

Liquidity risks can arise from specific individual products or business lines, meaning that an overall framework is required for total liquidity management. Some of these risks can arise from contingent commitments – which may be contractual or non-contractual (where the reputational costs of not meeting that commitment are sufficiently severe as to make them effectively contractual). Liquidity risks and credit counterparty risks are inherently interrelated, and liquidity risk can easily transform into solvency risk for an institution.

Some questions which financial institutions need to address in examining their liquidity management arrangements include the following:

- How is liquidity risk of new (and existing) products to be measured?
- What liquidity risk costs should be incorporated into the funding costs of products (and how do internal systems achieve this)?
- How are all potential liquidity risks (such as contingent commitments and lines of credit provided) appropriately incorporated into centralized liquidity planning and management?

For Central Banks and Prudential Regulators, questions which warrant attention include:

- What are the appropriate structures for liquidity support facilities which Central Banks provide to individual institutions (lender of last resort, rediscount window etc)?
- How should system liquidity management techniques be designed (such as use of securities lending v repos; allowable collateral etc)?
- Can liquidity creation outside the banking sector and based on activities such as repos and securities loans be adequately controlled by use of traditional central Banking weapons?
- What are some possible early warning signs of institutions facing liquidity problems? Table 3 provides some suggestions.

**TABLE 3: EARLY WARNING INDICATORS**

- rapid asset growth, especially when funded with potentially volatile liabilities
- growing concentrations in assets or liabilities
- increases in currency mismatches
- a decrease of weighted average maturity of liabilities
- repeated incidents of positions approaching or breaching internal or regulatory limits
- negative trends or heightened risk associated with a particular product line, such as rising delinquencies
- significant deterioration in the bank's earnings, asset quality, and overall financial condition
- negative publicity
- a credit rating downgrade
- stock price declines or rising debt costs
- widening debt or credit-default-swap spreads
- rising wholesale or retail funding costs
- counterparties that begin requesting or request additional collateral for credit exposures or that resist entering into new transactions
- correspondent banks that eliminate or decrease their credit lines
- increasing retail deposit outflows
- increasing redemptions of CDs before maturity
- difficulty accessing longer-term funding
- difficulty placing short-term liabilities (eg commercial paper)

*Source: Basel Committee: BCBS144*

## Liquidity Risk Disclosures

Since liquidity risk of a bank is important, there is an argument that disclosures should be made which enable investors to assess the extent of such risk. On the other hand, the potential for bank runs suggests that there needs to be care taken in the form and nature of disclosure to avoid increasing such risk.

The Basel Committee provided a list of possible disclosures shown in Table 4. Since that time, APRA has mandated liquidity risk disclosure by those Australian banks which operate under the Liquidity Coverage Ratio (LCR) requirement (explained later). Much of that disclosure relates to data showing how the banks are complying with the LCR and Net Stable Funding Ratio (NSFR) requirement, and minimum requirements are set out in Attachment F of APS 330. However, the banks are also encouraged to disclose information about their exposures to, and management approaches to, liquidity risk, and each of the banks provides some such information in the Basel Capital and Risk Disclosures found on their websites – although in some cases it does not go very far beyond reporting the numbers required for LCR and NSFR calculations!

**TABLE 4: POSSIBLE LIQUIDITY RISK MANAGEMENT DISCLOSURES**

| |
|---|
| the aspects of liquidity risk to which the bank is exposed and that it monitors |
| the diversification of the bank's funding sources |
| other techniques used to mitigate liquidity risk |
| the concepts utilised in measuring its liquidity position and liquidity risk, including additional metrics for which the bank is not disclosing data |
| an explanation of how asset market liquidity risk is reflected in the bank's framework for managing funding liquidity |
| an explanation of how stress testing is used |
| a description of the stress testing scenarios modelled |
| an outline of the bank's contingency funding plans and an indication of how the plan relates to stress testing |
| the bank's policy on maintaining liquidity reserves |
| regulatory restrictions on the transfer of liquidity among group entities. |
| the frequency and type of internal liquidity reporting |
| *Source: Basel Committee: BCBS144* |

## Bank Liquidity Management Theory

It is possible to find theoretical models of bank liquidity management as far back as Edgeworth (1888)[6]. The approach adopted there and in subsequent papers was to view liquidity management as a trade-off between the opportunity cost of holding lower yielding liquid assets (to meet possible deposit outflows) and the penalty incurred if outflows exceeded available liquid assets. The penalty could be thought of as the cost of last resort loans from the Central Bank, or the need to borrow

[6] Edgeworth, F.Y., 1888, The mathematical theory of banking, Journal of Royal Statistical Society 51, March, 113-127.

from other banks at higher interest rates, or to sell some assets at discounted prices. If f(X) is the probability distribution of deposit outflows (X), D is total deposits, R is liquid assets (reserves) held, r is the excess of the yield on loans over holding liquid assets, and p is the penalty per unit of shortfall of liquid assets relative to withdrawals. A risk-neutral bank will choose R such that the marginal cost (r) of an extra dollar of reserves equals the expected marginal benefit. That latter amount is p x prob(X>R) = $p \int_R^D f(X)dX$. The level of liquid asset holdings X can be determined once f(X) specified, and various comparative static results derived.

A number of immediate results follow from this simple model. First, the more volatile are outflows, the higher will be reserve holdings. Second, the higher the interest rate available on reserves the greater will be the amount held (particularly relevant given the "Quantitative Easing" experience of recent years. While the US Fed has purchased large amounts of assets, the reserves this has injected into the system have been held by US banks – rather than leading to increased credit expansion. Third, the penalty cost of accessing the LOLR may include more than just the interest cost but a reputation effect, and in the GFC in some jurisdictions the nature of Central Bank liquidity facilities impeded use of such borrowings. Fourth, the penalty cost could be contingent on the state of the financial system, such that in good times individual banks underestimate the credit spread costs of raising wholesale funds or discounts required to sell marketable assets in a crisis – leading to inadequate holdings of liquid assets. This was arguably the case in the GFC and provides some rationale for liquidity regulations imposed since then.

## 19.7 Banking Sector Deposit and Liquidity Creation

There is an important feature of bank liquidity creation at a banking system level. Because bank deposits are used as money (most payments taking the form of transfers from the bank account of the payer to the account of the payee) a loss of deposits by one bank does not necessarily mean a loss of deposits by the banking system as a whole. (Even when the payee invests the proceeds in some non-bank financial institution (NBFI), for example, that leads to an increase in the NBFI deposit with its bank). The banking system will only lose deposits when: (a) the depositor withdraws cash from the bank (and that is not redeposited in some bank by a subsequent recipient); (b) the payee is the government which uses the RBA as its banker; (c) the payee uses the funds to purchase a security from the central bank; (d) the payee uses the funds to reduce loans outstanding to its bank.

Even if the payee is a foreigner there will be no change in bank deposits unless the Central Bank intervenes in the foreign exchange market to prevent a freely floating exchange rate. The reason is, put simply, that to make a payment to a foreigner the payer will need to buy foreign currency from some other party who will place the AUD amount received in their bank account. (In reality, the

process is obviously more complex than this involving the banks as intermediaries in the foreign payments process – but the outcome is essentially the same).

These system–wide effects are also relevant for understanding the link between aggregate bank lending and the scale of bank balance sheets. When a bank approves a loan it effectively "writes up" both sides of its balance sheet temporarily as follows. The borrower's loan amount is a bank asset, and the borrower draws the loan by offering a liability of the bank (via cheque or electronic transfer) to another person. If the borrower's counterparties were customers of the same bank, then their deposits would increase, and the bank would have an equal increase in both assets and deposit liabilities. More likely, however, where the counterparties were customers of other banks, it would be the other banks whose deposits increased and this would be matched by a transfer of cash from the original lending bank to those other banks. (This occurs via transfers between the Exchange Settlement Accounts held by banks at the Reserve Bank). Banking system deposits would have increased by the same amount of the initial loan.

If all banks went on a lending spree, would the process have a limit, or would bank deposits in aggregate keep expanding to finance their lending? No, because all banks would find their cash holdings relative to deposits shrinking (because of the increase in the latter). This creates a liquidity risk for each that they might find themselves with net deposit outflows that they had insufficient cash holdings to be able to meet. But potentially the growth in lending and deposits arising from a burst of "animal spirits" among bankers could be much more than desired from a macro-economic or system stability perspective (particularly if the loan quality was declining). And the process operates in reverse if bankers reduce loan outstandings due to pessimism, amplifying the credit contraction and leading to economic slowdown.

As well as macro-economic concerns about the role of bank lending in contributing to or amplifying business cycles, bank liquidity issues are also a concern for systemic stability systems. In particular, banks faced with significant deposit outflows and a liquidity crisis may be forced to engage in "fire sales" of marketable securities, pushing down market prices of such securities and, via losses incurred, running the risk of a liquidity crisis becoming a solvency crisis. (Calling in loans from customers, can have similar effects by prompting defaults and losses for the bank where the underlying collateral is insufficient to meet the promised loan repayment).

## Measuring Liquidity Creation

Given that liquidity creation is generally recognised as one of the key functional roles of banks, obvious questions are: how do we measure the amount of bank liquidity creation at any point in time; how does it vary between banks and what do such variations imply; how does it vary over

time; how have regulations affected the amount of liquidity creation? Perhaps because "liquidity" is a somewhat amorphous concept, and not necessarily independent of economic conditions, there had not been much attention paid to these empirical questions until a study by Alan Berger and Christa Bouwman (RFS, 2009). Since then a number of studies have used variants of their approach and developed alternatives[7] to try and answer some of those questions posed above.

Berger and Bouwman's approach can be illustrated as follows.

- Classify all bank activities as liquid, semi-liquid, illiquid based on product category ("Cat") and maturity ("Mat")
- Assign weights to activities:
  - Assets: illiquid =1/2; semi-liquid = 0; liquid = -1/2
  - Liabilities: liquid = ½, semi-liquid = 0; illiquid = -1/2
  - Off-balance sheet: illiquid guarantees = ½
- Combine bank activities according to liquidity weights.

They find, *inter alia*, much liquidity created off-balance sheet, largest banks create most of liquidity (in USA), some positive correlation between liquidity creation and bank M/B ratios.

Bai et al (JF, 2018) adopt an approach in which the individual bank liquidity measure (Liquidity Mismatch Indicator (LMI) can be aggregated to provide a sector wide measure relevant for macro-prudential policy. Whereas the weights used in B&B are time invariant, the Bae et al weights incorporate measures of market liquidity and liquidity premia which vary over time. They find that banks with high liquidity underperform (in stock market terms) during stable periods but not in crisis periods. The LMI index is calculated by assuming that counterparties (on both sides of the balance sheet) act to extract the maximum cash possible in a time of crisis, and is a "liquidity weighted" sum of asset and liabilities. The weights reflect this assumption and also that the bank will determine its liquidity position optimally.

## 19.8 How does the Australian system liquidity approach work?

Current arrangements date from 1997, although there has been a very significant change to arrangements since March 2020. Before 1997 a special group of authorised short term money market dealers acted as intermediaries between the RBA and others. That system also involved complex "float" arrangements (the timing of debits and credits due to deferred settlement) creating a number of complications for short term system liquidity management by the RBA.

[7] One such approach was proposed by Brunnermeier et al (NBER, 2009. This has been applied by Bai et al (JF, 2018),

Fundamental to the operation of the Australian financial system are the r*ole of ESA (Exchange Settlement Account) balances and the target cash rate*[8]

ESA's are the transactions accounts held by banks (and some others) at the Reserve Bank through which settlements with other banks arising from the operation of the payments system are made. Transactions of customers with the government (tax payments etc) which uses the RBA as its banker will also impact a bank's ESA, as will transactions by the bank (or its customers) with the RBA (such as purchases or sales of government securities). Those types of transactions (with government and the RBA) will lead to changes in the aggregate level of ESA balances. Only banks and some others have ESA accounts (ultimate liquidity) with the RBA. Other NBFIs (including smaller ADIs such as credit unions) have bank deposits as their transactions accounts.

ESA balances are in aggregate something of a "closed system". Transactions between banks simply redistribute the existing stock of ESA balances between the banks. Similarly if a bank customer makes a payment to a customer of another bank via electronic means or cheque, the credits and debits to those customer bank accounts lead to interbank transfers of ESA balances. However if a bank customer decides to hold more notes and coins rather than bank deposits ESA balances are likely to decrease – with the composition of RBA liabilities changing to be less ESA balances of banks and more notes and coins on issue. The word "likely" is used above because the outcome will depend upon how banks react to an outflow of notes and coins. If they seek to replenish their cash holdings then they will receive that cash from the RBA with payment made by a reduction in their ESA balance.

The other potential "leakage" from the system is if the RBA intervenes in the foreign exchange market to affect the exchange rate. If, for example, it buys USD from a bank, it will credit the banks ESA with AUD. But FX transactions between members of the private sector (banks and others) simply affect ownership of the stock of ESA balances. The buyer of USD will make AUD payment to the seller involving a debit (credit) to the buyer's (seller's) AUD bank accounts and an exchange of ESA balances between the two banks involved.

The RBA sets its target cash rate at its monthly Board meeting (1st Tuesday of each month) based on its macroeconomic analysis, as the key instrument of monetary policy. The cash rate is the rate at which banks lend ESA funds unsecured to each other overnight. Bank ESA accounts at the RBA are used for interbank settlements resulting from the pattern of payments flows in the economy. The

[8] See here for a discussion of RBA market operations and this RBA article which explains the importance of the "interest rate corridor".

structure of interest rates paid on ESA and charged for ESA "overdrafts" has historically (until March 2020) ensured that actual cash rate varies hardly at all from the target rate. The RBA calculates and reports the actual cash rate as a weighted average of the lending transactions which occur. The cash rate has served as an "anchor" for the entire term structure (yield curve) of interest rates, with longer term and private sector rates responding to movements in the cash rate. Figure 1 shows the relationship between the cash rate and the 90 day bill yield

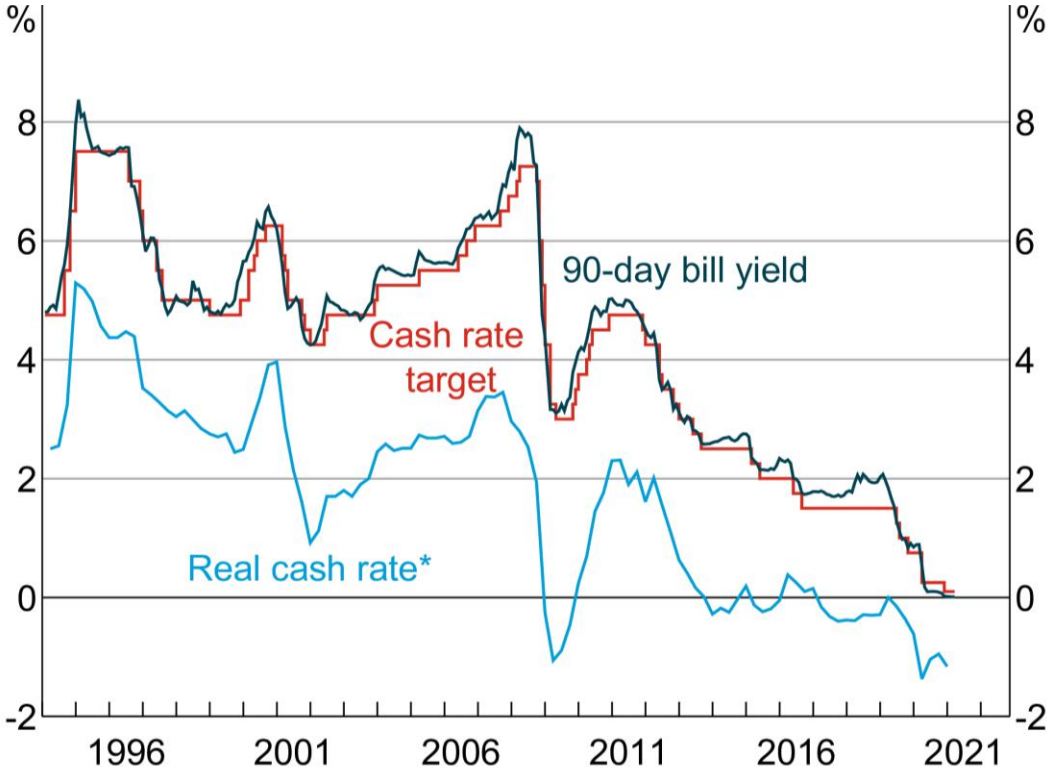



FIGURE 1: SHORT TERM INTEREST RATES (SOURCE: RBA CHART PACK)

The RBA makes a daily morning projection of expected net settlements during the day– ie the expected change in ESA funds arising from settlement between the RBA and banks of transactions. (Prior to changes in November 2013 these were changes arising from previous day low value transactions which were batch settled at 9.00am. Since then "direct entry" transactions are settled in batches during the day and overnight, as explained in this speech by the (then) Assistant Governor (Financial Markets) Guy Debelle.)

Relevant "exogenous" transactions which change aggregate ESA balances are:

- govt transactions with the private sector (taxes, expenditures) – RBA is govt banker
- govt bond issues and redemption of maturing bonds

- RBA FX transactions
- currency demand
- unwinding of past RBA repos

Generally there is a system cash deficit (ie ESA balances would fall without RBA action) and the RBA makes announcement at 9.30 of intended repo transactions (market operations), inviting bids from the private sector to sell government (or other) securities to the bank in exchange for credits to bank ESA balances. It makes further announcements of dealing intentions during the day if its forecast of the aggregate flows needs adjustment.

High value interbank transactions are settled on a real time gross settlement (RTGS) basis during the day.

For each bank there is a need to manage its ESA (cash) position. Based on knowledge of likely interbank and "exogenous" transactions banks can forecast likely end of day ESA position. If a deficit is projected, they will want to participate in RBA repo tenders to obtain cash (ESA funds). But they also need to manage the daily ESA balance. The RBA has a number of arrangements which facilitate that (as follows).

- In general, (until March 2020) ESA balances pay the target cash rate minus 25 bp. (Since November 2013 some agreed small "buffer" of ESA funds to meet intraday payments receives the cash rate). Overnight borrowings from the RBA involve a charge of the cash rate plus 25 bp. This "corridor" (-25bp, + 25bp) gives an incentive for banks to borrow/lend ESA funds among themselves overnight and keep actual ESA balances as low as possible.
    - Because the RBA adjusts the supply of ESA balances to meet projected aggregate needs, competition between banks as lenders/borrowers keeps the actual rate roughly (virtually) equal to the target cash rate. This is partly conventional – and reflects the small number of parties each likely to be on the opposite side of a transaction in the future and thus there being limited long term gains from hard bargaining.
    - The November 2013 changes increased the preferred size of bank end of day ESA balances from around $1 billion in aggregate (but with a big spike in demand in the GFC – for which the RBA increased supply to accommodate) to around $20-30 billion. This arises from those changes involving direct entry transactions being settled on a net basis in batches during the day and overnight rather than in one batch settlement the next morning. Batch amounts to be settled after banking hours are not known when interbank cash market closes.

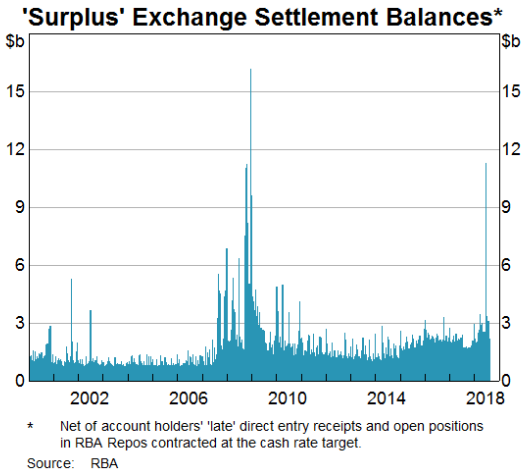



FIGURE 2: SURPLUS ESA BALANCES

- During the day, the pattern of settlements for an individual bank could see it gain or lose ESA funds temporarily. That can be managed by doing "open" repos with the RBA to obtain ESA funds. The RBA sets a pre-determined maximum amount of open repos for each bank. Such open repos and any matching holdings of ESA funds both use the cash rate – so there is no penalty from borrowing via repo and holding proceeds in an ESA. ("Adjusted ESA balances" = actual balance minus open repos at the cash rate, were little changed from actual ESA balance prior to Nov 2013 changes). But if the repo is left in place overnight the borrowing cost on the amount in excess of ESA balances is the cash rate plus 25 bp.

## Repo Transactions (Until March 2020)

Morning "auction/negotiation" – RBA indicates quantity and maturity preferences. Data on outcomes in RBA Bulletin Statistics (Table A3) – different repo rates for general (government) v other collateral up until changes in Nov 2013, since when no distinction is made between type of collateral in dealing intentions.

Originally acceptable collateral was only Australian Govt & semi-govs, AAA Supranational debt was allowed from 2000, and foreign govts, bank bills and CDs (of third parties) acceptable from 2004. Marked expansion of allowable collateral occurred during the GFC. This included: ADI debt > 12 month from mid Sept 2007 (with a haircut of 9%); RMBS/ABCP (AAA/P1 rating) if >90% full doc mortgages, from third parties (haircut 10%+); "Self securitisations" in 2008. The range of maturities of repos was also expanded markedly. Whereas previously RBA repos were generally quite short term, the range was expanded out to 9 months or more.

## AOFM Securities lending facility

The AOFM will lend specific CGS to RBA which will then repo that security against repo from dealer using general collateral (any G/S) with dealers (ie dealer gets specific CGS in exchange for any G/S). Enables dealers to make two way market in CGS. But Repo rate on specific CGS = cash rate - 300bp versus repo rate on general collateral = cash rate, ie a significant penalty for dealer. A safety valve but with strong incentive not to use.

## The March 2020 changes and implications

For many years, the financial markets have focused on the monthly announcements of the RBA regarding its cash rate target, with market indicators such as the Overnight Indexed Swap (OIS) rate reflecting market expectations of what, if any, changes the RBA would make. The actual cash rate (the rate paid and received between banks for overnight borrowing and lending of Exchange Settlement Account (ESA) balances held at the RBA) never deviated from the RBA's announced target.

Things have changed markedly since the RBA broke with "tradition" and announced an out-of-cycle change in the cash rate (from 50 bp to 25 bp p.a.) on March 20. The nexus between the target and actual cash rate has broken. Within three weeks the actual cash rate (calculated by the RBA as a weighted average of actual transactions) had fallen to the 13-14 bp range (with very few transactions outside that range). And often there were insufficient transactions in the overnight market to calculate a reliable average cash rate figure. Figure 3 shows the OIS30 day rate which reflects market expectations of the average cash rate over the next 30 days – and that has stabilised at around 13-14 bp. p.a.

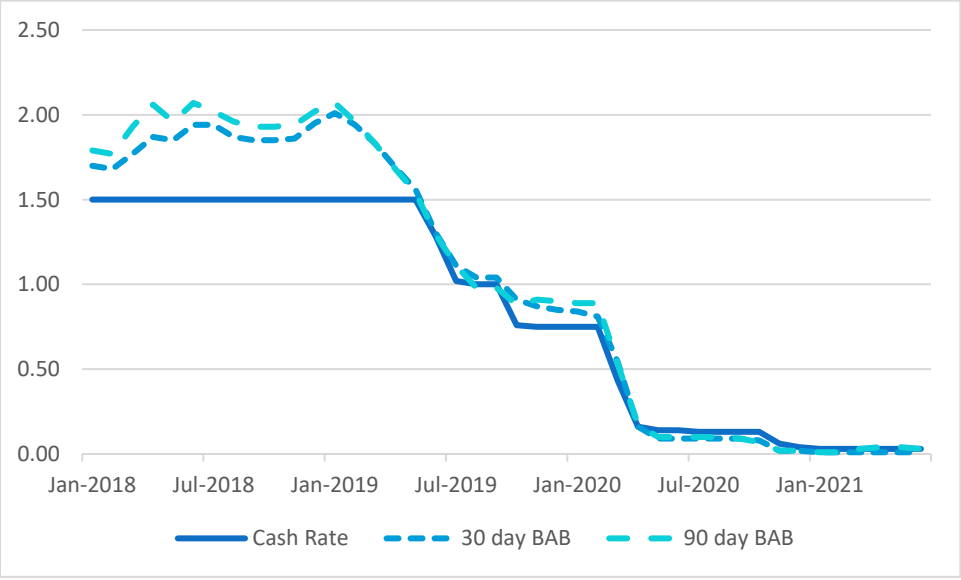



**FIGURE 3; AUSTRALIAN MONEY MARKET RATES (SOURCES: RBA STATISTICAL TABLES A3, F1)**

What has also changed is the behavior of the banks' ESA balances, which are their "cash" holdings for meeting and receiving payments to and from other banks – and borrowed and lent between them at the actual cash rate. Since late 2013 the total of ESA balances for all banks was generally around $25-30 billion. The total soared to a peak of over $100 billion in April, since declining to be in the region of $60 billion (more than double pre-March levels).

So, the obvious questions are: why has this happened, does it make the cash rate virtually irrelevant, and if so, is that a temporary crisis situation or more permanent?

The causes of these developments can be traced to several main factors. (Speeches by senior RBA officials, Debelle and Kent provide information). First, the increase in liquidity (reflected in the higher ESA balances) means that banks have less need to borrow cash in the interbank market, reducing the interest rate they are willing to pay. But in years past, the RBA would have used its market operations (selling government bonds via repurchase agreements) to withdraw that liquidity from the market, reducing ESA balances, until the actual cash rate met their target rate.

So, the second component of the explanation must lie in some changes in the RBA behavior. And there have been several which are explained in this 2021 speech by Deputy Governor Debelle. One is a change in the interest rate the RBA pays banks on their ESA balances. Previously it was the cash rate less 25 bp, which under the current target would have meant a zero rate. But the bank initially changed that to a flat rate of 10 bp, which meant that the actual cash rate had a floor of 10 basis points – why lend surplus funds to another bank at less than 10 bp when you can get a rate of 10 bp from the RBA? In November 2020 when the cash rate target was lowered to 10 bp, the interest rate on bank's surplus ESA balances was reduced to zero. The actual cash rate has sat below the 10 bp target at around 3 bp in 2021 (on the relatively few days when there have been any transactions in the overnight market).

But that still doesn't explain why the RBA doesn't soak up the excess liquidity to get the actual cash rate up to its "target". A major reason is the uncertainty created by the Covid-19 Crisis. There have been large injections of liquidity into the economy by Government support measures and in current conditions the RBA has felt it appropriate to maintain a high level of system liquidity. Two other changes are also relevant here.

One is the decision to also adopt the same "target" as the cash rate target for the yield on 3 year government bonds. And therein lies an immediate problem of two targets and one instrument! If there is any underlying tendency for the 3 year bond rate to go above the target, the RBA needs to buy bonds from the market – increasing their price and lowering their yield, and injecting liquidity into the market.

Is it likely that a target of the same rate for the cash rate and three year bonds is consistent with underlying economic forces? Maybe – in the Covid crisis circumstances there are too many uncertainties to be definitive, and the RBA is influential in affecting financial markets! Pre-crisis though, the 3 year bond rate has tended to lie above the cash rate (although sometimes below) in the order of 15-20 basis points over the last five or so years. So it is hardly likely that scoring a bulls-

eye on both targets is possible and that something has to give – in this case achieving the cash rate target. When the 3 year bond rate target was 25 bp, the actual cash rate sat at around 13-14 bp – just above the effective floor for the cash rate of 10 bp points (which was the rate paid on ESA balances). When the target was changed to 10 bp, the actual cash rate sat at around 3 bp. This 7 bp spread is quite a bit lower than the historical average bond-cash yield spread of 15-20 basis points.

In addition, the RBA has also adopted a different focus in its targeting of short term interest rates. As explained in the August Statement on Monetary Policy, the focus of the RBA has turned to stabilizing the repo rate – the interest rate at which banks borrow short-term funds (ESA balances) from the RBA by a sale and repurchase agreement involving government securities. Since late April 2020, when the cash rate target was 25 bp that rate stuck steadily at 18 basis points before falling in November 2020 to stick at the same 10 bp figure as the cash rate target.

To achieve that, the RBA has suspended its prior practice of effecting sufficient OMO transactions (mainly via repos) to achieve its target liquidity consistent with the target cash rate. Up until the start of March its actual daily dealings were typically (with a few major exceptions) the same as (or within a couple of percent of) its announced intentions at the start of the day. Those announced intentions were calculated to change aggregate liquidity to a level consistent with bank cash market demand and supply equilibrating the actual cash rate at the bank's target level.

But from March 2020 onwards, the reverse has happened. Announced daily intentions of the amount to be dealt are hardly related at all to actual dealings. Indeed, since April 2020 till July 2021 the announced "intended" amount has been stuck at $1 billion each and every day, and the actual amount has varied all over the place (but substantially less most of the time in 2021). Rather than fixing a quantity to be dealt, the quantity dealt has been varied such that the repo rate (the interest rate at which banks are borrowing from the RBA using the repo mechanism) has remained constant at initially 18 and since November 2020, 10 basis points.

Why the shift in approach? One reason may be that the RBA deals in repos for its market operations at varying maturities, mostly between one and three months since the shift. By allowing demand to determine the volumes traded at different maturities, they are stabilizing the repo rates (which can be regarded as risk free rates) over that range of maturities. In contrast, the cash rate is for the shortest maturity possible (overnight) and the link between it and longer term rates is likely to have become tenuous in the current crisis.

Reflecting the change in approach (and market conditions) the relationship of the 30 day and 90 bank bill rates to the cash rate has changed markedly as shown in Figure 3

The availability of cheap repo financing, and surplus liquidity, has led to very cheap short term borrowing rates for banks in the market. In fact those 30 and 90 day bill rates (which should incorporate some default risk premium) have been slightly below the equivalent term OIS rates (which are risk free rates)!

One complication influencing these various rates is the impact of the Major Bank Levy (of 6bp). The base for the levy is all liabilities other than non-insured deposits, with bank ESA holdings also deducted in calculating the levy base. The MBL means that the cost of raising funds such as via bank bills of CDs is 6 bp pa higher than the rate paid which makes the overall cost marginally below the RBA repo rate. It is unclear exactly what the effect of the MBL is on the cost of funds raised by way of RBA repo. For a bank borrowing by means of a repo with the RBA, the MBL has, in the first instance, no effect – since the additional borrowing will be offset by the increase in ESA holdings in calculating the levy base. However, once those funds are used for loans, and if this leads to a decline in the bank's ESA balances, then the repo borrowing adds to the MBL base. But the system level of ESA balances has increased as a result of the repo transaction, so no aggregate increase in the MBL base has occurred. How this plays out in aggregate is not clear.

Similar issues arise in the context of overnight cash rate lending. A lender of ESA balances will experience an increase in the MBL base (as a result of no longer having those balances), while the borrowing bank will have no MBL base change – since its increased borrowings are matched by the increased ESA balances. This change in the MBL base simply reflects the consequences of increased inter-bank borrowing rather than being a peculiar feature arising from the role of ESA balances. (If, for example Bank A lent to bank B which also lent to bank A, the MBL base would increase since it is based on a gross, rather than net, debt calculation).

So, the RBA has not (yet, as at mid 2021) needed to drop the cash rate to zero to achieve lower short term funding costs for the banks. It has achieved essentially the same outcome via its change in operating procedures and targeting the repo rate – at the cash rate "target".

## 19.9 Basel Liquidity requirements

The liquidity regulations introduced as part of Basel 3 as implemented in Australia are summarised here and here. There are two main components, the LCR and the NSFR applying to larger banks. For smaller banks and ADIs there is a simpler approach known as the Minimum Liquidity Holdings (MLH) approach which is outlined first..

## MLH regime

The Basel standards provide for Alternative Liquidity Arrangements, and flexibility of regulators to adopt alternative approaches for non-internationally-active banks. In Australia smaller ADIs operate under the Minimum Liquidity Holding (MLH) regime. For this their holdings of HQLA must exceed 9% of "Liabilities" (on-balance sheet liabilities (including equity) and irrevocable commitments, less the capital base). Over the last 15 years, the average MLH ratio has been in the order of 15%, increasing in 2021 to around 20% (APRA's QADI statistics provide information).

HQLA is defined somewhat differently to that for the LCR approach for the MLH approach and comprises: (a) cash; (b) securities eligible for repurchase transactions with the Reserve Bank; (c) investment grade bank bills and CDs issued by ADIs (d) deposits (at call, within two business days) held with other ADIs net of placements by the other ADIs; (e) any other securities approved by APRA.

It is worth noting that compared to the LCR regime: (a) the maturity structure of liabilities is not considered; (b) the MLH approach provides a greater range of eligible liquid assets – many of which will pay higher returns than the HQLA allowable under the LCR. Thus a smaller institution may be disadvantaged by liquid asset holding requirements relating to both long and short term liabilities, but advantaged by the greater range of liquid assets permitted.

## Liquidity coverage Ratio (LCR):

The original January 2013 Basel document introducing the LCR is *bcbs238.*.A summary description of the LCR is provided here.

The LCR requires banks to have adequate HQLA (High Quality Liquid Assets) to withstand a stress scenario – and avoid fire sales of private sector securities which drive prices down and create price-margin spirals. Only HQLA (in Australia, limited to government securities) are seen as suitable securities in this regard.

The Basel Committee has developed requirements based on a 30 day stress scenario (using GFC experience) which was announced in December 2010 and revised in January 2013. International phase-in requirements have involved meeting a level of 60% of the requirement by January 2015 increasing to full compliance by January 2019. In Australia, APRA specified that full implementation would commence in January 2015.

The specific LCR requirement is that:

$$\frac{Stock\ of\ HQLA}{Total\ net\ cash\ outflows\ over\ next\ 30\ calendar\ days} \geq 100\%$$

Annex 4, of bcbs238 defines the various categories of eligible HQLA and imposes limits on the use of certain types of HQLA assets, and specified that the value of certain assets used in the calculation should be given "haircuts". (For example, a covered bond with a value of $100 would only be included in the calculation to a value of $80, reflecting a haircut of 20%). The HQLA must be *unencumbered* such that there are no restrictions on using it to obtain cash.

HQLA 1 – cash, central bank deposits, government securities

HQLA 2A – Multinational agency bonds with 20% risk weight, corporate bonds rated AA or above, covered bonds: allowed up to 40% HQLA with haircut of 20% applied

HQLA 2B (at national discretion) RMBS rated AA or above, corporate debt ($BBB^-$ - $A^+$ rating), ordinary (non-financials) shares: allowed up to 15% HQLA (and haircuts)

*APRA* Prudential Standard 210 allows only HQLA 1 (and specified HQLA2 to be similar to the Basel HQLA 2A, and precluded HQLA2B – although those types of (non-equity) securities are generally repo-eligible at the RBA for using the CLF). At the time of introduction this meant that there was a shortfall of CGS & semis (State government securities) available due to past government budget surpluses. Banks held around $180 bill, and would have needed an extra $300 bill. If banks were required to purchase that amount of securities from the limited stock available, this would have placed significant pressure on bond prices given demand from domestic and foreign institutional investors. Consequently, the Committed Liquidity Facility (CLF) was introduced as a complement.

**TABLE 5: APRA PRUDENTIAL STANDARD 210 HQLA CATEGORIES**

| | | |
|---|---|---|
| HQLA1 | Currency, Central Bank deposits,Marketable securities issued by government or multinational agencies with zero credit risk weight, well-traded, liquid, in same currency as for liquidity calculation | At market value without haircut |
| HQLA2 | Marketable, well traded, securities of sovereigns etc with 20 % risk weight. Non-financial institution, plain vanilla, corporate debt (including CP) and covered bonds (issued by others) with recognised credit rating of at least AA- and well traded | Maximum of 40 per cent, 15 per cent haircut to market value |
| Committed Liquidity Facility | Amount of CLF available to each bank determined annually by APRA; amount included is Min(CLF, assets held as eligible CLF collateral) | Qualifying collateral must be RBA repo-eligible, market value and haircuts applied, adjustments applied where bank engages in secured transactions with other counterparties. |

A feature of the LCR is that it can fall below 100% during stress period. (This avoids the taxi-rank fallacy).

The stress scenario involves: assumptions about outflows of retail deposits, loss of wholesale funding and short term secured funding, requirements to post collateral if downgraded or from market movements, drawings on liquidity facilities etc. But it also anticipates some inflows and need to continue making some types of loans (eg retail loans – so only count 50% of net cash inflow from retail loan repayments.

There is a very detailed list of assumed "run-off" rates given in Annex 4 of BCBS 238, reflecting the diverse range of activities and arrangements with customers made by banks. Most relevant however are: retail deposits and those of small businesses (<30 days) are assumed to have "run-off" rates of between 3 per cent (if insured) and 10 per cent, with no run off for longer term deposits. In contrast, run-off rates for large non-financial corporates are set at 40 per cent, and those of financial institution counterparties at 100 per cent.

Thus $$\begin{matrix} Net \\ Cash \\ Outflows \end{matrix} = \begin{matrix} Expected \\ Cash \\ Outflows \end{matrix} - Min\left[\begin{matrix} Expected \\ Cash \\ Inflows \end{matrix} ; \begin{matrix} 75\%\ of\ Expected \\ Cash \\ Outflows \end{matrix}\right]$$

where the expected amounts are based on GFC experiences.

There are a number of Implications from the introduction of the LCR regime.

One is the pricing of deposits to alternative customer types. Because of the differential liquid asset holding requirements, it can be expected that, via their funds transfer pricing schemes, banks will offer higher interest rates on deposits that are "stickier". Lower deposit interest rates will be offered on less sticky deposits such as from other financial institutions relative to retail rates because of the requirement to hold more lower- yielding HQLA. The effect has been substantial (see Davis and Maddock (AER, 2019) for analysis), with estimates of a differential between rates offered to individuals compared to financial institutions (such as super funds) of 60 bp or more (prior to the near-zero rates during the Covid Crisis).

A second is the nature of deposit terms and conditions. In Australia, it has been traditional for customers to be able to "break" term deposits (ie request early withdrawal) with the only penalty allowed to be charged by banks being non-payment of the full interest which had accrued over the period. Because there was no penalty in terms of principal amount involved, this may be insufficient to prevent customers demanding early repayment of term deposits in a period of crisis. Consequently, there was a need for a change in legislation to allow imposition of notice of

withdrawal conditions (eg 31 days) on term deposits while still allowing those deposits to be treated as “basic deposit products” (for which there are no PDS requirements nor special staff training required). ASIC provided relief from the existing legislative requirement in December 2014 (extended in 2016) and many banks have introduced 31 day notice of withdrawal requirements for early withdrawal of term deposits.

Another effect is upon the demand for and pricing of HQLA. It could be expected that the induced demand for government debt by banks would lead to reduced returns on government debt due to increased competition with other investors and a limited supply. The introduction of the CLF reflects that concern.

TABLE 6: LCR RUN-OFF ASSUMPTIONS - SUMMARY OF APRA PRUDENTIAL STANDARD 210

| Run-off rate (%) | Cash outflow category (for liabilities with actual possible maturity < 31 days) |
|---|---|
| | **Retail cash outflows and qualifying SME deposits** |
| 5 | Stable deposits (covered by FCS and customer relationship exists) |
| 10 | Less stable retail deposits |
| 25 | Higher run-off less stable retail deposits (not FCS covered and/or on-line account, rate-sensitive, no customer relationship) |
| | **Unsecured wholesale funding** |
| 5 | Operational deposit balances fully covered by deposit insurance |
| 25 | Operational deposit balances not fully covered by deposit insurance |
| | Non-operational deposits from non-financial corporations, sovereigns, central banks, PSEs, MDBs and SMEs of greater than AUD 2m: |
| 20 or 40 | If fully covered (not covered) by deposit insurance |
| 100 | All other non-operational deposits (eg financial institutions) |
| 100 | Unsecured debt issuance |
| | **Secured funding** |
| 0 | Secured funding transactions backed by HQLA1 or CLF eligible debt securities |
| 15, 25, 100 | Secured funding transactions (based on quality of collateral and counterparty) |
| 100 | · All other secured funding transactions |
| 100 | **ABCP, covered bonds, funding exposures to SPVs, conduits etc** |
| 100 | **Increased liquidity needs related to derivatives and other transactions** (cash outflows, potential collateral provision needs and calls on collateral held etc) |
| 5 - 100 | **Undrawn Committed credit and liquidity facilities** (lowest rates for retail, highest for non-bank financial institutions) |
| | **Other contingent funding obligations** |
| 5 | Revocable credit and liquidity facilities |
| Historical Average | Trade finance related obligations (average of recent 12-month period)<br>Non-trade finance guarantees/letters of credit (50% of average)<br>Debt buybacks (10% or 5% for Australian securities) |
| 5 | Non-contractual obligations related to structured products and managed funds |

| | |
|---|---|
| Variable | Issuers with an affiliated dealer or market maker<br>Other non-contractual contingent funding obligations<br>(To be set by APRA for each ADI after consultation with the ADI) |
| 100 | **Other contractual cash outflows** |

### Is the LCR well founded?

The approach adopted places the onus for liquidity insurance upon the banking sector and private financial markets. The LCR approach does not envisage the banking system relying (at least initially) upon the safety valve of RBA liquidity provision via repurchase agreements etc. The logic of the approach can be questioned, in so far as it applies to system wide crisis scenarios rather than individual bank difficulties.

Consider a situation in which a liquidity crisis occurs and banks respond by selling their holdings of government securities. Such widespread action will push the prices of those securities down and their yields up, which is unlikely to be a desirable outcome in such a situation from the perspective of the RBA. Consequently, there is likely to be RBA operations in the cash market to inject liquidity by purchasing government debt or by repurchase agreements based on those or other eligible securities.

Consequently, the merits of an approach which assumes that the market can ensure enough liquidity in a crisis situation seems contradictory to the likely outcome, when the only ultimate provider of liquidity – the Central Bank – is likely to have to act. To the extent that this is the case, the exclusion of other repo-eligible securities from the LCR calculation can be questioned. To the extent that the LCR is aimed at ensuring individual bank liquidity adequacy in a time of individual stress, there are also some questions which should be posed. First, are requirements based on a system-wide stress scenario appropriate? Second, the exclusion of a range of private sector assets from the calculation seems less warranted since their values would be little impacted by sales by one bank only.

The dilemma here is that the LCR appears to be one instrument aimed at achieving two objectives – one being individual bank liquidity adequacy in a single-name stress situation and the other being system wide liquidity adequacy in a generalized crisis scenario. A long standing tenet of policy formulation is that at least as many instruments are required as there are objectives if those objectives are to be fully met, rather than being constrained by a trade-off.

### Committed Liquidity Facility (CLF) – for banks subject to LCR

The Basel standards permit the use of Alternative Liquidity Approaches (ALA) if a country has inadequate HQLA available to banks to meet the LCR requirements. The options included: a CLF type facility; use of foreign currency HQLA; greater use of level 2 HQLA with increased haircut. But

regulators would need to have arrangements in place to limit bank reliance on these rather than HQLA1.

When the LCR was introduced, APRA decided that the only HQLA assets it would accept for meeting LCR requirements were government debt (HQLA1). At the time, there was a substantial shortage of government debt available to banks (given past budget outcomes and high foreign demand for Australian government debt). So a CLF at the RBA was introduced in 2015 and details are provided by Bergmann et al (RBA, 2019) and here.

Under the CLF arrangements, the 14 (or so) banks which operate under the LCR regime have the ability to meet part of their LCR requirement by having access to a specified amount of RBA short term repo funding for meeting liquidity needs. The aggregate amount of CLF facilities available is determined by APRA and the RBA based on the assessed available supply of HQLA to banks – and size of the CLF has fallen in recent years as government budget deficits have increased the supply of government debt. The total amount is allocated among the banks, based on an assumption that they will meet some minimum proportion of LCR requirements by holdings of HQLA.

For the privilege of having a CLF, banks were initially charged a fee of 15 bp p.a. on the amount available to them. Should they need to access the CLF, the borrowing cost was set equal to the cash rate +25bp. From January 2020 the fee was increased to 17 bp and then again increased in January 2021 to 20 bp. In setting this fee, the bank is attempting to avoid distorting bank demand for HQLA to meet the LCR. Too high a fee would lead to increased demand for government debt and push their interest rates up. Too low a fee would, in a sense, subsidise banks by enabling them to avoid holding lower yielding government debt (rather than other assets). Setting the available aggregate amount of CLF in response to availability of debt and bank buffers for LCR levels aims to balance these forces.

To meet the requirements for substituting CLF for HQLA in calculating their LCR, banks must hold on their balance sheet repo-eligible securities at least as large (including allowances for margins applied if repos occur) as their CLF allocation. The RBA publishes a list of repo eligible securities (and issuers) which includes: foreign government and supra-national authorities, Australian government securities, Bank bill and CD issuers, ADI securities, RMBS, CMBS, ABS, other AAA rated securities, ABCP. Internal securitisations are also repo-eligible and the larger banks have taken advantage of this to parcel up mortgage loans into tranches for securitisations which are held on balance sheet for meeting CLF requirements.

Size of individual bank CLF:

RBA estimates available HQLA which could be reasonably held by ADI's (given total supply and other demand), currently assumed to be around 25 per cent of total stock;

Each bank estimates target net cash outflow (NCO) of stress scenario based on its 3 year funding plan; $CLF_{system} = NCO_{system} - HQLA$;

Maximum $CLF_{ADI} = (NCO_{ADI}/NCO_{system}) \times CLF_{system}$ (a buffer of 10 per cent above LCR=100 allowed).

Expectation that ADIs will use HQLA and access CLF facility as last resort

TABLE 7: APRA DETERMINATION OF AVAILABLE CLF AMOUNTS

| ($ billion) | 2015 | 2016 | 2017 | 2018 | 2019 | 1-Jan-20 | 1-Dec-20 | 1-Feb-21 | 1-Apr-21 |
|---|---|---|---|---|---|---|---|---|---|
| Total Net Cash Outflows | 410 | 402 | 400 | 387 | 381 | 378 | 440 | 450 | 450 |
| Available AGS and semis | 175 | 195 | 220 | 226 | 225 | 243 | 362[1] | 446 | 446[2] |
| Total CLF made available | 275 | 245 | 223 | 248 | 243 | 223 | 188 | 142 | 139 |

Brischetto and Jurkovic (RBA, 2021) explain why the size of the CLF has been reduced and fees increased since 2019 in reflection of the larger stock of government debt available as liquid assets to banks, and noting the actual LCR of banks (including large increase in ESA balances) being well above the required minimum.

## Effects of the LCR/CLF arrangements

There are a number of issues arising from these arrangements. First, it can be asked whether the process of excluding certain assets (such as RMBS) from LCR eligibility, but then making them repo-eligibility for the CLF, is soundly based? Should a bank have a liquidity problem, then both HQLA and RMBS can be used to access cash. Perhaps the argument is that in a widespread liquidity crisis, if banks undertook fire sales of RMBS into the market, the downward impact on yields could aggravate the situation. However, one might expect that, as it has done in the past, the RBA would intervene to inject liquidity via purchase of such securities via repos. If the liquidity problem only applied to one bank, it could be expected that it would be able to liquidate holdings of RMBS or other assets without disrupting financial markets. So, it is difficult to reconcile APRA's insistence that RMBS and other assets should not be eligible directly for inclusion in LCR calculations, but that they are eligible indirectly via the CLF mechanism.

Second, the repo eligibility of certain securities for the CLF endows them with a liquidity characteristic which other assets do not have. This could be expected to reduce the yields they need to offer. However, at the same time, the requirement that banks hold such securities on balance sheet to match their CLF allocations, reduces the supply of such securities in the market (although self-securitisation may simply reflect a different way of holding loans which were not for sale in any event).

APRA estimate of cost of Basel 3 LCR/CLF (from RIS statement)

Assume increase in voluntary liquid asset holdings post crisis from $98 to $305 billion, Basel increases that to $435 billion. (Mix of HQLA and assets eligible for CLF)

Cost of carry – liquid asset return less funding cost: 100bp for HQLA, 15bp for CLF assets

$ bill cost then expressed as % (b.p) of liquid assets, and as % of illiquid assets (increase in interest rate required to offset carrying cost. (eg 8.6bp = $1.8bill/illiquid assets). Liquid assets of $435bill = 17% total assets, so illiquid assets = 0.83*$435bill/0.17. (Incremental cost = 2.9 bp)

| | Pre-crisis | | Without Basel III liquidity | | With Basel III liquidity | |
|---|---|---|---|---|---|---|
| | 2007 ($bn) | Cost (bp) | 2013 ($bn) | Cost (bp) | 2013 ($bn) | Cost (bp) |
| HQLA1 | 6 | 100 | 95 | 100 | 135 | 100 |
| CLF assets | 92 | 0 | 210 | 15 | 300 | 15 |
| Cost of carry in $bn | | 0.06 | | 1.26 | | 1.80 |
| Weighted average cost over HQLA in bp | | 6.1 | | 41.4 | | 41.4 |
| Cost over non-liquid assets in bp | | 0.4 | | 5.6 | | 8.6 |
| Incremental difference in bp | | | | 5.3 | | 2.9 |

## Required Net Stable Funding Ratio (NSFR)

Initially mooted in a December 2010 document (BCBS188) the NSFR was finalised in October 2014

APRA undertook consultation on the introduction of the NSFR in 2016, and subsequently announced that implementation would occur on January 1, 2018. The precise nature of arrangements is outlined in an updated version of Prudential Standard 120)

The NSFR is calculated for a bank as the "Available amount of stable funding" / "Required amount of stable funding" or ASF/RSF. The denominator can be intuitively interpreted as the volume of longer term assets on the bank balance sheet. An intuitive interpretation of the numerator is the amount of

longer term liabilities in the bank's funding mix. In practice, these aggregates are calculated by applying weights to their components.

The NSFR requirement is that ASF/RSF > 100%, intuitively that the bank is funding its longer term assets with longer term funding, and not relying on rolling over short term funding for financing those assets. While a single bank may be able to roll over short term funding to finance long term assets in normal conditions, the concern is that relying on short term funding could lead to fire sales of longer term assets in a crisis when many banks are unable to roll over such financing.

The time horizon involved is one year and both ASF and RSF are calculated respectively as averages of "liabilities" and "assets/commitments" weighted by "stickiness" over 1 year horizon. The calibration of available stable funding is based on two assumptions: (a) funding tenor - longer term liabilities are more stable, (b) funding type and counterparty – short term funding from retail/business more stable than from wholesale markets. Table 8 provides information on ASF weights from APS120.

**TABLE 8: APS 120 AVAILABLE STABLE FUNDING WEIGHTS**

| ASF weight | Examples | Notes |
|---|---|---|
| 100 | Regulatory capital (including Tier 2 with >1 year maturity)<br>Term deposits/borrowings with > 1 year maturity | |
| 95 | "stable" (for LCR) retail/SME deposits of < 1 year maturity | Also intermediated deposits (eg super fund "cash option") for retail customers (subject to 12 months "tied" agreement) |
| 90 | "less stable" retail/SME deposits of < 1 year maturity | As above |
| 50 | Non-financial customer deposits with < 1 year maturity<br>Operational deposits<br>Other funding with 6-12 months maturity | Some super fund deposits |
| 0 | Other (including from financial institutions with < 6 months maturity) | |

"Required funding" reflects assumptions about: (a) need for resilient credit creation (b) bank loan roll-over behaviour for customer relationships (c) asset tenor – some short term assets mature and not rolled over (d) high quality assets can be securitised or traded – don't need stable funding. Table 9 provides information on the weights.

TABLE 9: REQUIRED STABLE FUNDING WEIGHTS

| RSF weight | Examples | Notes |
|---|---|---|
| 0 | Currency, Central Bank deposits (< 6 months maturity), trade date receivables expected to settle normally | |
| 5 | (other) HQLA1 | |
| 10 | Loans (<6 months maturity) secured against HQLA1 | |
| 15 | Unencumbered HQLA2A assets<br>Loans to financial institutions with maturity < 6 months | |
| 50 | Loans to financial institutions with maturity 6-12 months<br>Australian equities<br>Loans (corporate, retail etc) with maturity < 1 year | |
| 65 | Residential mortgages (>12 months maturity) | If standardised risk weight < 35% |
| 85 | Assets posted as collateral for derivatives<br>Loans with > 12 months maturity (and risk weight >35%) | |
| 100 | Encumbered assets (> 1 year)<br>Fixed assets, non-performing loans, loans to financial institutions (> 1 year) | |

## Theoretical Underpinnings

Various papers such as Brunnermeir and Oehmke (JF, 2013) indicate potential for excessive maturity transformation. Papers such as Allen and Gale (JEEA, 2005), Shleifer and Vishny (JF, 1997) etc suggest potential for asset prices to depart from fundamental values such that fire sales can lead to losses and potential losses and risk of insolvency. Brunnermeir andPederson (RFS, 2009) demonstrate how liquidity problems can lead to vicious spiral as asset sales generate downward pressure on asset prices and margin/collateral requirements etc. Some empirical papers suggest greater failure rates of banks with poor funding structures (but adverse effects may not require failure – just distress or weakness leading to asset sales and spillovers onto markets).

## NSFR Possible consequences and issues:

(a) Lower profits for banks due to less "riding the yield curve"

(b) Effects on interest rates paid/charged on deposits/loans for different maturities

(c) Lasting effects on shape of yield curve for different types of securities – less bank demand for longer term assets (other than government debt), more bank demand for long term liabilities

(d) Changes in funding mix reflecting weights applied in ASF

(e) Less willingness to make long term loans

(f) Increased role for shadow banking/capital markets funding

(g) Design of new deposit products – growth of longer term negotiable certificates of deposits which can be sold in secondary market

(h) Need for reconsideration of "break terms" for term deposits – previously, banks unable to charge penalty other than interest amount for early withdrawal.

(i) Can "mutual funds" be constructed which invest in LT bank deposits but offer investors ready access (eg with some notice of withdrawal) to their investments?

(j) "stickiness" of short term funding partly dependent on bank interest rate policies in times of liquidity stress, these may change and affect stickiness, such that "arbitrary" weights no longer appropriate.

(k) Some arbitrariness in distinguishing between nature of counterparties and stability of funding provided – eg re SMSFs and Institutional Super Funds in Australia, with potential for differential interest rate offers flowing on to profitability of those institutions.

(l) Should long term assets available for use as collateral for repos with Central Bank have lower RSF weights?

(m) What should be disclosure requirements of banks re NSFR?

# 20. Operational Risk

## Contents



## 20.1 Introduction

The Basel Committee has defined operational risk as "the risk of loss resulting from inadequate or failed internal process, people and systems or from external events" (see Figure 1. This excludes strategic and reputational risk. It introduced capital requirements for Operational Risk as part of Basel 2 in 2006.

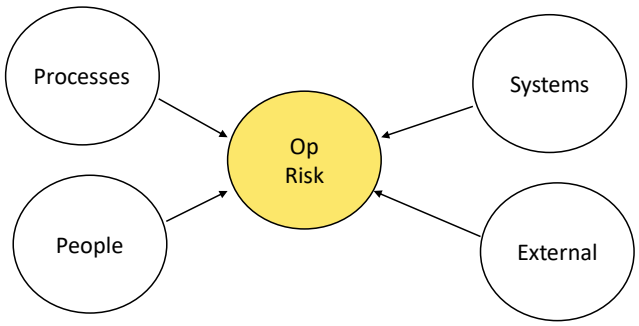



FIGURE 1: THE BASEL SCHEMA OF SOURCES OF OPERATION RISK

Typical event categories for OR are listed (with some examples given) in Table 1 (Attachment E of APRA's APS 115 gives more detail).

TABLE 1: OPERATIONAL RISK CATEGORIES AND EXAMPLES

| Category | Examples of causes of losses |
|---|---|

| | |
|---|---|
| **Internal Fraud** | Unauthorised activity (such as rogue traders) or theft by employees |
| **External Fraud** | Robbery or "hacking" of computer systems |
| **Employment Practices & Workplace Safety** | Workers compensation, legal proceedings regarding discrimination |
| **Clients, Products and Business Practices** | Breaches of suitability, disclosure and fiduciary requirements, improper business/market practices, flaws in products, unsuitable advice |
| **Damage to Physical Assets** | Weather events, vandalism |
| **Business Disruption and System Failures** | Telecommunications failures, software or hardware failure |
| **Execution, Delivery & Process Management** | Data/accounting entry errors, missed delivery deadlines, non-compliance with reporting requirements, incomplete documentation/authority for transactions |

At a general level the types of operational risk outlined in Table 1 are relevant to any type of business, and not specific to banks (or other financial institutions). But the various activities of banks may create particular exposures to certain types of events. And one problem for bank management and for the design of regulatory arrangements aimed at ensuring bank safety is that losses from such events will vary in size and frequency and be of different significance in different parts of bank activities. In some areas there may be quite frequent losses of small amounts, while in others there is risk of a very unlikely event which involves very large losses. This heterogeneity has meant that the application of statistical modelling to derive overall operational risk capital requirements, initially favoured by the Basel Committee, has proven unsuccessful and led to the subsequent adoption of less technical approaches.

The types and level (the possible losses) of operational risk will vary across different bank activities. The Basel Committee's original *Standardised Approach* for OR provides some indication of *their view* of its relative importance for different activities. That approach linked OR capital requirements to gross income (defined as Net Interest Income (NII) plus Non Interest Income (NON)) of categories of

business activities, with different weights for each category. (NII can be seen as a proxy for the scale of bank intermediation via raising funds and lending/investing, while NON is a proxy for the scale of other activities)[1]. Table 2 illustrates, where the numbers in brackets indicate the ranking in importance as inferred from the associated capital requirements. (More detail on activities in each of these activities can be found in Attachment D of APRA's APS 115.

**TABLE 2:BASEL COMMITTEE IMPLIED OPERATIONAL RISK RANKINGS OF BUSINESS UNITS**

| **Business Unit Operational Risk Ranking** |
|---|
| Corporate Finance (1) |
| Trading/Sales (1) |
| Retail Banking (3) |
| Commercial Banking (2) |
| Payments & Settlements (1) |
| Agency Services (2) |
| Asset management (3) |
| Retail brokerage (3) |

There is a wide range of OR events which give rise to losses, ranging from very small amounts to very large amounts. Some, such as system failures leading to non-functioning of merchants' EFTPOS terminals, involve losses for customers (cancelled sales) as well as for the bank (via lost merchant fees). And such events can also impact adversely on the reputation of the ADI (not categorised as an OR) and affect future business.

Some of the very large OR events are worth briefly reviewing

## Rogue Traders and Operational Risk

Experience, both domestically and overseas, has shown that banks can suffer extremely large losses when inadequately controlled traders undertake transactions which are inconsistent with the limits meant to apply to their activities. In some cases, the activities may have been undertaken to

[1] They are imperfect proxies. While fees associated with intermediation could be included in NON, it can be expected that an increase in such fees would be offset by a lower NII.

deliberately defraud the bank, including by reporting fictitious profits to generate salary bonuses. But in some others it is a cumulative process arising from failed attempts to hide trading losses in the hope that further profitable trading will enable the position to be rectified. In some cases ,the rogue trading remains disguised for a number of years.

Arguably, remuneration structures which reward profitable traders with very large bonuses create a moral hazard problem by encouraging them to take on high risk positions. Regulators have responded to this source of risk by attempting to ensure that remuneration arrangements are conducive to appropriate risk taking.

International examples of "infamous" rogue traders include (with amounts involved in USD):

- Nick Leeson whose losses of over $1 billion in the mid 1990s led to the collapse of the 233 year old Barings Bank;
- The "London Whale" (Bruno Iksil), at JP Morgan, whose losses of $6.2 billion were discovered in 2012
- Jerome Kerviel of Societe Generale whose losses of over $7 billion were exposed in 2007
- John Rusnak of Allfirst Financial, part of Allied Irish bank, whose trading losses of $700m were exposed in 2002

The last example is particularly interesting since the bank commissioned the consultancy firm *Promontory* to investigate and report on the failings in risk management and compliance that allowed this to happen – and released that report publicly. Most major banks took notice of the report and asked consultants it investigate whether they were at risk of similar activities.

One Australian bank to do so was NAB, and the consultant's report did not identify problems for the bank. But, nevertheless, within two years NAB discovered that it had been home to a group of rogue traders and suffered a loss of AUD 360million. Both a report commissioned by the NAB Board and an APRA report into the control and risk management failings were publicly released. Ultimately the scandal let to the exit of the Chief Executive Ofiicer, other senior management and members of the Board. The Bank was required to undertake a program of remediation.

## AML/CTF and Operational Risk

One illustration of the relevance of operational risk can be found in the massive penalties imposed on CBA and Westpac in 2018 and 2020 respectively by AUSTRAC. On its website AUSTRAC describes

its role as being "responsible for preventing, detecting and responding to criminal abuse of the financial system to protect the community from serious and organised crime". CBA paid a penalty of $700 million and Westpac a penalty of $1.3 billion, equal to around 7 and 20 per cent respectively of prior year profits. Details of the failures by the banks to identify and report suspicious transactions involving money laundering can be found on the Austrac list of enforcement actions

The legal basis for these fines derives from a set of regulatory arrangements developed internationally by the inter-governmental body, the Financial Action Task Force (FATF) which was established in 1989. AUSTRAC and similar government organisations in other countries monitor the actions of financial institutions and others with the aim of eliminating money laundering and terrorist financing. In effect, the approach involves outsourcing responsibility for policing these illegal activities to banks and other private sector entities. Banks are required to identify and report to AUSTRAC "suspicious" transactions, including any cash transaction above $10,000, and to take actions to prevent such transactions unless determined to be legitimate. While some transactions should be easily identifiable as suspicious, identification is made difficult by the disguising of money laundering transactions as business payments and receipts using fake invoices.

Huge penalties have also been imposed on banks in other jurisdictions for breaches of their AML/CTF obligations. But some would argue that the regulatory structure which has been put in place is inappropriate. The banks, after all, are not the ones actually undertaking illegal acts. They are involved because they operate the payments system through which transfers of funds are made. Imposing a "policing" role on them requires them to incur very large costs of compliance staff and software development to fulfil the task they have been assigned. While penalties for not adequately fulfilling the task should incentivise them, the rationale for the scale of those penalties can be questioned. Indeed Ronald Pol has argued in a 2020 article in the journal *Policy Design and Practice* that the approach of using money flows to detect and prevent serious crime is extremely ineffective in stopping and penalising crime – which is (or should be) the objective.

## The Hayne Royal Commission and Operational Risk

It could be argued that the Hayne Royal Commission, which was charged with examining misconduct in the financial sector, was actually all about examining certain types of operational risk. Justice Hayne found many examples of miss-selling of products, poor financial advice, non-adherence to contract terms, fees for no service, etc. by ADIs and other financial institutions. Consequently there

have been large amounts of remedial payments to affected customers by the institutions concerned, as well as penalties imposed by regulators.

Whether the institutions have actually suffered losses as a result of the misconduct, and its exposure, is an open question. Activities such as sales of unsuitable products, or charging excessive fees, generate profit for the ADI. Subsequent remedial payments and penalties may be less than the profits which were generated. Consider a very simple, hypothetical example. Suppose a bank had a deposit of $1 million from a customer for one year and paid zero interest on the deposit rather than the correct amount of $50,000 based on the proper interest rate of 5 per cent p.a. It used those funds to make a $1 million one year loan at 10 per cent p.a. generating income of $100,000. The error is discovered at the end of the year and a remedial payment of $50,000 made to the customer. The banks still makes a profit of $50,000 (rather than $100,000 which it would have made if the error had not been discovered).

Of course, in more realistic, complex, examples the bank may incur significant operational costs in identifying and investigating thousands of cases where customers may have been mistreated. And additional financial penalties may be imposed by regulators. Clearly, getting caught out for misbehaviour imposes costs on the bank, but whether those costs are sufficient for the bank to expend the resources required to ensure no future repetition of similar events is another matter. But some penalties imposed have been relatively large – particularly by reference to earlier years (when ASIC's approach to misconduct had generally been to encourage negotiation of a settlement with customers (with no admission of liability) rather than to prosecute). In its enforcement update (Report 688) for the second half of 2020, ASIC stated that penalties of $57.5 million had been imposed by the courts on two NAB subsidiaries for fees-for-no-service misconduct.

The amounts involved for the large Australian banks have been extremely large. Since the Hayne Royal Commission of 2018, each of the major banks has made provisions in its accounts for remediation expenses (payments to customers and additional operating costs in dealing with the issues) of well over $1 billion. Getting precise information on the actual, cumulative, amounts over a multi-year horizon is not simple, since the banks (naturally) do not emphasize these in the public reporting.

## 20.2 Attempting to Quantify Operational Risk

Quantifying operational risk is problematic, given the range of possible events and different scales of events. Similar to its approach to credit and market risk, the Basel Committee initially adopted an approach of attempting to derive a Value at Risk estimate for operational risk which could be used for setting capital requirements. To quantify probability and size of possible losses, approaches which have been used include

- Loss distribution approaches – estimating probability distributions based on historical data
- Scenario Analysis
- Scorecards – "expert" judgement of probability and size of losses from various types of events

For banks accredited to use what was called the "*Advanced Management Approach*", a value at risk type estimate could be obtained from such approaches and a capital requirement obtained. For smaller institutions and those not accredited to use internal models, Basel 2 capital requirements used either a *Basic Indicator* approach or a *Standardised Approach.* The latter related the risk to the gross income from various activities with different weights for each activity (as implied in Table 2) to get a total. The capital requirement ranged from 12 to 18 per cent of gross income (over the last three years – only counting years where it was positive) where

Gross income = NII + NON = (approximately) non interest expenses + profits

For the *Basic Indicator* approach, a 15 per cent multiplier was applied to the average annual gross income of the bank as a whole over the previous three years (only counting positive cases).

Why would a capital requirement for operational risk in the basic indicator approach of Basel be related to gross income rather than profits or net income? Will this choice imply different impacts upon different types of deposit taking institutions? If the capital charge for OR is linked to gross income, how will it vary with changes in the level of interest rates?

Initially the Basel Committee proposed a calibration of the capital requirement for OR such that it would be equal to 20% of total capital requirement (and subsequently reduced this to 12%).

APRA's implementation of the standardised approach involved a bank doing the following.

1. Dividing activities into retail banking, commercial banking, and other activities
2. Applying specified OR capital requirements to each component and aggregating.

The OR capital requirements for retail and commercial banking areas are related to the size of gross outstanding loans and advances in those areas, while for other activities, "adjusted gross income" (AGI) which excludes income from those two areas is the basis for calculation. The calculation uses the average of the last six half years. For retail banking the capital required is 0.12*0.035* LAR and for commercial banking it is 0.15*0.035*LAC where LAR and LAC are gross loans and advances in retail and banking areas respectively. (The 0.035 is a scaling factor). For "other activities" the capital required is twice the average of max[(0.18*AGI), 0]. Once the aggregate capital requirement is calculated it is multiplied by 12.5 to convert to a risk-weighted asset equivalent.

Would APRA's standardised approach be likely to lead to higher or lower OR capital requirement than if it used the Basic indicator Approach? (Hint: Compare the 0.035 scaling factor with Gross income/Assets)

## 20.3 The "new" Basel Approach

Recently, as part of the Basel III finalisation, the Basel Committee has eschewed the Advanced Management Approach, which reflects the difficulties with modelling OR and the Standardised Approach. This was signalled in a consultation paper released in March 2016. It proposed, for larger banks, an alternative Standardised Measurement Approach (SMA) which combines the *Business Indicator* approach with historical loss data from the bank's experience. In its December 2017 paper (summarised here) it adopted such an approach, to be implemented by 2023.

This approach, to apply to all banks other than smaller institutions which follow the simplified framework, specifies:

Required Operational risk capital = BIC x ILM.

where

- BIC is the business Indicator component defined as a weighted sum of (i) interest, leases & dividends component (ii) services component, and (iii) financial component, with weights related to the total value of activities

- ILM (the internal loss multiplier) incorporates a measure of the average historical losses over the preceding 10 years.

Many critics have pointed out that the ILM could lead to some strange time-series behaviour (and cross- sectional inequities) in the capital requirement, such as when a bank had a very large operational loss event 10 years ago and virtually none since. The following year the large figure would drop out of the calculation and see a marked decline in the required capital position.

There are three key points to note about the BIC, which APRA has largely followed (other than rejecting the inclusion of the ILM multiplier). First, rather than apply different weights to different activities, the method of calculating each of the three components is different. Second, to allow for different business models, the calculations are often based on the higher or lower of two variables. Third, in general, the calculations are done for an average over the preceding three years to reduce short run variability in the OR capital requirement.

## 20.4 The "new" APRA Approach

In December 2019, APRA finalised its updating of the prudential standard APS 115.0 on the Standardised Measurement Approach for operational risk capital requirements, and released ARS 115.0, the Reporting Standard in March 2021. The new APS115.0 standard takes effect from 1 January 2023 (changed from 1 January 2022).

### Smaller ADIs

In its December 2020 consultation, APRA signalled a simpler approach for smaller ADIs (assets less than $20 billion) in which there would be a flat operational risk capital charge of 10 per cent of RWA. This is aimed at reducing compliance and regulatory burdens for smaller institutions under the objective of "proportionality", without compromising prudential safety. For smaller, less complex ADIs, APRA has decided to adopt a "flat-rate capital add-on" This approach is to apply to ADIs with less than $15-20 billion in total assets, provided their activities are relatively simple and domestic in nature. This would "exclude any ADIs with a trading book, material non-centrally cleared derivatives exposures, offshore funding and purchased payment facility providers" as well as foreign subsidiary banks and foreign banks.

## Larger ADIs

APRA rejected the use of the internal loss multiplier approach for the SMA approach on the grounds of complexity and potential volatility. But otherwise it generally follows the new Basel approach. It requires ADIs to calculate the OR capital charge as 12 per cent of its *business indicator (BI)* plus additional amounts if BI exceeds $1.5 billion and if BI exceeds $45 billion. The increase in the marginal capital charge with BI (which is related to the ADI size) is argued to be appropriate given the increased complexity of larger institutions.

| Business Indicator (BI) value ($billions) | OR capital charge |
|---|---|
| < $1.5 | 0.12 x BI |
| $1.5 < BI < $45 | 0.12 x BI +0.03 x (BI – 1.5) |
| BI > $45 | 0.12 x BI +0.03 x (BI – 1.5) +0.03 x (BI-45) |

Unlike the *basic indicator* which previously applied to smaller institutions (and which has now been replaced by a *flat rate capital add-on* or the standardised approach, the BI involves a somewhat obscure calculation. The BI value is calculated as the sum of three components:

$$BI = ILDC + SC + FC \quad (1)$$

where:

- ILDC is the interest leases and dividend component
- SC is the service component
- FC is the financial component.

Calculation of these components is complex, and generally involves averaging over the past three year's figures to reduce year by year variability in the components. In deriving the formulae, the Basel Committee aimed "to avoid penalising certain business models, such as those based on the distribution of products bought from third parties, and those based on high interest margins".

The three components of BI in equation (1) are broadly related respectively to the Income Statement items (NII + Fees + Trading Income) that add up to Gross Income (ie Income before operating expenses). But since some items in some years could be negative (eg trading income), the absolute values are taken such that a loss in one year and a profit in another year of the same

amount would contribute equally in the calculation. The reason is that it is the scale of the activities which is likely to be related to operational risk. In addition, rather than netting some items of income and expense, both income and expense are included as better reflecting operational risk contributors.

Knowledge of the precise formulae used is obviously important to the bankers and regulators with responsibility for calculating the OR capital charge, and potentially relevant for researchers who may want to examine the merits of the formulae. But for others, it is a mind-numbing complexity which is best avoided. In case any readers are interested, the box below provides some of the detail.

*Calculating the BI Components*

ILDC can be thought of as similar to NII (but also incorporating leases etc), although if the sum of an *asset component,* defined approximately as 2.25 x gross financial assets, and the *dividend component* (dividends received from investments in stocks etc) is smaller, that latter figure is used. Thus a bank engaged in activities which have a very high NIM, would have the ILDS calculated using the asset and dividend component estimate. (Notably, whereas the Basel Committee used a 3.5 multiplier of gross financial assets, APRA has adopted a 2.25 figure).

The SC calculation is quite complex. It is based essentially on the sum of two main components. One is the maximum of fee and commission income and expenses, such that it is the scale of these activities which matters since that (rather than the net amount) better reflects potential operational losses. (A very complex adjustment to this component aims to offset a potentially excessively high OR capital requirement from banks with business models emphasising fee income). By taking the maxima, the Basel Committee argues that this does not create unwanted biases in the OR capital charge between those banks that both originate and distribute mortgages by way of securitisation and those banks which purchase loans from third parties to securitise. The latter would incur fees and expenses in the loan purchase activity, whereas the former would not. The second component is, for similar reasons, the maximum of other operating income and other operating expenses.

FC comprises a trading book component and a banking book component, both based on three year averages. The former is the three year average of the absolute values of trading book profit or loss. The banking book component is similarly calculated using profit or loss on “mark to market” items in the book.

## 20.5 Discretionary Changes in Operational Risk Capital requirements

APRA has imposed additional operational risk capital charges on ADIs in response to identified deficiencies in their governance, accountability and risk-management frameworks. There are two possible rationales for such changes.

One is that the ADI is perceived to have a heightened level of risk as a result of those deficiencies and thus higher level of capital than prescribed by the usual requirements is needed to act as a buffer for possible losses. It is unlikely that APRA would publicise such measures in order to avoid reducing public confidence in the ADI.

The other is that imposing such an additional capital charge will provide an incentive for the ADI to quickly rectify those deficiencies. If the requirement to have a higher level of capital imposes costs on the bank (which occurs if the cost of funding via equity exceeds that of other non-equity funding) the adverse impact on profitability should spur quicker rectification of those deficiencies. To the extent that there are no concerns about the ADI's immediate prudential position (such as from having a night capital ratio) then publicising the add-on should not reduce public confidence in the ADI's solvency, and may increase incentives to act quickly through reputation effects on the ADI's board and management.

In May 2018, APRA used this approach following the findings of the Prudential Inquiry into CBA and announced a $1 billion capital add-on. Subsequently in November 2020 the add-on was reduced to $500 million as a result of the bank's progress in implementing the agreed Remedial Action Plan (RAP).

In July 2019 APRA applied $500 million OR capital requirement add-ons to ANZ, NAB and Westpac "to reflect higher operational risk identified in their risk governance self-assessments" conducted following the Prudential Inquiry into CBA. Then in December 2019, APRA increased the Westpac add-on to $1 billion. The additional impost was in response to the bank's slow progress in rectifying matters (including breaches of APRA's liquidity standard). The December 2019 Media Release emphasised that "Westpac is financially sound".

In April 2021 APRA also applied higher OR (and liquidity) capital requirements on Macquarie Bank in response to breaches of prudential and reporting standards, arising from inadequate arrangements for managing operational risk due to it complex intra-group structure. The media release stressed

that these “breaches are historical and do not impact on the current overall soundness of Macquarie Group’s capital or liquidity positions.” The penalty involved an extra $500 million OR capital requirement (as well as adjustments to the bank’s LCR and NSFR calculations).

What are the effects of such add-on capital requirements. First they don’t immediately require the banks to raise extra equity capital. They have capital surplus to the regulatory minimum requirement, so the main effect is to reduce the size of this buffer (of the ratio of CET1 capital to risk weighted assets (RWA)) by 15-20 basis points for the major banks, because the capital ratio falls. But if banks raise capital or keep it unchanged, why would the capital position (the numerator of the capital ratio) cause a reduction in the ratio?

The reason is that, APRA having decided on a dollar amount of capital add-on requirement, that number (eg $500 million) is converted into a Risk Weighted Assets (RWA) equivalent by multiplying it by the 12.5 multiplier used for operational risk capital calculations. (So $500 capital is equivalent to $6250 million of additional RWA). With a resulting higher level of RWA and unchanged current level of actual capital, the banks’ capital ratios therefore initially decrease.

Whether this would have caused any change in bank loan interest rates probably depends on the size of their capital buffers and views on likely duration of the impost. Probably the main benefit from this action is the reputation “game” it introduces. Banks had been sluggish in addressing issues in risk culture. Each bank could be expected to want to win the public race to be first to have the capital impost removed as a signal to markets that it has a superior risk culture to its peers.

# 21. Market Risk Management and Regulation

## Contents



## 21.1 Introduction

The general definition of market risk used by the Basel Committee and national supervisors is:

"Market risk is defined as the risk of losses in on and off-balance-sheet positions arising from movements in market prices. The risks subject to this [the market risk capital] requirement are:

(1) The risks pertaining to interest rate related instruments and equities in the trading book;

(2) Foreign exchange risk and commodities risk throughout the bank."

APRA classifies market risk (in APS-116) into:

"general market risk - the risk of loss owing to changes in the general level of market prices or interest rates. It arises from positions in interest rate, equities, foreign exchange and commodities;"

and

"specific risk - the risk that the value of a security will change due to issuer-specific factors. It applies to interest rate and equity positions related to a specific issuer."

It defines a *TFC* (traded market risk, foreign exchange and commodities) capital requirement as regulatory capital required given the exposure to market risk (as calculated according to APS-116).

This is treated separately to interest rate risk arising from different interest rate characteristics of liabilities and assets in the "banking book" (IRRBB). In large banks the ALCO or other relevant committee will assess IRRBB and if outside of preferred range transfer that risk to the trading desk via an internal swap (or other) transaction. The trading desk will then manage that risk as part of the overall interest rate risk from activities of the bank.

While smaller banks may have trading desks and be exposed to TFC risks, most will not be in that situation. Indeed APRA has signalled via a December 2020 consultation that smaller ADIs (with less than $20 billion assets for example) will not face a market risk capital charge (from a planned implementation date of 2023).

## 21.2 Bank Management of Market Risk

To operate a trading book, a bank must obtain approval of a trading book policy statement from APRA, and must have a framework for prudent valuation of trading book positions.

Information about the approaches used by the major banks to manage market risk arising from trading book activities can be found in their Basel disclosures (with most information in the annual disclosure). For example, in its September 2020 disclosure, ANZ states that "market risk stems from ANZ's trading and balance sheet activities and is the risk to ANZ's earnings or economic value arising from changes

in interest rates, foreign exchange rates, credit spreads, volatility, correlations or from fluctuations in bond, commodity or equity prices".[1]

ANZ's Board Risk Committee comprises only Non-Executive directors and is responsible for overall oversight of management's implementation of ANZ's risk management strategy, consistent with the Boards risk appetite statement. A group of senior executives comprises the Credit and Market Risk Committee (CMRC) which is responsible for the oversight and control of credit, market, insurance and material financial risks across the ANZ Group and is accountable to the Board Risk Committee and advised by the Market Risk function which is:

" a specialist risk management unit independent of the business that is responsible for:
• Designing and implementing policies and procedures to ensure market risk exposures are managed within the appetite and limit framework set by the Board.
• Measuring and monitoring market risk exposures, and approving counterparty and associated risks.
• The ongoing effectiveness and appropriateness of the risk management framework."
To manage traded market risk ANZ uses "A robust Value at Risk (VaR) quantification approach supplemented by comprehensive stress testing"

In addition to traded market risk banks also are exposed to *non-traded market risk* which is the balance sheet exposure to interest rate movements (IRRBB) and changes in the AUD value sensitivity of foreign currency capital and earnings to exchange rate changes.

## Managing Traded Market Risk

A first step in managing traded market risk is to measure it. Banks will do this by attempting to estimate the probabilities of possible outcomes (gains and losses) that might occur over some relatively short time horizon from the current positions held by the bank's trading desks in interest rates, foreign exchange and commodities. (Equity trading desks would also be included where relevant).

This involves: (a) being able to identify positions held; (b) assessing the likelihood of possible movements in interest rates etc and the sensitivity of the value of positions held to such movements;

[1] Note that earnings and economic value could give conflicting messages if mark-to-market accounting is not used. Consider a portfolio of long term bonds, half floating and half fixed interest rate, both currently trading at par and paying 4 per cent. If the interest rate increased to 5 per cent the coupon interest earnings of the portfolio would increase to 4.5 per cent. But the market value of the portfolio would decline (the floating rate bonds would remain at par but the fixed rate bonds would decline in value). However, if earnings also included the decline in market value (as well as coupon interest) earnings would also decline.

(c) summarising the range of possible outcomes in some standardised metric(s) useful for assessing risk and making risk management decisions.

These are not simple exercises. Consider interest rate positions. The bank's trading desks will deal in a wide range of securities and derivatives. The value of each will be most sensitive to interest rate changes at different maturities (such as duration for a fixed rate bond), but likely influenced by movements in the entire yield curve. It is necessary to develop scenarios about possible changes in the yield curve, calculate overall gains or losses in that scenario, and assign probabilities to those scenarios.

A common approach has been to use Value at Risk (VaR) methodology, and historical simulation has been one method used. In this method, the one day change in the value of the current position is recalculated using the most recent 500 day history of daily changes in the yield curve. Those 500 hypothetical changes in position value are ranked from largest loss to smallest loss (ie largest profit). If it is assumed that each of those historical daily changes is equally probable looking forward, then there is a one percent probability of either the first, second, third, fourth or fifth largest loss occurring. The fifth largest loss thus indicates the size of the loss that there is only a one percent chance of equalling or exceeding (the 99 percent VaR figure)– if the past history of interest rate changes is a good guide to the future!

While the development of VaR was a valuable advance for risk management, it does have its weaknesses. One (but common to all approaches) is the problem of specifying the probability distribution of future interest rate changes. History is not necessarily a good guide, and other methods of forecasting will often be used. Second, it doesn't indicate whether losses might exceed the VaR number by a little or a lot. This has led to development and use of other metrics such as *Expected Shortfall* which, essentially, measures the average of those values exceeding the VaR number (the "mean of the tail" of the distribution). Third, what time horizon should be used? Ten days is often used as representing a period within which positions could be adjusted to remove excessive risk. Fourth, VaR numbers for different positions cannot be simply added to get an overall VaR number. One reason is that correlations between changes in value of different positions need to be taken into account (whenever asset A records a loss, asset B might record a profit, for example). But another more technical reason is that VaR is not "sub-additive" because of the way it is derived as a point on the

support (range) of the probability distribution. One might think intuitively that VaR(A+B) < VaR(A) + VaR(B) because of the effect of correlation, but that is not the case.[2]

Banks and regulators are continuously striving to find better risk measures. And one basic lesson from finance is "don't put all your eggs in one basket" (ie diversify). So there has been increased use of additional approaches such as *stress tests*, such as by assuming some highly adverse scenario and assessing its consequences for the value of positions.

Of course, it is better to avoid being in positions where risk is larger than consistent with the bank's risk appetite. Hence, an important component of the risk management system is the imposition of position limits on individual traders and trading desks. By calculating the VaR arising from various positions, a limit can be placed on the maximum position allowed, so as to ensure that the VaR will always be no more than that desired.

Suppose, for example, the maximum VaR desired for a trader taking long and short positions in a particular asset is VaR*=100, and the profit (loss) on a position of X (where positive is long and negative is short) when the yield of the asset changes by Δr is:

Profit = 5X. Δr

Then if |Δr| = 2 is the change (positive or negative) in r which could occur or be exceeded 1 per cent of the time, then |X| = 10 is the maximum long or short position which gives a VaR of 100. (If Δr = +2 and the trader is short 10 (X=-10) the profit will be -100, and similarly if Δr=-2 and X=10). See the Appendix for more detail.

This leaves unanswered the question of how the maximum VaR for any trader should be determined. If, for example (unrealistically) the trader could virtually perfectly predict future price movements of the asset being traded, she would almost always make large profits and rarely make losses. So a large VaR limit would be desired – since setting a small position would reduce profits made (by preventing the dealer from taking large positions which in most circumstances yield large profits).[3]

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[2] Danielsson et al (LSE, 2005) discuss – but also show that in many cases, VaR is sub-additive

[3] Also, in setting limits based on the assumption that VaR's for individual dealers generate a desired VaR for the bank as a whole, there is the likelihood that individual dealers may operate inside the limits allowed, with the result that overall the bank is taking less risk than consistent with its risk appetite.

So, it could be expected that experienced traders would be given larger limits than novices – if it is assumed that they are better at "reading" the market or at exiting potentially loss-making positions. Likewise, a trader who consistently makes profits could expect to see an increase in the limits applied to them. However, the fact that there is little evidence of superior trading ability (achieving higher profits without commensurately higher risk taking) of individuals over the long run cautions against such strategies in setting limits. Most banks will also have some *loss limits* in place, such that continued losses will lead to suspension and review of the activity.

## 21.3 Regulatory Approach

The BCBS approach determines market risk capital requirements based on:

- Prudential regulation distinguishing between assets held in a "trading" book and those held in "banking" book.
- Capital for credit (counterparty) risk is required for the banking book and derivatives in the trading book
- Capital for market risk is required for trading book
    - Both general market risk and (for equity and interest rate positions) specific risk (associated with issuer). For example, the yield to maturity of a 3 year bond issued by Company XYZ might shift differently to the 3 year government or swap rate due to a change in the credit rating of XYZ, giving rise to a basis, or specific, risk.

In 2013 the Basel Committee began a *Fundamental Review of the Trading Book (FRTB)* regulation which was finalised in 2016 (https://www.bis.org/bcbs/publ/d352.pdf) with full implementation originally 2019 but deferred in December 2017 with the Basel 3 finalisation announcement until 2022. An explanatory note on main details is available at https://www.bis.org/bcbs/publ/d352_note.pdf

### Pre FRTB

*Pre FRTB (Fundamental Reform of Trading Book)* revisions to regulatory arrangements, a specific risk capital charge substituted for a credit risk capital charge for items in trading book. For banks using the standardised[4] approach, the specific risk capital charge for traded debt securities was very similar to

[4] Note that the Basel Committee uses the term "standardised" whereas APRA has, until recent consultations, used the term "standard".

the credit risk capital charge (but a much lower effective risk weight (0.25% – 1.60%) for investment grade securities). That gave incentives for whether to put securities in the trading book or banking book. Consequently there were regulatory restrictions on interrelationships between the banking and trading books.

These restrictions are outlined by APRA in APS-116 (in effect from January 2015)

"An ADI must allocate to the trading book positions in financial instruments, including derivative products and other off-balance sheet instruments, that are held either with trading intent or to hedge other elements of the trading book. Positions held with trading intent are those which:

(a) are held for short-term resale; or

(b) are taken on by the ADI with the intention of benefiting in the short-term from actual and/or expected differences between their buying and selling prices, or from other price or interest rate variations; or

(c) arise from broking and market-making."

(Trading book positions must be marked to market (fair-value) daily and recognised in P&L)

## Post FRTB

The **FRTB** – fundamental reform of trading book – led to the following changes:

- Revised internal models-approach (IMA)
- Revised standardised approach (SA)
- Shift from VaR to ES measure of risk under stress
- Incorporating risk of market illiquidity
- Revised trading-banking book boundary

The last of these was aimed at reducing scope for regulatory arbitrage via:

- Strict limits on movement between banking & trading book
- Applying an additional capital charge if the movement would reduce the capital charge (ie such that aggregate capital charge kept constant)
- Internal risk transfers from trading to banking book not recognised

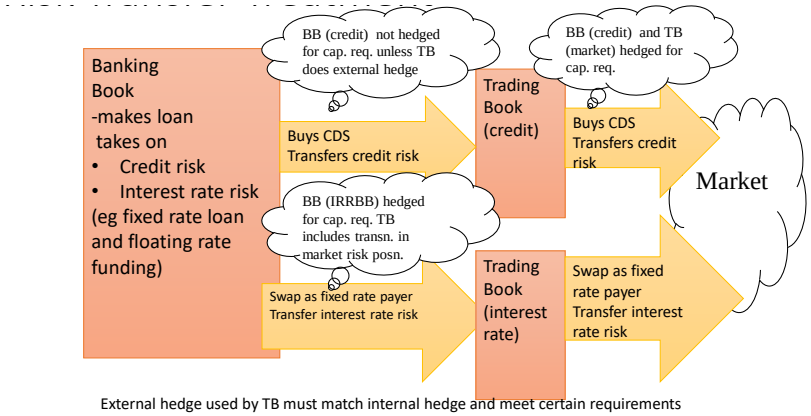
- Specifying which instruments must be included or excluded, and those presumed to be included

As with all Basel changes there are long transitional arrangements – national regulators were to finalise new standards by Jan 2019 and implement by end 2019, (but subsequently delayed to end 2022, and then to end 2023 when the Covid-19 crisis struck).

## 21.4 Trading Desk (Book) Definitions, Treatment and Regulation

> (a) A trading desk for the purposes of the regulatory capital charge is an unambiguously defined group of traders or trading accounts. Each individual trader or trading account must be assigned to only one trading desk.
>
> (b) The desk must have a clear reporting line to senior management and must have a clear and formal compensation policy linked to its pre-established objectives.
>
> (c) A trading desk must have a well-defined and documented business strategy, including an annual budget and regular management information reports (including revenue, costs and risk-weighted assets).
>
> (d) A trading desk must have a clear risk management structure. This must include clearly defined trading limits based on the business strategy of the desk. The desk must also produce, at least weekly, appropriate risk management reports. This would include, at a minimum, profit and loss reports and internal and regulatory risk measurement reports.
>
> *Source:* Basel Committee

The figure below provides an overview of the treatment of risk transfer from the banking book to the trading book implied by APS-116.




## 21.5 Requirements for Accreditation to use Internal Models Approach

For a number of years, only the four majors and Macquarie had approval to adopt the internal models approach. The application of an "all or none" approach by APRA which prevented using internal models for some risks and the standard approach for others prevented the ability of smaller institutions to transition gradually to using internal models approaches. In 2015 (following a suggestion of the 2014 AFSI) APRA allowed ADIs to apply to use internal models for only some categories of risk. In 2018, ING received approval to use the internal models approach for market (and credit) risk. Other regional banks have been preparing for obtaining approval for internal models for several years.

Banks wishing to use their internal models, rather than the standardised approach, for determining capital required for market risk, require accreditation from the regulator. As part of that they must also be able to demonstrate that their models are robust, by subjecting them to "back-testing". This involves, for example, calculating how many times over some past number of days the actual loss exceeded the estimated value at risk. If a 99 per cent confidence value is being used, then the VAR should be exceeded only once in every 100 days. So, using say 500 days of history, the number of actual violations could be compared to an expected number of 5 to assess how well the model performs.

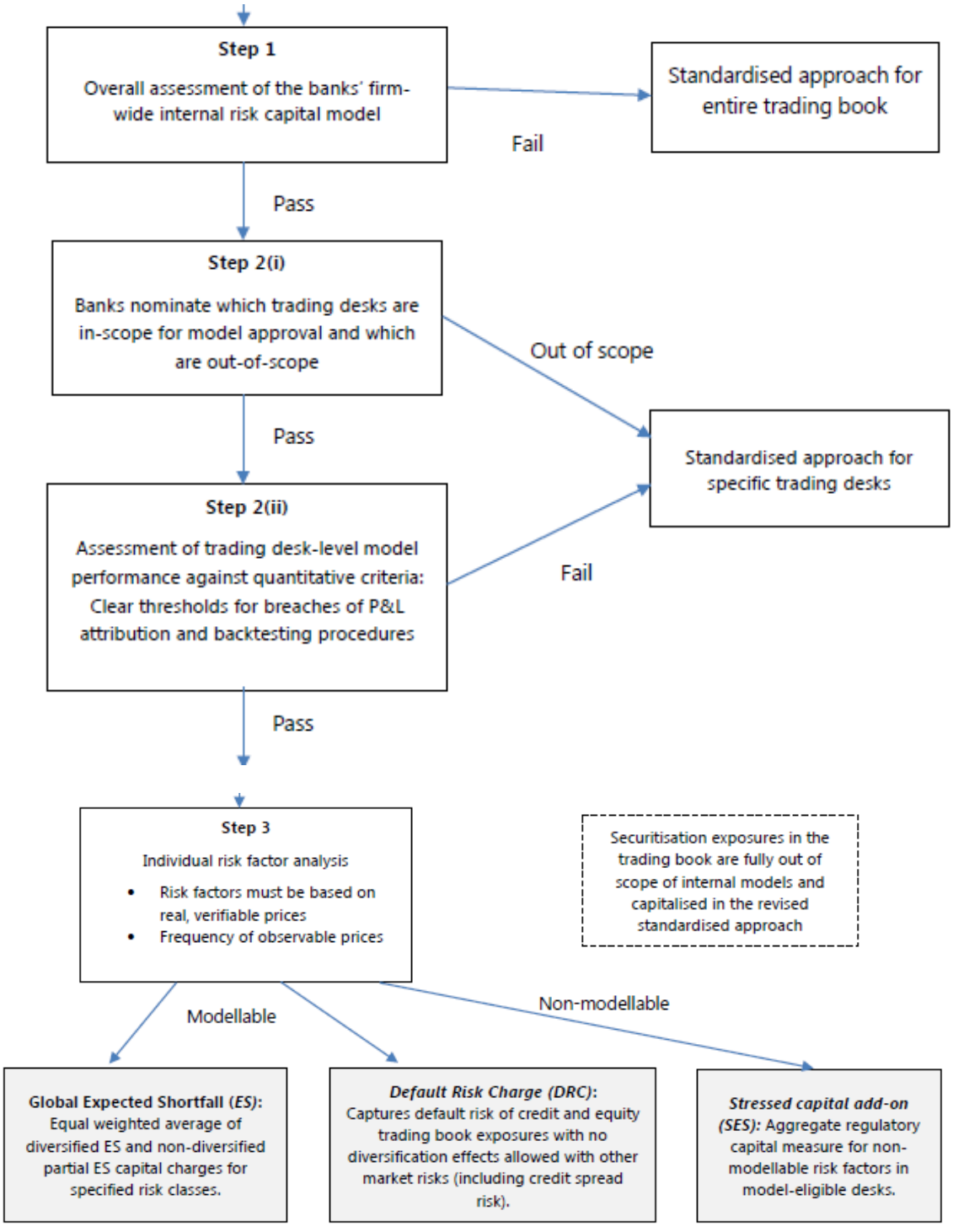



FIGURE 1: THE INTERNAL MODELS APPROACH FOR MARKET RISK: SOURCE: BASEL COMMITTEE

## 21.6 Internal Models Approach

Use of bank internal model may be approved, subject to:

- Risk management systems, skills, model accuracy, stress tested, positions held in "approved" trading desks
- Regulatory models may differ somewhat from those used for internal management

Prior to **FRTB,** the regulatory approach used value-at-risk from all market risks

- Calculated daily
- 99$^{th}$ percentile, one tail confidence interval
- 10 trading days holding period
- Minimum historical data of 1 year used
- Could incorporate cross-asset category correlations

**Post FRTB**

- Compute Expected Shortfall (ES) daily, bank-wide and for each trading desk
- Use 97.5$^{th}$ percentile, one tailed confidence level
- Calculate for 10 day liquidity horizon (holding period), and scale to other horizons (using complicated formula), eg
    - Major currency interest rates – 10 days
    - Credit spread: corporate – 40 days
    - FX volatility – 40 days
    - Equity price (small cap) - 20 days
    - Precious metals price – 20 days

Ideally each instrument can be expressed as a function of some limited number of risk factors for which correlations and covariances are known

For interest rates and equities models should capture both market risk and specific risk.

- Interest Rate Exposures

  - Yield curve model with at least 6 factors (maturities)
  - Ability to capture basis risk
- Equity Exposures
  - Market Index (at minimum) or Industry Indexes or individual stock volatilities
- Exchange Rates
  - Risk factor for each currency

## Regulatory Formulas

Once internal models have been used to identify expected shortfall (or other risk measures), regulatory formulas incorporate those metrics to determine capital requirements. Because risk figures could vary substantially on a daily basis (and are potentially able to be manipulated) there is a "smoothing" type of adjustment, involving comparison with some historical average of the bank's risk figures. Figure 2 (drawn from Basel Committee publications) provides the definitions and algebra for those interested in such details.

$$IMCC(C_i) = ES_{R,S,i} \times \frac{ES_{F,C,i}}{ES_{R,C,i}}$$

$$IMCC = \rho\left(IMCC(C)\right) + (1-\rho)\left(\sum_{i=1}^{R} IMCC(C_i)\right)$$

$$IMCC(C) = ES_{R,S} \times \frac{ES_{F,C}}{ES_{R,C}}$$

IMCC is Internally modelled capital charge at bank-wide level

IMCC(C) – no constraints on cross-risk-class correlations

IMCC($C_i$) – each risk class treated independently

$ES_{RS}$ is ES based on stress case and reduced set of risk factors

$ES_{RC}$ ($ES_{FC}$) is ES over 12 months using reduced (full) set of risk factors

ρ = 0.5

$$C_A = max\{IMCC_{t-1} + SES_{t-1};\ m_c \cdot IMCC_{avg} + SES_{avg}\}$$

Daily capital requirement ($C_A$) for approved desks is the higher of:

(i) its previous day's aggregate market risk capital charge.

(ii) an average of the daily capital charges for preceding sixty trading days, multiplied by a scaling factor (the total of a multiplication factor and a plus factor);

And also higher of same calculation using "stressed VAR" using multiplication factor ($m_c$) ≥ 1.5 and with

- ("plus" factor of up to 0.5 depending on the ex-post daily VAR model performance , as determined by "back testing")

The aggregate capital charge for market risk is:

$ACC = C_A + DRC + C_U$

DRC = default risk charge;

$C_U$ is (standardised) charge for unapproved desks

**FIGURE 2: MARKET RISK REGULATORY FORMULAE**

## Back Testing

Internal models will, hopefully, provide reasonable estimates of the risk taken by the trading desk. If, for example the models predict that daily losses greater than $X will only occur 1 per cent of the time, then in one year of (say) 250 trading days, then it would be expected that such losses would be observed only 2 to 3 times per year. Because models are imperfect, in some years more or less *exceptions* (losses greater than $X) might occur. But a much greater number of exceptions may signal that the internal model is not fit for purpose.

Regulators thus require periodic comparison of daily value-at-risk measure with the realised daily profit or loss ("trading outcome") for each desk

- Using at least one year of current observations
- Require at a 99 per cent level of confidence ≤ 12 exceptions and at 97.5 per cent level ≤ 30 exceptions

(Note that each day's VaR will vary depending on the trading desk's position, so each day a "back-test" of realised outcome must be done against the VaR previously estimated for that day).

If the required condition is not met, the bank must use the standardised calculation.

Also Various P&L metrics are to be used for assessing model robustness

- (Unexplained P&L) / (Std dev (P&L)) <(-10%,+10%)
- Var (unexplained P&L)/Var (hypothetical P&L) <20%

It is possible that the VaR calculation may be using models for pricing of securities and derivatives which do not capture all sources of risk. (Non-linearities in price-interest rate relationships, correlations and basis risk are expected to be included). APRA expects ADIs to recognise and incorporate such other sources of risk (risk gaps) in a RNIV (risks not in VaR) framework implying additional capital add-ons, until the risk gaps have been eliminated by modelling adjustments. Identifying omitted risks could be done by comparing actual profits implied by the trading desk pricing models with those implied by the bank's risk models.

## 21.7 The Revised Standardised Approach

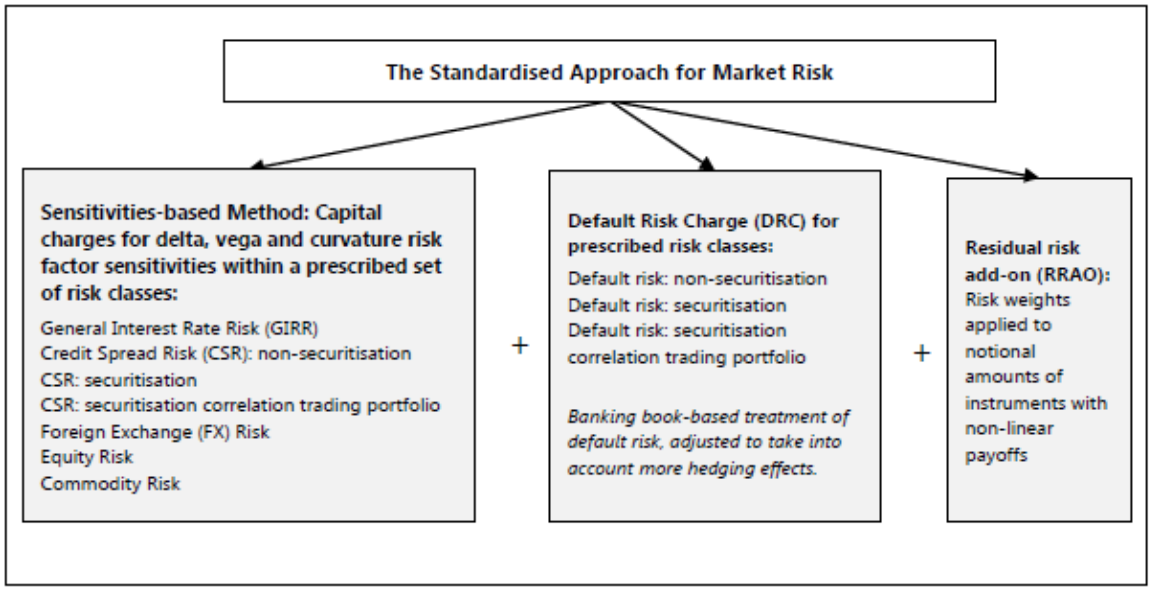



FIGURE 3:THE REVISED STANDARDISED APPROACH. (SOURCE: BASEL COMMITTEE, D352)

The basics of the standardised approach require for each "risk class" (eg FX, equity, interest rate) a calculation of the risk charge for the "Sensitivities" component, which involves:

- identifying positions in relevant instruments
- identifying risk factors (such as interest rates at different maturities) and sensitivities of positions to those risk factors

- calculating risk position based on position x risk factor
- calculating a "risk charge" (capital requirement)
- Specific approaches are specified for
  - traded debt securities and other interest rate related securities,
  - traded equities and other equity instruments,
  - foreign exchange,
  - commodities
  - and options on each of these asset classes.

An example for the current standardised approach (which is simpler) is given below. To this is added a "default risk charge" based on risk of loss from a "jump to default" situation. The "residual risk" add on attempts to cover missing considerations from the former two.

## An Illustration of the Standardised Approach

This example is drawn from APRA's Prudential Practice Guide APG116

This example is "pre FRTB" but still relevant. APRA has advised it does not anticipate implementing new approach until 2024 at the earliest. It intends to implement FRTB for internationally active banks, but not yet decided on what, if any changes for others. https://www.apra.gov.au/sites/default/files/170321-letter-to-ADIs-FRTB.pdf

Consider the following portfolio of positions in the trading book(s)

- a qualifying bond, $13.33 million market value, residual maturity 8 years, coupon 8%;
- a government bond, $75 million market value, residual maturity 2 months, coupon 7%;
- an interest rate swap, $150 million, the bank receives floating rate interest and pays fixed, the next interest fixing occurs after 9 months, residual life of the swap 8 years. ( This swap can be replicated as short an 8 year fixed rate bond and long a 9 month bond);
- a long position in interest rate futures of $50 million, maturing in six months time, life of underlying government security 3.5 years. (Interest Rate Futures and FRAs are entered into the template as equivalent long and short positions in different maturities of underlying instrument).

These positions are entered into the template as shown below. The approach is based on noting that if $w_i$ is the dollar amount of gain per $1 long position in asset i ($A_i$) for some standardised change in the market interest rate for asset i, and if there is perfect positive correlation of the market interest rates then total possible gain/loss is:

Gain/Loss = $\sum w_i A_i$

Once the positions ($A_i$'s) have been recorded, then the weights ($w_i$) can be attached and summed. However, there will be less than perfect correlation and hence some long and short positions will not necessarily offset each other (as assumed in the simple summation). So, there will need to be some "offsets" or "disallowances".

Illustration – Bank Interest Rate Trading Book Positions

a qualifying bond, $13.33 million market value, residual maturity 8 years, coupon 8%;

a government bond, $75 million market value, residual maturity 2 months, coupon 7%;

| | Zone 1 | | | | Zone 2 | | | Zone 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time-band | 0-1 | 1-3 | 3-6 | 6-12 | 1-2 | 2-3 | 3-4 | 4-5 | 5-7 | 7-10 | 10 - 15 | 15 - 20 | Over 20 |
| | Months | | | | Years | | | | | | | | |
| Position | | +75 Govt | -50 Fut. | +150 Swap | | | +50 Fut. | | | -150 Swap +13.33 Qual. | | | |

Illustration – Bank Interest Rate Trading Book Positions

an interest rate swap, $150 million, the bank receives floating rate interest and pays fixed, the next interest fixing occurs after 9 months, residual life of the swap 8 years

a long position in interest rate futures of $50 million, maturing in six months time, life of underlying government security 3.5 years.

| | Zone 1 | | | | Zone 2 | | | Zone 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time-band | 0-1 | 1-3 | 3-6 | 6-12 | 1-2 | 2-3 | 3-4 | 4-5 | 5-7 | 7-10 | 10 - 15 | 15 - 20 | Over 20 |
| | Months | | | | Years | | | | | | | | |
| Position | | +75 Govt | -50 Fut. | +150 Swap | | | +50 Fut. | | | -150 Swap +13.33 Qual. | | | |

The risk weights ($w_i$'s) to be applied are shown in the following table and are based on a duration approach

## Time Bands and Risk Weights

**Risk Weights – increase with maturity time band implicitly based on $\Delta P = - D \Delta r P/(1+r)$ What is an "unlikely" size change in interest rates at different maturities over (say) a 10 day period?**

| Maturity | Duration | Risk weight (%) | Assumed changes in yield (%) |
|---|---|---|---|
| | 1 month or less | 0.00 | 1.00 |
| | over 1 and up to 3 months | 0.20 | 1.00 |
| | over 3 and up to 6 months | 0.40 | 1.00 |
| | over 6 and up to 12 months | 0.70 | 1.00 |
| over 1.0 and up to 1.9 years | over 1.0 and up to 1.9 years | 1.25 | 0.90 |
| | over 1.9 and up to 2.8 years | 1.75 | 0.80 |
| | over 2.8 and up to 3.6 years | 2.25 | 0.75 |
| | over 3.6 and up to 4.3 years | 2.75 | 0.75 |
| over 5 and up to 7 years | over 4.3 and up to 5.7 years | 3.25 | 0.70 |
| over 7 and up to 10 years | over 5.7 and up to 7.3 years | 3.75 | 0.65 |
| over 10 and up to 15 years | over 7.3 and up to 9.3 years | 4.50 | 0.60 |

The capital charge is calculated as the sum of :

(a) the net short or long weighted position across the whole trading book;
(b) a small proportion of the matched positions in each time band (the "vertical disallowance");
(c) a larger proportion of the matched positions across different time bands (the "horizontal disallowance"); and
(d) a net charge for positions in options, where appropriate

So the first step is to calculate (a) the net short or long weighted position across the whole trading book

| | Zone 1 | | | | Zone 2 | | | Zone 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time-band | 0-1 | 1-3 | 3-6 | 6-12 | 1-2 | 2-3 | 3-4 | 4-5 | 5-7 | 7-10 | 10 - 15 | 15 - 20 | Over 20 |
| | Months | | | | Years | | | | | | | | |
| Position | | +75 Govt | -50 Fut. | +150 Swap | | | +50 Fut. | | | -150 Swap +13.33 Qual. | | | |
| Weight (%) | 0.00 | 0.20 | 0.40 | 0.70 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.50 | 5.25 | 6.00 |
| Position x Weight | | +0.15 | -0.20 | +1.05 | | | +1.125 | | | -5.625 +0.5 | | | |

|Σ|=3

The change in portfolio value if the yield curve moves as specified (all rates in same direction and by more at long end

The risk weights used in this calculation increase with maturity time band and are implicitly based on

$$\Delta P = - D^* \Delta r P$$

They can be interpreted as representing what is an "unlikely" size change in interest rates at different maturities over (say) a 10 day period.

Calculation of Σ(Net Positions)x(Risk Weights) is an "approximate" VAR if all interest rates moved in same direction and by amounts supposed. This gives a capital charge for overall net position, but ignores possibilities of

(a) Within a time band, the risk of differential movements – this leads to a "vertical disallowance"

- Add 10% of smaller of net long and short positions in time band to capital requirement

| | Zone 1 | | | | Zone 2 | | | Zone 3 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time-band | 0-1 | 1-3 | 3-6 | 6-12 | 1-2 | 2-3 | 3-4 | 4-5 | 5-7 | 7-10 | 10 - 15 | 15 - 20 | Over 20 |
| | Months | | | | Years | | | | | | | | |
| Position | | +75 Govt | -50 Fut. | +150 Swap | | | +50 Fut. | | | -150 Swap +13.33 Qual. | | | |
| Weight (%) | 0.00 | 0.20 | 0.40 | 0.70 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.50 | 5.25 | 6.00 |
| Position x Weight | | +0.15 | -0.20 | +1.05 | | | +1.125 | | | -5.625 +0.5 | | | |
| Vertical Disallow. | | | | | | | | | | 0.5 x 10% = 0.05 | | | |

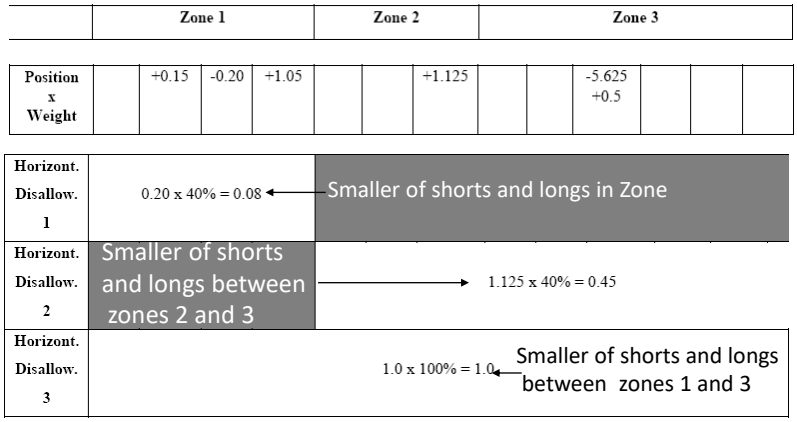
To allow for possibility of different movements in
e.g. swap and bond rates at the same maturity

(b) Across time bands, yield curve could tilt – hence "horizontal disallowance" of some part of offsetting net (ie matched) positions. Three zones are distinguished: < 1 year, 1-7 years, > 7 years and there are disallowances within and across zones

**Table 3 Horizontal disallowances**

| Zones[27] | Time band | Within the zone | Between adjacent zones | Between zones 1 and 3 |
|---|---|---|---|---|
| Zone 1 | 0 – 1 month<br>1 – 3 months<br>3 – 6 months<br>6 – 12 months | 40% | 40% | 100% |
| Zone 2 | 1 – 2 years<br>2 – 3 years<br>3 – 4 years | 30% | 40% | |
| Zone 3 | 4 – 5 years<br>5 – 7 years<br>7 – 10 years<br>10 – 15 years<br>15 – 20 years<br>over 20 years | 30% | | |

e.g. 40% disallowance in zone 1 – add 40% of smaller of net long and short positions (ie the "matched" part of position) of time bands in zone 1 to capital requirement




To allow for possibility of tilts or twists in the yield curve

The Total Capital Charge is then: (a) 3 + (b) .05 +(c) .08 + .45 + 1.00 = Total 4.58

# 22. Interest Rate Risk in the Banking Book (IRRBB)

## Contents

## 22.1 Introduction

Banks generate interest rate risk from their traditional balance sheet activities of deposit taking (and debt issuance) and lending, and from other off-balance sheet and trading activities. Given the various contracts entered into with specified future cash flows, changes in interest rates affect the present value of those cash flows and thus potentially the present value of the bank. An alternative way of thinking about this is to note that the need to replace maturing liabilities and/or assets will lead to different interest income or expense if there has been a change in interest rates by that date. Of course, banks also have the discretion to change interest rates charged or paid on variable rate loans or at-call deposits, and many contracts link the interest rate involved during the life of the contract to some market or indicator rate. This means that it is more important to focus on the repricing features of the contracts rather than their maturity.

As well as an effect on the present value of future income and expense cash flows, a change in interest rates will also affect current period earnings if the interest rates on assets and liabilities are differentially affected. Some banks may focus more on the current earnings effect, and others on the "economic value" effect – although both are generally considered (and important)

It has become common to separate interest rate risk into that involved in the banking book (IRRBB) and that involved in the trading book, as one component of the "market risks" managed there. (Other market risks include commodity, FX, equity risk etc).

One reason for this division is that large banks will typically "pass" unwanted interest rate risk from the banking book to the trading book to be managed by the relevant trading desk. Rather than changing the structure of loan and deposit interest rates to induce a change their maturity composition and repricing features and remove an undesired interest rate exposure, such transactions can be used to hedge the IRRBB. If the ALCO (or other entity responsible for managing IRRBB) decides to reduce interest rate exposure of the banking book, a transaction, such as an interest rate swap or FRA, will be undertaken between the banking book and the trading desk. The banking book has less interest rate exposure and the trading desk now has that exposure to manage. A second reason is that the nature of interest rate risk created by the trading desk arises from taking positions in the market which can be changed quickly, whereas the interest rate risk in the banking book is more "structural' in nature reflecting the banking business.

This does raise a potential issue for regulatory capital requirements, since deals between the banking book and the trading book convert IRRBB into market risk of the trading book. If the capital

requirements are not consistent across the two activities there may be scope for regulatory arbitrage. Regulations associated with trading book activities (market risk) attempt to limit such regulatory arbitrage.

## 22.2 The Importance of IRRBB

Since the most basic business of banks is taking short term deposits and lending longer term, it might be thought that the exposure to interest rate risk associated with this is a major component of bank risk management. It is not unimportant, but nowhere near as important as credit, operational and market risk.

There are several reasons for this. One is that banks often make longer term loans at variable interest rates, and thus are not locked in to a fixed return on long term assets. Indeed, the majority of Australian housing mortgage loans have interest rates variable at the bank's discretion – which are generally varied when the bank's cost of funding changes - thus passing interest rate risk on to the customer. (But it can be important as the Savings and Loans institutions in the USA who made long term fixed rate loans discovered in the late 1980s S&L Crisis)[1]. A second reason is that bank internal arrangements will generally involve passing much of the interest rate risk from the banking book onto the trading book, such that it gets reflected in market risk. While it may be difficult to substantially alter the structural interest rate characteristics of the banking book in the short run (such as by substituting long term for short term deposits, or moving to floating rate rather than fixed rate loans), it is relatively easy to hedge interest rate exposures by transactions in derivatives either with the trading desk or with third parties. Interest rate swaps, futures contracts, forward rate agreements, and interest rate options are among the hedging tools available.

Australia was one of the earlier adopters of an IRRBB capital requirement (optional under Basel 3) for banks using the Internal Models approach to risk management. Other ADIs were not subject to and IRRBB charge, although changes announced in 2019 in a draft of APS 117 (to apply from 2022) may alter that for some ADIs for whom APRA determines such a charge would be appropriate. Although no capital charge for IRRBB applied to most banks (ie those not accredited to use internal models), all were required to report to APRA on interest rate risk in the banking book using a standardised template.

[1] See Curry and Shibut (FDIC Banking Review, 2000) for an overview.

One way to assess the relative importance of IRRBB is to consider how much it contributes to the bank's regulatory total RWA calculation (for those banks subject to an IRRBB capital charge)]. While IRRBB risk management models calculate a capital requirement by reference to interest rate exposure, the resulting capital amount can be converted into an equivalent RWA by multiplying by the inverse of the required capital ratio. If, for example, the bank (or regulator) determines that capital of 10 is required as a result of IRRBB and the capital/RWA requirement is 0.08, then 10 of capital is equivalent to having 125 of RWA.

Doing this type of calculation (for Australia's major banks) leads to an aggregate RWA contribution from IRRBB which has averaged around 3 per cent of RWA, although the numbers have historically varied quite a bit over time and between banks as reported in this KPMG document. Some of the changes proposed to APS 117 are designed to reduce that variability.

## 22.3 Sources of Interest Rate Risk

Vuillemey provides a relatively recent survey of theoretical and empirical work on interest rate risk in banking, with a particular emphasis on the extent to which banks rather than consumers (businesses) take on aggregate interest rate risk. He notes that banks pass on a lot of interest rate risk by use of variable rate loans, but do retain some interest rate risk – with a negative exposure (bank equity value falls when interest rates rise). Since banks also engage in maturity transformation (longer term assets than deposits) their stock prices should also be positively related to unexpected steepening of the yield curve (if term to repricing is related to maturity).

Interest rate exposures can be basically divided into two main types

*Balance sheet mismatches* - e.g. short term deposits, long term (fixed rate) assets etc., often referred to as "riding the yield curve". Note that even maturity matching can leave an interest rate exposure if the pattern of cash flows varies between assets and liabilities (e.g. due to interest frequency, principal repayment methods). The market value of each will respond differently to interest rate changes. (This can be thought of alternatively as the problem of "reinvestment rate" risk – and leads to a focus on *duration*).

*"Off" balance sheet activities:*

- Forward rate agreements (FRAs) where net payment from bank to customer is made at a future date depending on value of BBSW at that date relative to a contractual value.
- Interest Rate Swaps (like a string of FRAs)

- Interest Rate Options: both explicit option contracts written for customers and Implicit, e.g. prepayment options for fixed rate borrowers
- *"Real" exposures* - impact of high/low interest rates on loan defaults, loan demand, deposit supply etc.

## "Riding the Yield Curve": Profits and Risks

Banks typically make longer term (duration) loans than their deposits (more precisely, exposure comes from a longer time to loan "repricing") such as 5 year fixed rate loans financed by 3 month deposits. Banks normally have an expected profit from "riding the yield curve" since there is generally a positive slope of the yield curve reflecting a term premium.

But it is important to note that if the *expectations hypothesis (EH)* held, there would be no expected profit from riding the yield curve. The EH states (in its simplest depiction for a two period world where 0 is the current date) that

$(1+{}_0r_1)(1+E_0({}_1r_2)) = (1+{}_0r_2)^2$.

For example if the current 1 year rate (${}_0r_1$) = 0.05, and the current 2 year rate (${}_0r_2$) = 0.06, the EH implies an expected 1 year rate in 1 year $E_0({}_1r_2)$ = 0.07. If the EH held, then the bank would be refunding the 2 year 6 per cent loan in the second year at a higher rate (7 per cent) which offsets the cheaper funding rate of 5 per cent over the first year.

Generally, there is some "term (or risk) premium" in the yield curve, such that longer term rates are higher than implied by market expectations, generating some profit from riding the yield curve. But that is not always the case, and risks are involved in trying to achieve that expected profit.

## Types of Interest Rate Exposure

In practice there are different types of interest rate exposure, and the Basel Committee identifies three types of interest rate risk for IRRBB. These are:

- Gap risk – arising from the term structure of assets and liabilities in the banking book, and risk will depend upon the type of change in the yield curve
- Basis risk – where instruments with the same tenor may be repriced according to different interest rate indices
- Option risk – where customers have implicit or explicit options which may be exercised in response to interest rate changes.

The BCBS also notes that Credit Spread Risk in the Banking Book (CSRBB) must be considered, since interest rate changes could alter PDs and LGDs.

## 22.4 Simple techniques for assessing interest rate exposure

There are two well known, long standing, relatively simple techniques for assessing IRRBB, known as gapping and the duration approach. They inform more modern approaches and are ingredients in the model used for reporting on IRRBB as required in ARS117, as well as the standardised model developed by the Basel Committee. The internal models used by accredited banks are much more complex but rely to some extent on the techniques involved in both approaches.

We thus discuss the two approaches before considering bank internal modelling and APS 177, ARS 117, and the Basel standardised model.

Note that exposure refers to the sensitivity of the variable under consideration to interest rate changes (such as the dollar value change per basis point change in interest rates).

### Gapping

Consider the simple bank balance sheet below

| Assets | | Liabilities | |
|---|---|---|---|
| At call and overnight loans | $20 | At call deposits | $10 |
| Treasury notes maturing in 7 weeks | $30 | Deposits due in five weeks | $20 |
| Fixed rate 18 month loans | $50 | Deposits due in 4 months | $60 |
| | | Shareholders funds | $10 |

The gapping approach involves grouping assets and liabilities into "resetting time buckets" - i.e. by the date at which the interest rate is first able to change. (N.B. this is not necessarily the same as maturity, a five year loan could have interest rates reset every six months for example). The precise "buckets" chosen will vary with the nature of the organisation.

For the example here, we use:

[0-1 month], [1-3 month], [3-6 month], [6-12 month], [12-24 month], [over 24 month]

This gives:

| "Bucket" (months) | 0-1 | 1-3 | 3-6 | 6-12 | 12-24 | >24 (insensitive) |
|---|---|---|---|---|---|---|
| Assets | 20 | 30 | 0 | 0 | 50 | 0 |
| Liabs | 10 | 20 | 60 | 0 | 0 | 10 (equity) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gap | 10 | 10 | -60 | 0 | 50 | -10 |
| Cumulative Gap | 10 | 20 | -40 | -40 | 10 | 0 |

### Interpreting the Gap

Positive gaps in the [0-1] and [1-3] month buckets mean that if interest rates were to increase tomorrow (and stay at that level), net interest income (NII) would increase for the periods 0-1 month, and for 1-3 month. The reason is that more assets than liabilities have rates that reset at the higher yields over that period. (There are more **rate sensitive assets** than **rate sensitive liabilities** in that bucket).

The negative gap for the [3-6] month gap means that the increase in interest rates would reduce net interest income in that period. The cumulative gap at that point and subsequently indicates that if the increase in interest rates persisted, net interest income would fall over the period 0-6 months and 0-12 months. Note that this assumes the portfolio is not changed, and that after one month both the 20 of assets and 10 of liabilities have both repriced at the new interest rate level. Of course, redoing the gapping bucket in one month's time would require slotting those into the relevant bucket.

## Problems with gapping

- Gapping only gives directional estimate of exposure - not very precise quantitative estimates. However, one can estimate the change in NII by using $\Delta NII = (Cum.Gap).\Delta r$ for some assumed change in interest rates at different tenors.
- Results may depend upon "buckets" chosen
- It is sometimes difficult to classify repricing date of assets where the bank has discretion to reset the rate - but faces marketing/political constraints upon flexibility. Likewise, are retail deposits to be classed as rate sensitive or not - the interest rate can be changed, but quantity is not necessarily very sensitive to market movements. Typically such at-call deposits will be spread over repricing buckets as a way of indicating that, in the longer run, the rate paid will need to respond (to some degree) to interest rate changes, but not necessarily immediately.
- It takes the current balance sheet as given. It ignores "run-offs" from existing assets and liabilities in terms of interest payments and principal repayments which can be reinvested at new market interest rates.
- It ignores other sources of interest rate exposure (off balance sheet, "real" exposures)

- Focuses upon net interest income - not economic value (Value depends upon NPV of all future net interest income. Interest rate change could cause current and future NII to move in opposite directions).

The example given, does not incorporate any derivative positions in the banking book. These can be incorporated by replicating them as positions in the underlying assets. For example a position as a fixed rate payer in a $100 two year swap with the floating rate adjusting every six months can be replicated as being short a two year fixed rate $100 bond and long a six month $100 bond.

## Duration and the Duration Gap Approach

### Duration Definition

- Consider asset A with cash flows at date i of $C_i$, i = 1...m (where m is the maturity of the asset).
- Assume the yield curve is flat, at an interest rate of r
- The present value of $C_i$ is $P_i = C_i/(1+r)^i$
- The market value of asset A, $V_A$ is $V_A = \sum_{i=1}^{m} P_i = \sum_{i=1}^{m} \frac{C_i}{(1+r)^i}$
- The duration of A, $D_A$ is $D_A = \frac{\sum_{i=1}^{m} i.P_i}{V}$
- The units of measurement of duration is time (e.g. years) - since the numerator is of dimension (time multiplied by PVs) and the numerator is of dimension (PVs).

Duration can be defined as a weighted average time to maturity of the cash flows of an asset. It also has particular economic significance as a measure of the interest sensitivity of an asset's price.

### Interpreting Duration

If security a has cash flows $C_1$, $C_2$,…. $C_m$, then its market value is

$V_a = C_1/(1+r) + C_2/(1+r)^2 + \ldots\ldots C_m/(1+r)^m$

Differentiating

$dV_a/dr = -1.C_1/(1+r)^2 - 2.C_2/(1+r)^3 - \ldots\ldots - mC_m(1+r)^{m+1}$

$= -(1+r)^{-1}[1.C_1/(1+r) + 2C_2/(1+r)^2 + \ldots mC_m/(1+r)^m]$

Since the term in [..] is equal to $D_a.V_a$

$dV_a/dr = -(1+r)^{-1}[D_a.V_a]$

Hence $dV_a / V_a = - D_a\, dr/(1+r)$ and duration can be thought of as the elasticity of an asset's value w.r.t. (1+r) - since dr = d(1+r).

Modified Duration $D^* = D/(1+r)$ is often used instead giving

$dV_a/dr = -[D^*_a.V_a]$

The percentage change in an asset's price following a change in the interest rate can be obtained by multiplying its modified duration by the change in the interest rate. **Error! Reference source not found.** illustrates.

Examples

1. Zero coupon bond with $D_z = 4$. If r = .10 (i.e. 10%) and rises to .1010 (i.e. 10.10%), we have
   dV/V = - 4 (.0010)/1.10 = -0.0036, i.e. - 0.36%.
   Check: $P_z$ @ r=10% = $100/(1.10)^4 = 68.30$; $P_z$ @ r = 10.10% = 68.05
   % $\Delta$ $P_z$ = -(.25/68.30)100 = -0.36%
2. 15% coupon 5 year bond, when r = 8%, has duration of 3.99 (say 4)
   If r increases to 9%, the bond value falls by 4(.01)/(1.08) = -0.037 = 3.7 %.

## Convexity

Duration gives an accurate approximation for the change in a security's price for small changes in the interest rate. But due to the curvature of the price-yield relationship , the *convexity* of the security makes it only an approximation. See **Error! Reference source not found.**.

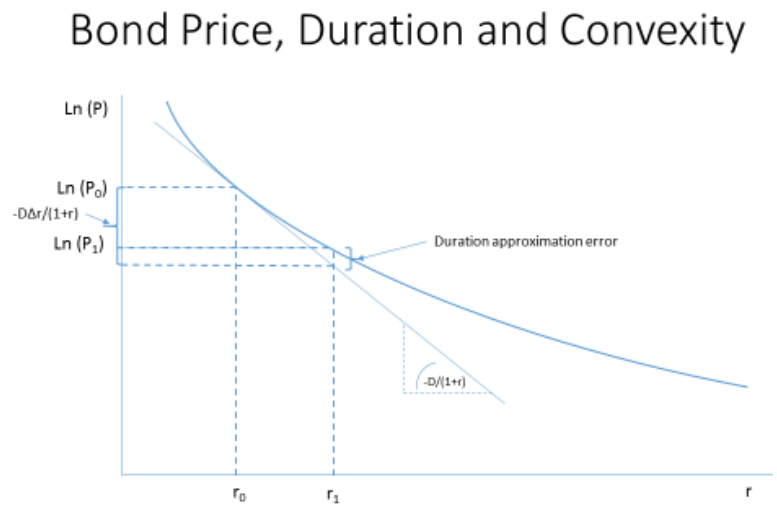



**FIGURE 1: ASSET PRICE CHANGES AND DURATION AND CONVEXITY**

## Duration Gap of a Financial Institution

The reporting requirements of ARS 117 do not calculate the duration gap for the whole ADI, but rather calculate a duration gap for different time-bucket positions. This enables different interest rate change assumptions for different time-buckets to be used. Nevertheless, the aggregate duration gap is worth examining as an imperfect summary measure of interest rate exposure. One problem in its application is that it logically requires use of the market value of assets and liabilities rather than their book values.

From the **market value** balance sheet,

E = A - L, i.e. equity value = assets minus liabilities

Hence $\triangle E = \triangle A - \triangle L$. Thus if we can find the duration of assets and liabilities, we can calculate the impact of interest rate changes on equity value.

$\triangle A = -D_a.A.\triangle r/(1+r)$ ; $\triangle L = -D_l.L.\triangle r/(1+r)$

hence $\triangle E = -[D_a.A - D_l.L]\triangle r/(1+r)$

$= -[D_a.- D_l.L/A].A.\triangle r/(1+r)$

$= -[D_a.- D_l.k].A.\triangle r/(1+r)$, where k = L/A (a measure of leverage)

Thus the impact of a change in interest rates on equity value can be broken down into three factors:

- the leverage adjusted duration gap $[D_a - D_l.k]$

- scale (A)
- the size of interest rate change

Note to calculate the duration of a portfolio of assets (liabilities) we must weight the individual durations by market value. For example, if $A = A_1+A_2$, in market value terms, then $D_a = D_{a1}A_1/A + D_{a2}A_2/A$.

Example:

Consider: A =\$100, L = \$90, E = \$10, $D_a = 5$, $D_l = 3$, r = 10%.

What effect will an increase in r to 11% have?

$\triangle E = -[5 - 3(.9)]100(.01)/1.1 = -\$2.09$, i.e. almost 21% of net worth.

## 22.5 IRRBB Approaches used by Major Australian Banks

An important issue in assessing interest rate risk is that of whether the focus should be upon the effects of interest rate changes on current earnings or on the present value of the banking book (reflecting changes in both current and future earnings). They will not always give the same message and it is possible to construct examples of balance sheet structures where an increase in interest rates reduces current earnings but increases the present value of the banking book. Such examples are not common, and both approaches generally indicate the same directional effect. But focusing solely on one may lead to poor risk management strategies. For example, if a future change in interest rates is likely to excessively impact current earnings, one response could be to change interest rates offered to induce an switch into in long term fixed rate deposit and out of short term deposits. That could remove the sensitivity of current earnings to interest rate changes but possibly increase the sensitivity of future earnings, and thus the present value of the banking book, to interest rate changes.

Common metrics for considering a change in economic value include:

- *PV01*: present value of a single basis point change in interest rates based on gap anaylsis;
- *EVE*: economic value of equity. This takes the balance sheet as given and ignores possible future changes, and uses the balance sheet identity that equity is the balance sheet residual. Changes in EVE are then the difference between changes in the market value of assets and liabilities.

- *EVaR*: economic value-at-risk.

The four major Australian banks report on their IRRBB in their Basel 3 disclosures. In measuring and monitoring IRRBB they all report using similar methods (but expressed differently) – see Table 1. The metrics considered can be summarised as:

*Risk measures*

- Economic value sensitivity (change in EVBB (economic value of the banking book) due to specific moves in yield curve)
- Earnings at Risk (EaR) or Net interest Income at Risk (NIIS), estimated for some holding period (eg a quarter) at a specified confidence interval. The assumed probability distribution of future interest rates could be based on historical data, or the figures could be calculated for some specific movement in interest rates (eg 200 a bp parallel movement in the yield curve).
- VaR – 99% confidence level estimate of interest rate change impact on EVBB
- Stress Testing outcomes

*Relevant metrics*

- Market Value (PV of all known future cash flows)
- Market value loss limits
- Embedded Value (Market value less book value of current balance sheet) which is incorporated into the capital position.

Vuillemey discusses repricing gap, duration and factor approaches to measuring and assessing the consequences of interest rate risk, arguing that empirical evidence indicates that income gap is a satisfactory measure since bank profits and stock price sensitivity to interest rates are related to the repricing gap.

## Public Reporting

In the quarterly Basel 3 dislosures all of the banks generally report only what is required by APRA. This is the change in EVE from +/- 200bp parallel shift of the yield curve, the RWA equivalent of that change in EVE and consequent capital required for IRRBB. (It is perhaps worth noting that in its April 2016 Standards Document the Basel Committee includes a principle that disclosure should include both the EVE effect and the effect on earnings, as well as other disclosures.

**TABLE 1: IRRBB APPROACHES OF MAJOR AUSTRALIAN BANKS (FROM BASEL DISCLOSURES)**

| | Westpac | ANZ | CBA | NAB |
|---|---|---|---|---|
| Objective | Reasonable stability of NII | controlling the potential impact that changes in market interest rates can have on the net interest income and balance sheet fair value | stable and sustainable net interest income in the long-term | optimise and stabilise the NAB Group's economic value and earnings over an investment horizon. |
| Constraints Specified | Net interest income at risk (NaR) limit, VaR limit, structural limits | Board approved risk appetite and limit framework | | Board approves the risk appetite for IRRBB, and sets the overall limits for VaR and Earnings at Risk (EaR). |

APRA outlined its expectations of risk management modelling and management for banks to obtain approval to use their internal models for determining IRRBB capital requirements in APS 117. Such models are required to incorporate repricing and yield curve risks (and deal explicitly with positions which do not have contractual repricing dates) and (generally) basis risk and optionality risk. "Embedded losses" in the banking book from past interest rate changes which have not been marked to market must be incorporated. Some of the key elements include:

- interest rates modelled must include at least one yield curve
- observation history of interest rates…must be at least six years
- Correlations between interest rates on the same and different yield curves must be recognised and included in internal model
- ADI's internal model must measure the maximum potential change in the economic value of the banking book (EVBB), as a consequence of changes in interest rates, for a 99 per cent confidence level and over a one-year holding period
  - ΔEVBB is difference between PV at current yield curve discount rates and one year hence simulated yield curve rates
  - Additional earnings offset =value of notional twelve-month, equally weighted, monthly moving average portfolio of recipient in fixed for floating interest rate swaps on notional principal equal to sum of book value of banking book

The bank is required to be able to document how its modelling derives its IRRBB including: rationale for assumptions; analytics and theory behind modelling; specific yield curve modelling (incorporating correlations between points on the same and different yield curves). Regular functionally independent reviews are required (on at least a three-year basis), and historical monitoring of model performance is required.

The capital requirement is based on estimation of a 99 per cent confidence interval for the change in the economic value of the banking book (EVBB) with a one-year holding period. The economic value is the NPV of expected future cash flows at the start of that holding period (with discount rates being actual (date 0) and simulated (date 1) wholesale market rates. Thus the calculation is the 99$^{th}$ percentile of EV0 – EV1 where each are calculated based on the outstanding balances (and repricing schedules) as at date 0. Both EV0 and EV1 incorporate an "earnings offset", and the discount rate used at date 1 must be consistent with the bank's yield curve modelling.

Each major bank will have a different internal model consistent with the APRA requirements. However, as indicated earlier, there is considerable variability across banks and over time in the resulting IRRBB capital requirement. While that may result from differences and changes in balance sheet composition, or use of hedging instruments, some part may also reflect different modelling approaches. One of the reasons behind the development of a new draft APS 117.0 issued in September 2019 (to apply from 2022) is to reduce the apparent variability in IRRBB capital requirements. Among those changes (see here for more detail and explanations) were:

- the placing of restrictions on repricing assumptions regarding "core" at-call deposits, and on optionality risk calculations.
- The basis risk capital add-on is also to be removed.
- Use of a 97.5$^{th}$ percentile expected shortfall measure rather than 99$^{th}$ VaR
- A requirement to use absolute interest rate shocks (rather than/ in addition to relative shocks)
- Calculation of the IRRBB capital charge as the maximum of the average calculated over the last three months and as calculated at the end of the quarter.
- Restrictions upon modelling assumptions including using at least eight (rather than six) years of past data for estimating interest rate volatility and correlations

## 22.6 IRRBB Regulation

Regulatory capital requirements for IRRBB were considered by the Basel Committee in the early 1990s but not pursued at that time. Some national regulators had their own domestic regulations, but it was not until Basel 2 that Basel standards for IRRBB were introduced. However, these were proposed as "Pillar 2" features, meaning that it was at the discretion of national regulators whether to implement such regulations. As common in Basel 2, there were alternative approaches suggested for large banks who could be accredited to use internal models for assessing IRRBB and consequent capital requirements, and for smaller banks who might be required to follow a standardised "template" approach.

One feature of the Basel approach was the recognition that:

> "While the economic value and earnings-based measures share certain commonalities, the Committee observes that most commercial banks primarily utilise the latter for IRRBB management, whereas regulators tend to endorse the former as a benchmark for comparability and capital adequacy."

The Basel Committee has developed a standardised approach to determining capital requirements for IRRBB, but has not mandated that capital requirements should be applied as part of Pillar 1. Rather, IRRBB is considered under Pillar 2 (supervisory processes). Australia is among the few countries that has imposed a capital requirement for banks – and has only done so for banks accredited to use the Internal Models Approach. The Basel Committee's standardised approach specifies calculation of the risk to a bank's capital and earnings under a range of interest rate scenarios involving different types of shifts in the yield curve.

## 22.7 Reporting IRRBB

Even though there is not a capital charge for most banks, and those approved to use internal models would not use this template to calculate their capital charge, all ADIs are required to regularly calculate and report to APRA an interest rate exposure using the template provided in ARS 117. That template combines concepts of *gapping* and *duration* and assumptions about the size of possible interest rate movements to estimate the exposure of the *economic value* of the banking book to interest rate changes. The *economic value* is the Net Present Value of the assets and liabilities and derivative positions held in the banking book.

## The ARS 117 IRRBB Reporting Template

The template used for reporting IRRBB by ADIs involves three main components.

1. Allocate assets and liabilities and derivative positions in the banking book by their time to repricing into time buckets specified by APRA.
2. Calculate the gap in each time bucket.
3. Apply weights (based on duration for that time bucket and an assumed interest rate change for that time bucket) to the gap and sum across all buckets.

Steps 1 and 2 have already been covered in the preceding discussion of gapping, APRA specifies time buckets which are shown in Table 2.

Also shown is a modified duration figure for each time bucket – which is a bit lower value than the midpoint of the time bucket. (That reflects an assumption about the likely spread of repricing dates across the time bucket and the cash flow pattern up until time to repricing). When combined with an assumed interest rate change for that time bucket, a weight for that bucket is derived. Each of those weights is based on an assumption of a 200 basis point parallel movement in the yield curve (ie dr = 200 bp), and derived from:

$dV_a/dr = -[D^*_a.V_a]$

or

$dV_a = -[dr.D^*_a.]V_a$ = - weight x position

It can be seen that the weights are twice the modified duration for each bucket. Taking the 2-3 year bucket as an example, if interest rates increased by 200 bp then the value of a $100 asset in that bucket would fall by approximately 4.5 per cent (two times the modified duration of 2.25), or $4.50. Conversely the value of a $100 liability would rise by the same amount. So, using the difference in the value of assets and liabilities in that bucket gives the net position which is going to be affected by the interest change, and summing across all buckets gives the total effect.

**TABLE 2: ARS 117 TIME BANDS (BUCKETS): SOURCE: *APRA* ARS 117.0**

| Time band | Middle of time band | Proxy of modified duration (years) | Weighting factor[12] (%) |
|---|---|---|---|
| 0 to <1 month | 0.5 months | 0.04 | 0.08 |

| | | | |
|---|---|---|---|
| 1 to < 3 months | 2.0 months | 0.16 | 0.32 |
| 3 to < 6 months | 4.5 months | 0.36 | 0.72 |
| 6 to < 12 months | 9.0 months | 0.71 | 1.43 |
| 1 to < 2 years | 1.5 years | 1.38 | 2.77 |
| 2 to < 3 years | 2.5 years | 2.25 | 4.49 |
| 3 to < 4 years | 3.5 years | 3.07 | 6.14 |
| 4 to < 5 years | 4.5 years | 3.85 | 7.71 |
| 5 to < 7 years | 6.0 years | 5.08 | 10.15 |
| 7 to < 10 years | 8.5 years | 6.63 | 13.26 |
| 10 to < 15 years | 12.5 years | 8.92 | 17.84 |
| 15 to < 20 years | 17.5 years | 11.21 | 22.43 |
| 20 or more years | 22.5 years | 13.01 | 26.03 |

## 22.8 The Basel Standardised Approach

In 2016, the Basel Committee specified a standardised approach for IRRBB, as part of its specification of standards and updating of principles, but there is no obligation for national regulators to impose it upon banks. The Basel approach also recognises that there can be changes in credit spread risk in the banking book (CSRBB), which vary in importance for mark to market positions and non-market deposit and loan (amortised cost) positions as shown in Figure 2. It does not incorporate CSRBB into the standardised model but notes that it “needs to be monitored and assessed”.

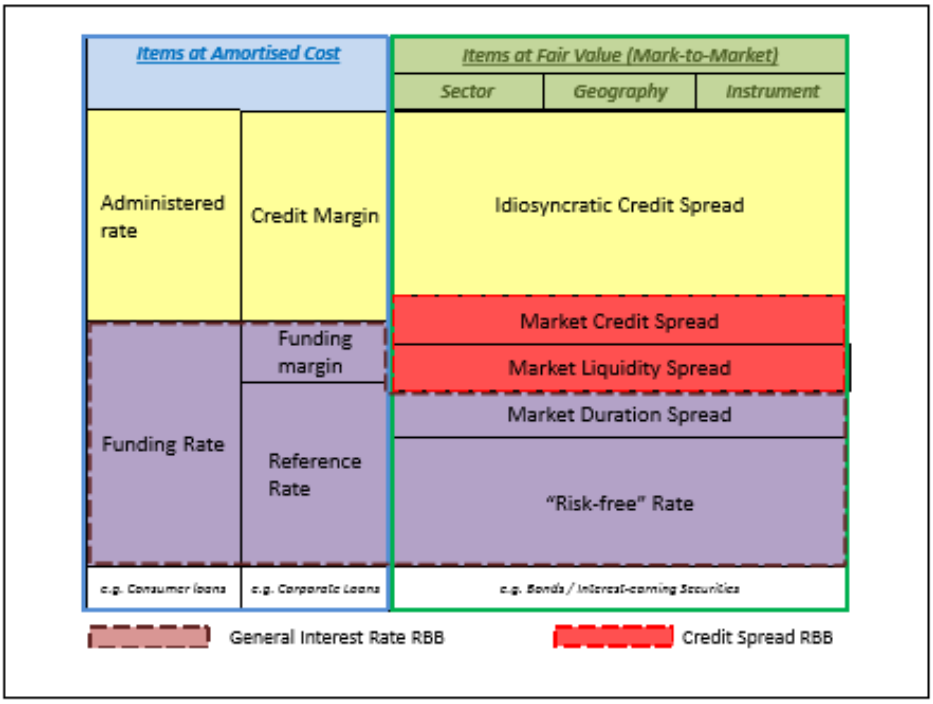



**FIGURE 2: BCBS DEPICTION OF COMPONENTS OF INTEREST RATES. SOURCE: BASEL COMMITTEE**

The Basel approach is based on EVE (Economic Value of Equity). Banks using this approach would:

- Allocate asset and liability and off balance sheet item positions to categories of: amenable; less amenable; not amenable to standardisation
- Slot cash flow by repricing maturities for amenable positions into prescribed time "buckets"
- Allocate NMDs (no-maturity deposits) to buckets via a core/non-core approach
- Use a prescribed BCBS table for incorporating behavioural options into allocations
- Measure ΔEVE (Economic Value of Equity) for six prescribed interest rate shock scenarios
- Apply add-ons to ΔEVE for automatic interest rate options involved in positions
- Take maximum reduction in EVE across six prescribed shocks
    - Shocks involve (for AUD) 400bp for parallel shift; 500bp for short end; 300 bp for long end and are parallel, short up or down (and shaped to no LR change); rotation shocks

The Basel approach specifies 19 time buckets (as per ARS 117 requirements in Table 2

For fixed rate instruments, coupon and principal cash flows are allocated to the relevant bucket. For floating rate instruments, coupon and are principal allocated to the next repricing bucket.[2] NMDs (non market deposits) are divided into retail & wholesale and by core / non-core features and slotted as follows:

- non-core are treated as overnight, core slotted at assumed average maturity (up to limits prescribed of 4 (for wholesale) or 5 (for retail) years)

Conditional prepayment risk is specified by BCBS for loans, and early redemption rate for term deposits also specified.

Calculation of EVE risk measure;

- Take net position of cash flows in each bucket for each specified interest rate shock scenarios, discount according to rates implied in that scenario, sum to get EVE under that scenario. Calculate difference from current EVE for each scenario.
- Maximum negative difference is the risk measure

## 22.8 Managing IRRBB

Bank risk management systems should identify how much IRRBB is acceptable given the bank's risk appetite. This is highly unlikely to be zero, but rather some range seen as acceptable and within which the relevant committee or responsible individual can elect to choose based on their view of potential risk and reward. In doing so, expectations about future interest rate movements will be relevant, particularly to the extent that they differ from those implied in the current yield curve.

One consideration in managing IRRBB is that consideration also needs to be given to funding requirements of the bank. For example, taking actions aimed at reducing the maturity of fixed rate borrowings on issue can reduce interest rate risk, but can create a need for replacement funding earlier than would have otherwise been the case. There may also be significant costs in attempting to change the structural characteristics of the banking book, given the maturity and interest rate preferences of the bank's customers.

Hence, while interest rate adjustments to influence deposit and loan maturity and repricing features are an option, it is often simpler to adjust IRRBB by transactions using interest rate derivative

[2] This reflects the fact that (absent changes in credit spreads) the interest rate sensitivity of a multi-period floating rate note is the same as a one-period security.

securities to achieve a desired IRRBB position. For large banks with trading desks, this will typically involve internal transactions between the banking book and the trading book, with the latter then engaging in external transactions to pass on that risk to third parties if the resulting market risk position is not desired. For smaller institutions, the bank treasury department will do such transactions directly with the market.

There are a range of interest rate derivatives which can be used to adjust IRRBB. These include interest rate swaps, interest rate futures, forward rate agreements, interest rate options – as well as more esoteric derivatives. In principle, their use is relatively straightforward. Suppose that the current position is that Economic Value of the banking book will decrease by $1 million for every one basis point increase in interest rates (and conversely for a decrease), and the preferred exposure is a sensitivity of $0.5 million per basis point. It is then necessary to select a derivative transaction which has a value which would increase by $0.5 million per basis point increase, such that the overall sensitivity is at the preferred level. This could be a position as a fixed rate payer in a two year swap with notional principal of $X million, or in a longer term swap with a smaller notional principal. (If interest rates increase, the swap will increase in value due to the higher floating rate payments received).

There is a wide range of derivative positions which could be undertaken. Some, such as a long position in an interest rate option, can enable the risk manager to take a position which reflects their view on the likely direction of interest rate changes, for the cost of the premium paid for an option. Choosing between the various alternatives will come down to considerations of cost as well as the credit risk associated with the counterparty. Moreover, the risk manager will need to reassess the position at regular intervals, as the banking book changes and interest rates change, and adjust the hedging position appropriately. Regular reporting as per the bank's risk management policies is also required.

# 23. Financial Institution Failures: An Australian Perspective

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## 23.1 Introduction

Failures of financial institutions are a natural consequence of a competitive financial market where inefficient firms are unable to compete profitably, or where risk management practices prove inadequate to provide financial resilience in the face of unexpected shocks. And there is always the possibility of rogue operators aiming to redistribute wealth from customers to themselves before disappearing the scene. Ponzi schemes[1] are the most obvious example of that.

Financial institution failures impose unexpected losses on stakeholders. These include: providers of finance (equity or debt or deposits); customers who have engaged the entity to manage their wealth; customers owed, or relying on, provision of financial services (insurance and advice)[2]; borrowers relying on credit facilities and expectations of loan availability for their business continuity, business counterparties with claims outstanding; and employees.

[1] Ponzi schemes involve a fund manager using funds provided by later investors to provide high returns to early investors, even though there may be no profitable investments made by the manager – and more likely a siphoning off of funds for personal use. As long as cash inflows from new investors exceed cash withdrawals of existing investors, the fraud may go unrealized for some significant time.

[2] Insurance failures can mean that individuals or businesses who are not customers can be adversely affected if the insurance provides for the policy-holder to be protected against claims by third parties (such as for motor accidents, workers compensation etc).

While some failing financial institutions depart the scene relatively smoothly (such as via a takeover, or early wind-up) it is rare that stakeholders are not subject to unexpected losses. Governments worry about such outcomes – particularly where customers are believed to have been unlikely to be able to assess the likelihood of such an event, and where losses are significant.[3] But also of concern is the possibility that an institution's failure could lead to financial instability, either due to spillovers from linkages with others in the financial sector or via adverse effects on confidence.

Licensing (including entry, operating, and reporting) requirements aim to ensure that only reputable, well managed, entities operate in the financial system. Various regulatory requirements and exposure of managers and directors to prosecution from operating while insolvent aim to ensure the closure and exit of failing institutions before major losses occur.[4] In some cases, prudential regulation is applied to provide a "safety net" protecting consumers of those institutions. The safety net includes specific regulatory requirements, supervisory oversight, and customer compensation arrangements if failure occurs.

But failures do occur, and the business of winding-up a failed financial institution is generally quite complex. Assets, such as loans, may be illiquid and hard to value and maximising the recovery value may require specialised skills. Creditor priorities can complicate matters and law suits are commonplace. Insolvency processes can take many years, such that even if there are sufficient assets to meet the claims of some stakeholders, there can be inordinate delays in those funds being received. For prudentially regulated financial institutions, special resolution arrangements generally apply to limit the harm to depositors or policy holders and to reduce financial sector disruption.

## 23.2 Australian Financial Institution Failures

Any attempt to study financial firm (and product) failures faces the difficulties of firstly defining what is meant by failure, and secondly delineating the boundaries of the financial sector. For current purposes, failure is used to refer to circumstances where significant losses, beyond what might reasonably have been expected possible, based on information provided, are incurred by investors and customers. By focusing on the financial sector, losses to investors in shares or bonds issued by non-financial operating companies are clearly not to be included (although issues of appropriate disclosure and investor protection are relevant). But there are, for example, numerous entities which engage in "business" operating activities, but which are structured as managed investment schemes

[3] Governments may also provide compensation schemes for employees who are owed money by the company for unpaid wages, leave entitlements, such as with the Australian Fair Entitlements Guarantee (FEG) Scheme.
[4] In March 2020 as a response to the economic disruption during the COVID pandemic, the government introduced a temporary "safe harbour" defence for directors from liability for insolvent trading.

(MIS). Agribusiness schemes, infrastructure funds and real estate investment trusts, fall into this category. "Failures" of such schemes (involving major declines in, or wiping-out of investor stakes) have often been inextricably intertwined with failures (insolvencies) and losses to stakeholders of companies which are the external managers of the schemes.

Similarly, there is an increasingly large array of complex financial products which are marketed to investors, both as listed and unlisted products. These include structured products (such as credit linked notes) issued by special purpose vehicles, as well as a range of derivative products, such as warrants, offered by financial institutions. Investors may be exposed to unexpected losses due to not being aware of the risks inherent in such products.

Australia has had a number of significant financial institution failures in recent history. At the start of the 1990s, following (and in part attributable to) the deregulation of the 1980s, two large state-government owned banks and some non-bank intermediaries failed.[5] Depositors in those banks did not suffer losses, due to state government guarantees, but some depositors with non-banks did.

The failure of the State Bank of Victoria reflected poor governance over commercial lending activities of its subsidiary Tricontinental as outlined in the resulting Royal Commission. Similarly the collapse of the State Bank of South Australia also reflected inadequate governance over commercial lending activities, outlined in an Auditor-General's Report and a Royal Commission, and also analysed from a political science perspective in this article by Greg McCarthy. The problems of the Trustee banks in Tasmania in the late 1980s, and eventual privatisation and sale to Colonial Ltd in 2000 are described here.

In March 2001, a large insurer HIH failed and the Federal Government instituted a policy holder compensation scheme ultimately costing the government (ie taxpayers) over $720 million.[6]

## 23.3 Failures of Prudentially Regulated Institutions

Australia has had very limited instances of failures of prudentially regulated institutions since the start of the millenium. The one major exception was the failure of HIH Insurance company in 2001. There have been some losses due to fraud for APRA regulated superannuation funds (such as in the case of the Trio failure in 2009). During the GFC, BankWest was acquired by the Commonwealth Bank, arguably averting a potential bank failure.

[5] These and other prior financial institution failures are discussed in the 2004 Study of Financial System Guarantees and a 2001 RBA Research Discussion Paper.
[6] An article in the 2015 Treasury Economic Roundup provides a good overview of the HIH collapse and its aftermath.

The HIH Failure

When the HIH insurance company collapsed in March 2001, it was seen as likely to be one of the largest corporate failures in Australian history with an expected deficiency of funds in the order of $3.6 to $5.3 billion (HIH Royal Commission). The failure was a systemic event, in that HIH had a large market position in several types of liability insurance – such that many businesses were either forced to suspend operations or continue without the protection of such insurance. It also left many policy holders without insurance, while claimants on existing policies faced the risk of non-payment.

The HIH failure reflected partly the effects of excessive competition in underwriting in attempts to gain market share. HIH (and other insurers) had for some time made underwriting losses (claims exceeding premiums) with viability relying on their investment earnings (based on investing funds available because of the lags between premium receipt and claims payouts).

The government implementation of a policy holder compensation scheme (operated by the private sector) ultimately costing the government (ie taxpayers) over $720 million, led to a Study of Financial System Guarantees as a prelude to the eventual introduction of the FCS.

## 23.4 Shadow Banking Failures

Shadow banking is generally defined as comprising those institutions outside of the prudentially regulated banking sector which engage in credit intermediation – raising funds which are used to create or invest in loans/securities which involve a credit risk exposure. There are two general types of entities involved. One type raises funds from investors in the form of debt – this includes institutions such as Finance Companies, Securitisation vehicles, Special Investment Vehicles such as those issuing Asset Backed Commercial Paper. Such institutions may fail due to credit risk taken on, but may also fail because of liquidity, interest rate, operational, or other risks – similar to banks. However, SIVs which are constructed to issue collateralised debt obligations (CDOs) cannot, unless other borrowings or fraud are involved, become insolvent – since changes in the value of the underlying assets are passed on to the investors in those products. “Failure” involves the loss of capital value of the investors in the CDOs

The Australian CDO market grew rapidly between 2001 and 2007 from less than $0.5 billion outstanding to nearly $15 billion outstanding, with most of the growth being in synthetic CDOs. “the available evidence for Australia suggests a larger non-institutional investor presence than is the case in other markets, with Australian CDOs having a higher share of retail and middle-market investors than offshore CDOs. Middle-market investors include local governments, university and charity

endowment funds, high net worth individuals and smaller boutique fund managers." (RBA, 2007). There were 12 listed CDOs in mid 2007.

Also within this category are specialised margin lenders, who may obtain loans from institutiona lenders (such as banks) to finance their provision of margin loans to clients. The failures of Opes Prime, Lift Capital, and PrimeBroker at the time of the GFC paradoxically imposed losses on their borrowing clients. The reason was use of a "non-traditional" form of margin lending (now disallowed) in which borrowers provided collateral in excess of the amount borrowed via a securities loan. Because ownership of the collateral had changed hands, borrowers were unable to reclaim it.

The second class of entities classified as shadow banking under this definition are managed funds which invest in credit products. Mortgage trusts are one example, and "high yield" income funds are another – with the expectation of "high yield" arising from investing in debt securities issued by lower rated borrowers or by the fund creating a synthetic credit exposure by writing credit protection insurance in return for a fee to supplement income from holdings of other securities. Returns to investors are uncertain, and failure may arise from liquidity problems – often linked to declines in the values of the underlying assets. Inappropriate marketing by some such entities can mislead investors into believing that high returns can be achieved without significant risk, and ASIC aims to ensure that this does not occur.

## Investment Vehicles and their Managers

Other forms of investment vehicles can expose investors to unexpected losses. In Australia, significant losses were experienced around the time of the GFC by investors in managed investment schemes involving agri-business, infrastructure assets, and property. In some cases this reflected underlying deficiencies in the business plans of the operations being financed by investor funds. In other cases it reflected liquidity problems – where assets were long term and illiquid and yet investors were able to request redemption of funds at any time. Large scale redemption requests at the time of the GFC led to unlisted property and mortgage funds being frozen to avoid fire sales of assets. In many cases investors were faced with a wait of years to redeem whatever was left of their investments.

More recent cases include:

Blue Sky Alternative Investments Blue Sky Alternative Investments (BLA) was an ASX listed investment firm, created in 2006, listed 2012 and delisted Nov 2019 (following appointment of receivers in May). Its growth and demise are outlined here. It had over $3 bill AUM (assets under management) at its peak, including listed funds (Blue Sky Alternatives Access Fund (BAF)) and unlisted investments. (It managed more than 80 funds). It was appointed to manage the SA Venture Capital Fund in 2017. A

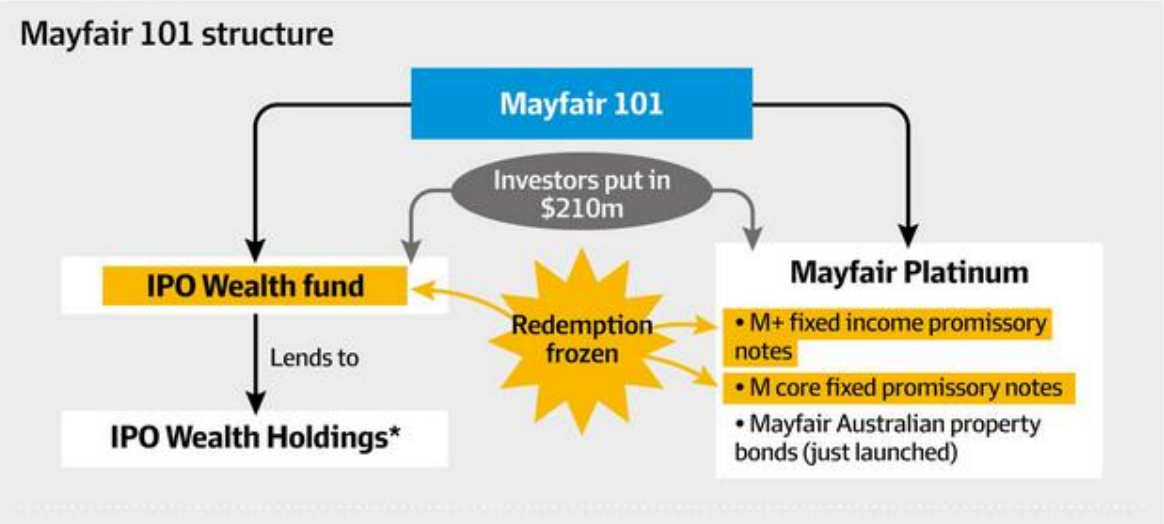
report by hedge fund (and short seller) Glaucus in April 2018 argued that the valuation of AUM ($3.9bill) was inflated (Glaucus estimated $1.5bill), implying an inflated value for projected fees for asset management, and claims that investors were being overcharged for management fees. A number of court cases have occurred against financial advisers who recommended various of the funds to clients). The listed fund (BAF) arranged to change its manager from BLA to WAM in 2020. Issues associated with Blue Sky's corporate governance (including lack of independent directors) are discussed here.

LM Investment Management was a funds management company offering a range of various funds to investors. It was the Responsible Entity for 7 registered MIS and marketed its funds both within Australia and to Asian investors. The LM First Mortgage Income Fund raised $400 million from investors before failing, and law suits were filed against EY in their role as auditors. Overall 12,000 investors lost most of the $800 million invested in the various funds. LM failed in 2013 when voluntary administrators were appointed and court appointed trustees were appointed to the LM Managed Performance Fund. That fund had made loans to a related party (the founder Peter Drake) for property development. The trustees reported a possible loss to investors of 95 per cent of funds invested. ASIC subsequently took action against Mr Drake, but was unsuccessful.

Prime Trust was an ASX listed trust whose RE was Australian Property Custodian Holdings Ltd (APCHL). It collapsed in 2010 with around 8,000 investors losing around $550 million. The trust owned retirement villages. It was created in 2001 and listed in 2007. The process involved in listing involved changing the trust's constitution to enable payments from the trust to APCHL (including a listing fee of $33 million, and several "poison pills" in the form of removal fee if APCHL was removed as RE and a takeover fee if a takeover occurred. While the RE had rights to alter the constitution (provided member's interests were not harmed), court action was taken against the directors of APCHL since the latter condition was not met. Behind the trust's collapse this article argues were fees (in the order of $150 million) extracted from the trust, and sale of the trust's management rights to Babcock and Brown

Mayfair 101 is a family owned "investment conglomerate" offering a range of investment products, and on 11 March 2020 it suspended all redemptions at the end of their fixed term. It had around $5 billion of investments, with funds raised from "sophisticated investors". The Mayfair 101 structure is shown in the figure from the AFR. Mayfair Platinum has the features of a finance company offering promissory notes. ASIC has taken action following suspension of redemptions. The IPO Wealth fund which on lends to IPO Wealth Holdings is a MIS
On 22 June 2020 it placed IPO Wealth Holdings Pty Ltd into voluntary administration, following the

decision of IPO Wealth Fund's trustee (Vasco Trustees Limited) to appoint receivers. IPO Wealth is a managed fund which invests in companies, and had around $82 million invested by 181 unit holders. There was also $130 million frozen in other Mayfair 101 products. The principal was subsequently prohibited from operating in the financial services industry for 20 years




Union Standard International Group (USG), an Australian based subsidiary of an offshore group, ran a trading website, through which high risk financial products were sold to customers, and raised funds from investors via an investment trust fund which some have suggested had characteristics of a Ponzi scheme. The trading website enabled customers to take highly leveraged bets on financial asset prices via products such as contracts for difference. In June 2020, USG appointed administrators when the Australian directors were unable to obtain access to funds controlled by the offshore parent to meet withdrawal requests.

USG paid high commissions to brokers for introduction of clients, and mounting losses may have been hidden in the financial statements in years prior to the failure. The investment trust product (known as "U-Plus"), promising high returns from trading activities by the company, was sold (apparently without proper authority) to overseas investors but marketed as an offering by the Australian subsidiary. ASIC commenced investigation in 2019.

## Mortgage and Property Fund Redemption Freezes

Prompted by the decline in asset value and attempts by investors to withdraw funds, a large number of unlisted managed investment schemes (mortgage, property, enhanced income, hedge funds) froze redemptions, following the onset of the GFC. Responsible Entities of such schemes were required under the Corporations Law (2001) to only permit withdrawals if "liquid assets" (saleable at market

value) are at least 80 per cent of investor funds.[7] However, ASIC can grant relief enabling some withdrawals from frozen funds and this ASIC Information Sheet (249) provides details. ASIC's Information Sheet 142 provides information on numbers of, and amounts in, frozen funds from 2009 (87 funds, $25.36 billion) up to 2015 (47 funds, $1.10 billion). Most major financial institutions have some involvement either as REs or in "badging" of such funds. Figure X shows the consequences for unlisted property and mortgage trusts, where the declines reflect the gradual "unfreezing" and withdrawal of investor funds and the lack of new investments. The experience of the post GFC unlisted trust sector is a close replica of the experience of the early 1990s when property trusts experienced massive declines in asset value and freezing of redemption – and which prompted replacement of trustee-manager structures with the RE model in the Managed Investments Act of 1998.

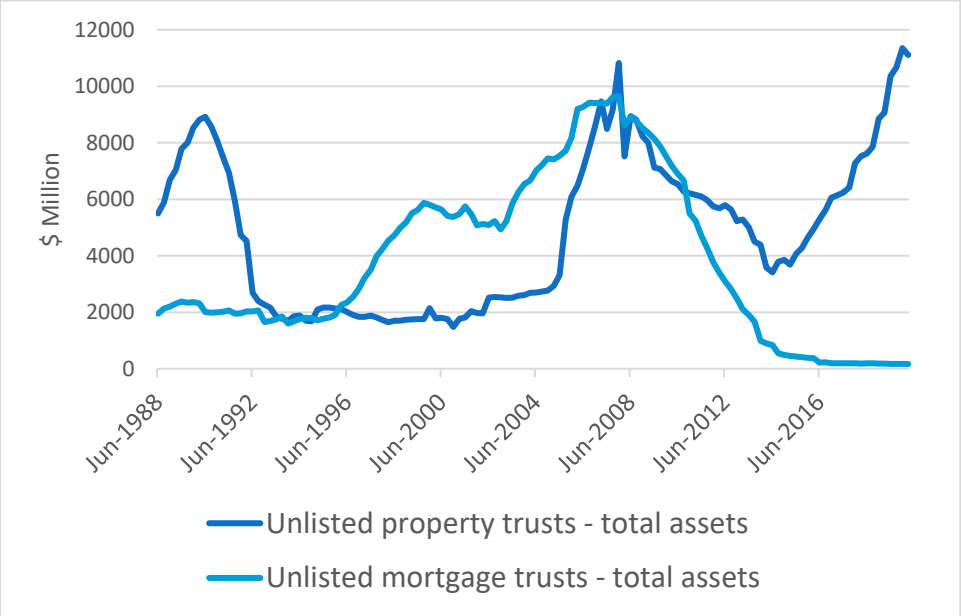



**FIGURE 1: UNLISTED TRUSTS TOTAL ASSETS (SOURCE: ABS CAT NO 5655.0, TABLE 5)**

There are a number of problems associated with resolving managed investment schemes which are subject to financial difficulty. This could arise either because the RE is in financial difficulty, for example if its other business activities have been undertaken under a leveraged structure and it faces insolvency. Alternatively the MIS itself may have incurred debt (arranged by the RE). A CAMAC Report in 2012 investigated these matters.

[7] Some had apparently "broken the buck", involving a situation where the constitution required repayment of units at the original purchase price, but where the net asset value had fallen below that figure. (ASIC, 2011)

Even in the case of a viable MIS, there are "difficulties with the existing provisions in relation to the transfer of a clearly viable passive collective investment trust from its incapacitated responsible entity" (ASIC submission to CAMAC). These include:

- *Meeting procedures for removal of incapacitated entity*
- *Accessibility of documents*
- *Complexity of related party arrangements*
- *Poison pills*:
- *Attracting a temporary responsible entity or replacement entity*

Members of MIS have no 'day to day' control over MIS but have the right to vote to change RE. However, there are problems in arranging general meetings and voting requirements. These include

> "a. The difficulties members face in replacing an underperforming RE of an unlisted MIS including the high threshold for removal and replacement, practical issues relating to member engagement and entrenching provisions;
> b. Unresolved issues relating to the procedure of member meetings to consider resolutions for the removal and replacement of a responsible entity;
> c. Mismanagement and/or misconduct by the RE, in particular relating to:
> i. Conflicts of interest between the interests of schemes for a multi-function RE and between the REs interests and a particular MISs; and
> ii. Related party transactions; and
> d. Inadequacy of professional indemnity insurance cover." Clarendon Lawyers (Submission to CAMAC)

Among the cases where problems for funds arising from problems with the RE have occurred are:

Opus Capital and Income Fund v Centuria (ASIC cancellation of Opus AFSL, for breach of NTA licence condition)
Wellington Capital as RE for the Premium Income Fund previously managed by Octaviar
Funds operated by RE's within Allco Group and B&B
Trio Capital which managed 10 MIS.
Agribusiness insolvent REs such as Timbercorp, Great Southern,
Century Funds Management (Centuria) and 360 Capital taking over management rights of property trusts from a financially distressed Becton funds management organisation in 2011
LM Investment Management Limited which went into voluntary liquidation in 2013, and was the RE of a number of MIS/managed funds.
The Prime Trust whose RE APCH Ltd was placed into liquidation in 2012.

## Finance Companies

For current purpose, the term "finance company" is used to describe any entity which raises funds from the public by issue of debentures, mortgage debentures, or unsecured notes to make loans (including leasing) or property development activities. Some such entities are subsidiaries of major operating companies (raising funds for use by the parent), and those are not considered here. The

term “debenture” is only permitted by law to be used if the borrowing is secured by a claim over tangible property – although that also includes receivables such as loans to other parties. In 2005 in Report 38, ASIC indicated potential problems with this definition. That report also noted that in 2004, prospectuses were lodged to raise $3 billion of which $930 mill was for on lending, $1.24 bill for own funding, $513 million was by subsidiaries of major companies and $309 million for CDOs.

In 2012 ASIC Regulatory Guide 69 outlined disclosure requirements for debenture issuers involving “if not why not” explanations if a number of benchmark “good practice” expectations for issuer characteristics were not met. These benchmarks included: equity ratio, liquidity, rollovers, debt maturity, loan portfolio, related party transactions, valuations, lending principles. For example, for issuers with significant property exposures a minimum equity/assets ratio of 20 percent is indicated, while for others a minimum of 8 percent is specified.

Subsequently in 2014 APRA, via imposing conditions for exemption from section B of the Banking Act (allowing Registered Financial Corporations to undertake “banking business” without a banking licence), limited the terms on which debentures could be issued to retail investors. The conditions include: not allowed to use words "deposits", "at-call", bank; no issuing of retail debentures with under 31 days maturity; no provision of transaction facilities (access to ATMs, EFTPOS).

Failures of Finance Companies have been a relatively frequent occurrence over many years. While generally of relatively small size, their use of debenture fund raising from retail investors, often in a specific local area where they have been seen to be akin to a local bank, has made their failures newsworthy, In its Report 173, ASIC listed 14 debenture issuers that had entered administration between March 2008 and September 2009. The largest of those had debentures of $178 million on issue, but 8 had amounts on issue of below $40 million. Before that time, Westpoint went into administration in 2005 with $400 million owing, generally in the form of promissory notes – which, by not being classed as debentures, enabled it to avoid prospectus requirements.

Common causes of finance company failure include: bad loans (credit risk); maturity mismatch between assets and liabilities (liquidity risk); inappropriate loans to related parties and fraud (operational risk); poor property and other investments (market risk). But for many, inability of small scale financiers to compete profitably in loan and “deposit” markets with large banks is a reason for exit via closure or takeover.

In more recent years, failures (some of which had operated for many years in regional communities) have included[8]:

Banksia (2012), 15,622 investors owed $663 million. A prior takeover of a troubled competitor in 2009 without adequate due diligence apparently contributed to failure, accompanied by inadequate accounting for loan losses. Debenture holders will likely eventually receive around 90 cents per dollar owed, although a dispute over fees charged by a litigation funder for a class action by some claimants was still active in 2019.

WIckham Securities (2012), 300 investors owed $27 million. Causes of failure identified included fraud. Following a class action against the trustees for debenture holders (Sandhurst Trustees), an out of court settlement for around $10 million was reached in 2018.

Gippsland Secured Investments (2013), 3,500 investors owed $143 million. Causes of failure identified included loan losses. Investors expected to receive over 90 cents per dollar owed. Reports were made of loans to related parties (directors) on concessional terms. The directors have claimed in a submission to a PJCCFS Inquiry that the actions of the Trustee in appointing receivers (following low asset valuations by their appointed valuer) was inappropriate.

Provident Capital (2012), 3000 investors owed $130 million. Causes of failure identified as losses on loans and advances due to poor loan oversight, debenture and note holders ultimately received in the vicinity of 20 cents per dollar owed.

Southern Finance (2012) 5,500 investors owed $290 million, funds frozen due to investor withdrawal demands following Banksia failure. Taken over in 2013 by Bendigo& Adelaide Bank).

Mayfair Platinum/Mayfair 101 (2020) issued secured and unsecured debentures to wholesale investors. Suspended payment in March 2020 due to liquidity issues. Under ASIC investigation.

## Stockbrokers/Dealers

Stockbroking firms (referred to in legislation as "dealers" and which could be thought of as investment banks) provide a range of investment and advice services for investors, as well as companies seeking to raise funds. The stockbroking/dealing activities will often be one part of a larger financial services firm.

Failure of a dealer could cause losses for customers in several ways. One type of loss which should not occur is loss of ownership of shares or other ASX traded securities purchased through the dealer's

[8] Information on such failures can be obtained from ASIC's key matters website and from the relevant insolvency firms (although access to such information is often restricted to stakeholders).

trading facilities. Those shares will be registered in the investor's name in the Chess registry, although held electronically in the dealer's account with a custodian. But losses could occur if "client money" held by the dealer (to facilitate transactions, meet margin calls, etc) has not been appropriately protected by being segregated from the dealer's own funds by way of being placed in a trust account, and not accessed for reasons other than approved transactions for the client. Another source of loss could be if transactions in progress when the failure occurs are not successfully completed.

The National Guarantee Fund, of which SEGC (an ASX subsidiary) is the trustee, is a compensation fund (of at least $100 million) for meeting investor claims arising from dealing with ASX market participants (typically referred to as stockbrokers or dealers). (The fund was originally established by contributions from ASX participants, and should the balance in the fund fall below the minimum specified amount, levies on participants and/or the ASX would be used). Allowable claims include cases where the dealer has not properly executed a transaction, but also where a dealer becomes insolvent and defaults on repayment of property entrusted to it by a customer (other than by way of a loan). In the case of insolvency, claims could be paid (up to a maximum of, in 2019, $15 million) if there is a shortfall of funds in the trust account of the dealer or a shortfall in securities in the custodian holdings of the Dealer. There is also a limit per claimant (following regulations made in late 2019).

The only recent (post-GFC) failure of a dealer was the insolvency of BBY Group (a financial services and stockbroking firm) in 2015 (described in Quilter, 2015), and whose AFSL was suspended by ASIC. The causes of failures included losses on underwriting a securities issue, and trading losses. Operational failures meant that there was a shortfall (of $21 million) in what were meant to be client money (segregated) accounts, due to use of funds provided by clients for inappropriate purposes. The insolvency process was still proceeding in mid 2020, with customer still unsure of their likely returns.

## 23.5 The GFC and Financial Failures in Australia

Around the time of the Global Financial Crisis, there were a large number of financial firm failures, although none within the prudentially regulated sector. Table 1 provides details.

A number of these failures involved listed companies (eg Centro, Allco, MFS, City Pacific) which had opaque, complex, corporate structures intertwined with roles as managers of investment vehicles. Their activities included purchasing illiquid assets, some of which were held on-balance sheet, but primarily on-sold into investment vehicles raising funds from retail and other investors. Profits came from both a spread between the price originally paid for the assets versus the sale price to the investment vehicle, and fees for managing the investment vehicle. Difficulties rolling over short term

borrowings given highly leveraged positions and declining asset values, and complex interconnections between the companies and managed funds contributed to their demise.

In some cases, underlying business activities of the investment vehicles were inherently inadequate to provide returns which investors had been led to expect. The Agribusiness Managed Investment Scheme (MIS) sector, stimulated by generous tax concessions, was the prime example. At July 2008, there were 371 licensed agribusiness schemes and around $8 billion had been raised from 75,000 investors since Managed Investment Act 1998. In many cases, investors in the MIS had borrowed heavily to buy units (sometimes from financier subsidiaries of the scheme operators) and remained liable for those debts even when the schemes failed. With regard to Great Southern (see Brown et al, 2010) the ABC reported in 2013 that it had led to "Australia's largest ever class action, more than 20,000 investors are seeking to recover their money following the $2 billion collapse of the company's managed investment schemes in 2009."

(These failures prompted parliamentary inquiries into the sector, but despite several recommendations, little has been done to rectify obvious problems as analysis of a subsequent (2018) failure of Quintis illustrates).

Another source of problems arose from margin lending activities using a securities loan model in which ownership of the underlying securities was transferred to the lender, who in turn was funded using a similar model by a major bank. Various stockbroking/securities firms (Opes Prime, Tricom, Lift Capital, Chimaera) failed when declines in the value of collateral provided to their lenders (and other operational failings) saw funding withdrawn, and their subsequent inability to return that same collateral to their margin loan borrowers.

While each case of failure had its own idiosyncratic issues, they illustrate the general problem of risk exposure arising from using high leverage to finance risky asset holdings. The consequences were amplified by complex, opaque, interdependent, structures, when asset values fell and market liquidity collapsed.

**TABLE 1: FINANCIAL FIRM FAILURES IN THE GFC PERIOD: AUSTRALIA**

| Date | Headline Event | Further Information |
|---|---|---|
| July 16, 2007 | Basis Capital announces suspension of withdrawals from two hedge funds due to inability to calculate NAV (previously reported at over $1 bill). | Planned liquidation of "master fund" in which its retail funds have invested announced on Aug 31. NAV reported to have declined by as much as 80 per cent. Basis Yield Alpha Fund bought "Timberwolf" synthetic CDO securities from Goldman Sachs in June 2007. Pursuing claim against Goldmans (2011). BT and St George had been offering margin loans to 80% of investment value. Retail investors had accessed the funds through bank based investment platforms. Had received an S&P 5-star rating |
| July 25, 2007 | Absolute Capital announces suspension of withdrawals from two "Yield" Funds (investing in corporate loans and CDOs). | Appointment of a voluntary administrator on Nov 27 under Australian insolvency regime arrangements. Announcement of winding up with likely return of A$0.10 in the dollar |
| Aug 14, 2007 | RAMS Home Loans, a securitiser, announces exposure to rollover risk in US XCP market. unable to roll-over short term funding of almost half of $14.6 billion portfolio. | The RAMS IPO was July 27, 2007 at $2.50. Sale of origination business to Westpac announced on Oct 2. Shareholders lost most of investment. |
| Dec 17, 2007 | Centro Property announces difficulties in rolling over debt and suspends redemptions from two managed funds. Share price drops from $6.20 to $1.36 | Jan 15, announces possible default event, forex risks, prior under-reporting of current liabilities, share price drops from $1.50 - $0.60. Feb 18, announces extension of refinancing facilities |
| Jan 18, 2008 | MFS was RE for managed funds and investor in hotels etc. Shares suspended due to financing problems. Suspension of redemptions from managed fund in Jan 2008. Name change to Octaviar, eventually delisted in August 2009. It was reported as having $5.4 billion of assets under management in 2007. MFS announces proposed separation of businesses and "recapitalization" share issue to pay off short term loans. Shares drop 75% to $0.99 as it attempts to raise $550m. | Shares suspended. Short term debt financing problems announced on Jan 23. Redemptions from its managed fund suspended on Jan 30. Sale of 65% of its stake in Stella Group announced on Feb 4. MFS Premium Income Fund froze $770 mill of 10,000 investors (most lost?) Funds invested in related entities, and assets bought and sold at inflated prices into managed funds? |
| Jan 23, 2008 | Allco Finance Group announcement of sales of stock borrowed from principals of Allco Finance Group due to failure to meet margin call. | Listed company involved in leasing and funds management. Debt financing problems and short selling reflecting margin loan difficulties of principals. Subsequent restructuring of debt arrangements with banks and selling off assets to reduce debt levels. Share price falls to below $1 from $9 in mid 2007 |
| Feb 1, 2008 | Tricom Securities fails to settle share trades causing market disruption | Tricom had on-lent borrowed stock and was unable to provide the stock to settle. Margin book subsequently reduced from $2.4 bill to $200 mill. |
| Feb 26, 2008 | ABC directors announce the use of margin loans over their shares in the company. | Share price collapses, company forced to sell 60 % of its US business |

| | | |
|---|---|---|
| Mar 28, 2008 | Opes Prime stockbroking placed in administration with margin lending book of over $1 bill. | Margin calls had not been made to selected customers. Creditor banks seizure (and sale) of stock involved in loans to directors of small listed companies led to stock market trading halts and substantial ownership changes. Chapter 4 of this PJCCFS Inquiry provides details |
| Mar 4, 2008 | Property developer City Pacific requests trading halt. Funds Management and Property developer. It was the RE for five mortgage and income funds and four property funds (including two listed on ASX). It listed on the ASX in 2001. | Shares plunge 58% on fears that $500m of short-term debt to the Commonwealth Bank will struggle to be repaid. In August 2009 receivers were appointed following a loss of its RE role over a fund whose management fees provided a major income source. |
| Apr 11, 2008 | Stockbroker Lift Capital is placed in administration | Followed a similar business model to Opes Prime. Margin loans made to customers ($700 mill owed by Lift to Merrill Lynch approx.) and ownership of their securities transferred to third party lenders to Lift. Dec 2009 creditors accepted scheme of arrangement enabling 65% recovery ($35 mill?) from Merrill Lynch (lender to Lift). Lift clients with loans still liable for payment? |
| Apr 16, 2008 | A receiver appointed by ANZ Bank to Primebroker Securities Limited, an associated company of Chimaera Capital. | Primebroker was engaged in non-standard margin lending (using a securities lending model) partly financed by ANZ Bank. |
| Oct-Dec 2008 | Property and mortgage trust freezes | In 2008, over 50 mortgage and property funds froze redemptions affecting over $30 billion of investments |
| October 2008 | Lehman Bros | Lehman (Australia) took over Grange Securities which had sold CDOs to Australian investors such as councils. Pursuit of settlement in court. (Also Oakvale Capital). "Cole" Report on NSW Local Government Investments (April 2008) This article provides information. |
| January 2009 | Storm Financial (14,000 clients (3,000 leveraged investment clients) | Financial advisory firm which encouraged investors to borrow against existing property (from lenders such as CBA, BoQ, ANZ) and also use margin loans (from Colonial and Macquarie) to leverage investments in index-linked managed funds (badged by Storm and operated by Colonial First State and Challenger). Up front fees of 7 per cent of assets under advice. Chapter 3 of this PJCCFS Inquiry provides details |
| April 23, 2009 | Timbercorp, a large listed company and RE of agribusiness managed investment schemes (34 MIS with $1.095 billion invested by 18,400 investors) was placed into administration | A PJCCFS Inquiry held into Agribusiness Failures provides more information. |
| May 15, 2009 | Great Southern, a large listed company and RE of agribusiness managed investment schemes (43 MIS with $2.2 billion invested by 52,000 investors) was placed into administration | See here for analysis of Great Southern Failure. Court actions over MIS investor liability for repayment of borrowings made to purchase units schemes were still underway a decade later. |
| March 13 2009 | Babcock & Brown entered voluntary administration. Large losses to shareholders and debtholders and replacement as RE of managed funds which had large debt levels) | By 2006 it held or managed (as RE) $72 billion of assets. Its market cpitalisation peaked at $9.1 billion Often described as a "Mini-Macquarie"- adviser/ arranger/ investor of structured asset-backed transactions, RE of MIS, operating in Real estate, infrastructure, operating leasing, structured finance, funds management and investing. Liquidation expected to be finalized in 2023. |

| | | |
|---|---|---|
| Oct 2009 | Trio/ASF investigated by APRA/ASIC for fraud and subsequent losses to superfund members. | A Treasury Review provides detail on how Trio, which was a RE for 28 managed funds and SRE for 4 super funds, invested those funds with its offshore hedge fund subsidiary, and subsequent losses of $176 mill. (Government compensates members of APRA super funds who lost $55mill, but not losses of members of SMSFs). Also a PJCCFS Inquiry |
| June 2010 | Sonray Capital, "introducing" broker of clients (4,600 investors) to CFD providers (and "shadow" broker – using others to fulfil orders). entered administration /liquidated | Misuse of client funds to cover operating costs and theft by executive(s) ($46 million,) recovery rate of around 2/3. |
| *Source: This* article and author updates. Trevor Sykes *Six Months of Panic: How the Global Financial Crisis Hit Australia*, Allen & Unwin 2010 provides information on a number of these failures, as does Adam Schwab *Pigs at the Trough*, Wiley 2010. | | |

# 24. Prudential Supervision: Principles and Practices.

## Contents



## 24.1 Introduction

The second pillar of the Basel accord is "effective supervision". Setting prudential regulatory requirements as per pillar one will achieve little if those standards are not enforced This chapter looks first at the principles and practices of prudential supervision. Then the focus turns to "macro prudential supervision"

## 24.2 Core Principles

Effective Prudential Supervision is one of the three Pillars (introduced in Basel 2) of the Basel Accord along with minimum capital requirements and effective disclosure. The Basel Committee provides guidance on "Core Principles for Effective Banking Supervision", the latest version being BCBS (2012) which followed a post-financial-crisis review of earlier guidance. There are 29 core principles provided under broad headings of: (a) supervisory powers, responsibilities and functions, and (b) prudential regulations and requirements.

The *prudential regulations and requirements* heading incorporate specific issues (considered in other chapters) of: bank governance, risk management processes, capital adequacy, credit risk management, provisioning and problem asset management, concentration risk, related party transactions, country risk, market risk, IRRBB, liquidity risk, operational risk, internal control and audit, financial reporting and external audit, disclosure and transparency, abuse of financial services.

Core principles under the heading of *supervisory powers, responsibilities and functions* cover issues such as: legal authority, independence and accountability (and legal protection) for supervisors, cooperation with other regulators (domestic and foreign), control over permissible activities of banks, powers regarding licensing criteria and approval of bank ownership changes and major acquisitions, the supervisor having a forward looking process for assessment of bank and banking sector risks involving an appropriate range of techniques and powers for collection of information, corrective and sanctioning powers over banks, ability to supervise banking groups and having appropriate home-host supervisory arrangements in place.

The core principles recognize that different jurisdictions will have different legal and institutional arrangements for the allocation of financial sector regulatory and supervisory duties and different financial system structures. Thus, in a number of countries such as Australia, the prudential supervisor (APRA) is responsible for supervision of a broader range of institutions than banks. Also some of the core regulatory principles (such as preventing abuse of financial services) may have more relevance to other regulatory bodies, such as those charged with financial consumer protection (ASIC) or AML/CTF regulation (AUSTRAC).

The Basel standard-setters also recognize that prudential supervisors will apply different "proportional" standards of supervision and regulation to institutions under their oversight. Smaller, simpler, less systemically important, institutions do not warrant the same level of resources devoted to supervisory activities – such as involved in on-site inspections. Simplified versions of regulatory, reporting and disclosure requirements are also likely to be appropriate.

## 24.3 International Cooperation

Given the multinational operations of many large banks, an important consideration for prudential regulation and supervision is that of inter-jurisdictional cooperation. The Basel accord allocates primary supervisory responsibility for foreign branches to the home country regulator and for foreign subsidiaries to the host country regulator. This reflects the legal differences between branches (which have no

separate legal identity to the parent) and subsidiaries (which are separate legal entities). But that alone is not sufficient to ensure that effective supervision, which takes into account implications for other countries in which the banking group operates, occurs.

## Colleges of Supervisors

A college of supervisors can be thought of as a working group of representatives from banking supervisors in the jurisdiction in which a bank operates. Each college is therefore focused on one particular cross-border banking group. The objective is to share information and achieve cooperation between regulators, both via meetings and other communications, and are not generally seen as decision-making bodies (except in the EU). They are particularly relevant for G-SIBs where assessment of risks must transcend national boundaries.

There is no specified format for a college, and a range of structures can be found. In some cases there may be a core college involving jurisdictions where the banking group is particularly active together with more general colleges incorporating regulators from other jurisdictions. In other cases there may be just one college (or other structures). The college is likely to meet with representatives from the banking group to better understand risk and other issues, and will generally provide feedback to the bank.

The Basel Committee has issued principles for the effective operation of colleges of supervisors.

This Basel Committee document indicated that in 2015, there were international supervisory colleges for ANZ and NAB (but not for CBA or Westpac) among the 68 colleges it identified at that time. APRA indicated in its response to the Interim Report of the Hayne Royal Commission that it was planning in 2019 to implement domestic supervisory colleges for large Australian ADIs.

## Trans-Tasman Council on Banking

The New Zealand and Australian banking sectors are highly interrelated via the strong presence of the major Australian banks in New Zealand. The four majors each have subsidiaries in New Zealand which, as a group, dominate the NZ banking sector. And for each of the Australian majors, the NZ operations generally provide over 10 per cent of group profits.

In past decades, some argued that the RBNZ's relatively *laissez-faire* approach to NZ bank regulation reflected its ability to piggy-back on strong prudential regulation of the Australian parents by APRA. But the NZ authorities have changed their approach towards greater regulation and supervision by the RBNZ. This included requiring the NZ operations of the Australian banks to be constituted in the form of separately capitalized subsidiaries (rather than branches). As per the Basel protocols, this meant that supervision was the direct responsibility of the host regulator (RBNZ) rather than the home regulator

(APRA). In the early 2020s further changes were underway including higher capital requirements and the introduction of deposit insurance, and a general review of the Reserve Bank of New Zealand Act.

The Trans-Tasman Council on Banking Supervision (TTC) was formed in February 2005 to coordinate crisis resolution and planning arrangements in Australia and NZ. The members are Australian and NZ regulators and Treasuries. The main resulting requirement was for the prudential regulators in both countries to consult, support, and take into consideration implications for the other country of actions undertaken in dealing with banking problems. The council meets several times each year and considers prudential regulation and financial stability issues, including approaches to the Covid-19 crisis and cyber-security.

## 24.4 Supervisory Approaches

Prudential supervisors obtain information about the "health" of a bank from a range of sources including data required to be supplied to the regulator by the bank on a regular basis or in response to specific requests, on-site examinations by supervisory staff, off-site monitoring using available data, meetings with bank senior management, information provided by the bank's external auditors or from other regulators (both domestic and foreign).

In Australia, data is collected electronically from ADIs (hereafter referred to as banks) on a monthly basis. The system used has been known as D2A (direct to APRA) which is being replaced with a new *Data Collection System* during 2020. The data collected is about the financial position (balance sheet) and financial performance (income statement) as outlined in reporting standards for *Economic and Financial Statistics* and *Financial Statements*. The data is confidential, and only a small part of it at the individual bank level (or aggregated) is made public in APRA and RBA publications. In contrast, in the USA large amounts of bank level data provided to the regulators via the quarterly *Call Reports* (Reports of Condition and Income) are made public. In 2020 APRA was consulting on the case for increasing the amount of data which might be made public.

The then APRA CEO John Laker outlined a number of characteristics of APRA's supervision approach in a speech in 2010. These included a "strong emphasis on on-site supervision" involving short targeted discussions following prior review of information, and requirements that APRA be consulted about various planned changes or initiatives. Supervisory teams assigned to each institution were relatively small and for large institutions were based in APRA's head office facilitating sharing of information across institutions. In another speech, APRA General Manager David Lewis emphasized that "[t]o us, 'regulation'

can be defined as the application of rules and 'supervision' as the oversight of the effectiveness of a firm's risk management." This implies a "risk-based" approach which is forward-looking for prudential supervision, which is also a characteristic of approaches found in many other jurisdictions. In 2020 APRA published a paper setting out its current supervision philosophy which is based on five foundation elements and three attributes. The foundation elements are: robustness; flexibility; openness; innovativeness; and being constructively tough. The three attributes are that their approach is: risk-based; forward-looking; and outcomes-focused.

## Alternative Models

The implementation of such an approach typically involves a number of steps. Figure 1 provides an outline of how the UK's Prudential Regulation Authority (PRA) approaches the task of assessing bank risk. (Somewhat similar approaches are followed by the Canadian OSFI and the Singapore MAS and APRA).

**FIGURE 1:THE UK, PRA APPROACH**


*Source:* PRA

First, there is an assessment of "inherent" or "gross" risks arising from the activities of the entity. Supervisory teams will make an assessment of this across characteristics such as credit, liquidity, operational, market risks etc together with a focus on emerging risks from competitive and market developments which could affect business viability. As well as risks to the safety of the individual institution, potential for spill-overs affecting the stability of the financial system will also be considered, particularly for larger institutions with important central roles in the system. Then the strength of the entity's risk mitigation ability will be examined. This will include assessment of features such as Governance, riskCulture, Remuneration, Accountability (giving the acronym GCRA), risk management systems for specific risks, overall strength of risk management, compliance and audit arrangements, together with consideration of the entity's financial resilience as reflected in such features as the entity's capital and liquidity position. In addition to these considerations, the ease with which the institution can

be resolved should it enter financial distress, and the general state of business and economic conditions which may affect the strength of all entities will also be considered. Ratings of inherent risk, risk mitigation ability, financial resilience and external factors will be combined in some way to derive a conclusion about what level of supervision is currently appropriate for the entity.

The level of supervision intensity can range from routine (which will differ between small and large entities) through stages where higher risk ratings determine a need for more intense monitoring, formal requirements for remedial actions to be taken by the institution, to (in the worst case) resolution actions.

## Australia – APRA'S approach

APRA has traditionally used its PAIRS and SOARS systems to guide the intensity of its supervision of prudentially regulated institutions. The PAIRS model determined both an estimated probability of failure of an institution and the impact of that. These were then inputs to the SOARS model to determine the intensity of supervision to be applied to the institution.

These were replaced in 2020 by its new Supervision Risk and Intensity (SRI) model which divides institutions into tiers reflecting size, complexity etc and devotes more attention to gathering more information about the larger more complex institutions – reflecting a principle of "proportionality" in the approach. That information is both quantitative together with subjective assessments of APRA staff regarding an institution's risk features, governance and controls etc. "Compared to the PAIRS model, new risk categories are being introduced to more explicitly address matters such as cyber risk; resolvability; governance, culture, remuneration and accountability; and (in superannuation) member outcomes. In addition, a new feature of the model will be the introduction of a common consideration of external environment factors impacting each industry, in the form of an overlay to the SRI scoring system that can be dialled up or down depending on current and prospective operating conditions." The SRI Risk score will determine the level of supervisory intensity.

An important feature of APRA's approach is an increased focus on "risk culture", which relates to behaviours, attitudes, and management of risk, and which is not readily assessable using the more traditional supervisory approach based primarily on financial indicators. Following its commissioning of a prudential report on governance at CBA, APRA published the results of a survey of self assessments of governance, culture, and accountability by large Australian financial institutions. APRA's conclusions from the survey were that:

- non-financial risk management requires improvement;
- accountabilities are not always clear, cascaded and effectively enforced;

- acknowledged weaknesses are well-known and some have been long-standing; and
- risk culture is not well understood, and therefore may not be reinforcing the desired behaviours.

### The USA "Camels" approach

The approach used by USA supervisors, referred to as a CAMELS rating approach is somewhat different. Specific ratings are given for capital adequacy, asset quality, management, earnings, liquidity, sensitivity to market risk, which are then combined into an overall rating. Bank management and boards are advised of the rating and, where necessary, remedial actions agreed with the supervisor. A 2018 Federal Reserve Bank of St Louis article by Stackhouse provides an overview (with more detail on each of the components in subsequent articles in the series). One potential benefit of the CAMELS type approach is that specific areas in need of supervisory attention can be identified.

## 24.5 Stress-Tests

A relatively recent development has been the use of stress-tests as a method of determining bank financial resilience. A 2019 speech by Andrea Enria (Chair of the Supervisory Board of the ECB) provides an overview of the value which stress-testing can provide for prudential supervision by identifying how a bank would fare in possible adverse future states of the economy. The disclosure of results of stress tests can, it is argued, also assist in enhancing market discipline, but possibly increases the risk of banks attempting to "game" the stress test to show themselves in the best light. Given that stress tests are "what-if" type speculative exercises, there is naturally much debate on how they should best be structured. One such debate relates to whether a "bottom-up" approach in which banks' own models are used to determine the effects on them of the hypothesized scenario, is preferable to a "top-down" approach in which the supervisors' models are used to determine the effects.

In a 2015 FRBNY Staff Report (No. 663), Hirtle et al provide a quite detailed outline of how a top-down stress test is structured and illustrate the components and interrelationships in their Figure 1 reproduced below. (The acronym "CLASS" stands for "Capital and Loss Assessment under Stress Scenarios".

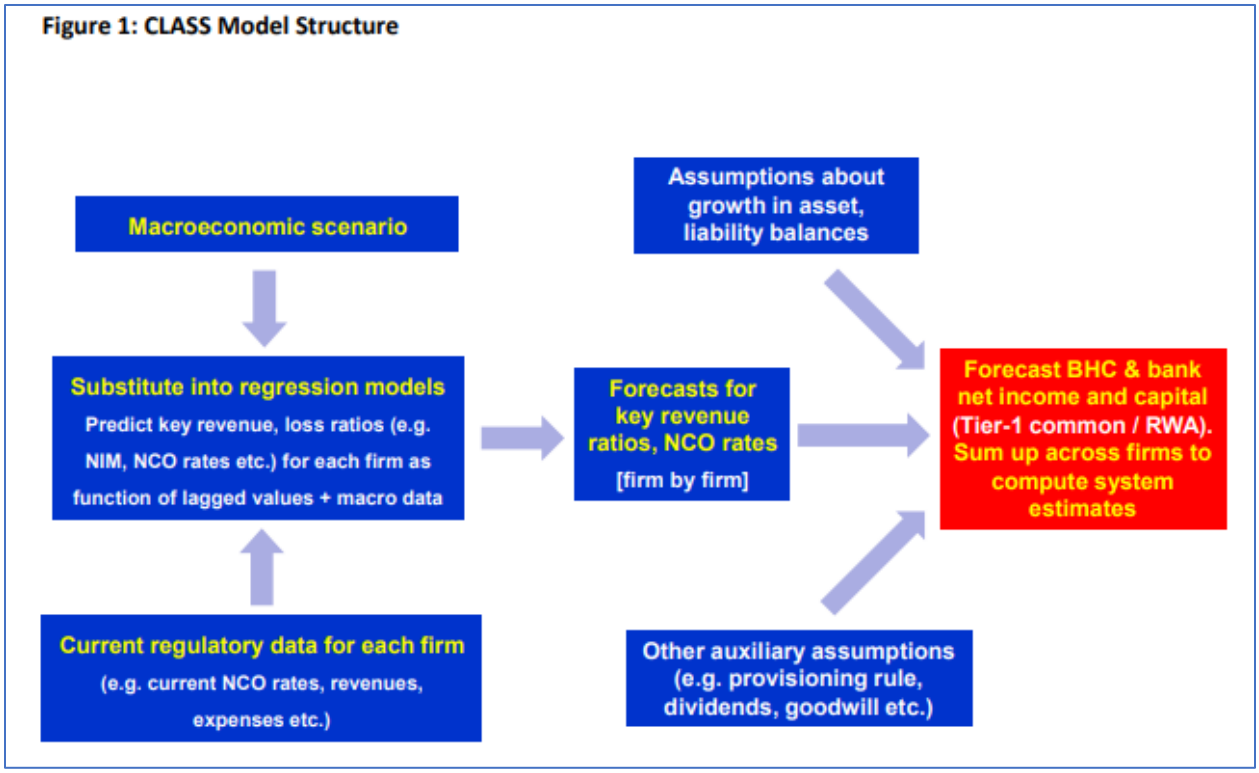



FIGURE 2:STRESS TEST MODEL STRUCTURE (FROM FRBNY STAFF REPORT 663)

As well as the macroeconomic scenario (and other relevant assumptions) about certain variables, an important ingredient is the use of regression models which relate key financial ratios of banks (such as NIM, Loan Loss Provision ratio, etc) to macroeconomic variables and other bank characteristics. These regression equations (where "macro" stands for a vector of relevant explanatory variables) typically take the form of either

$$ratio_t = \alpha + \beta_1\, ratio_{t-1} + \beta_2\, macro_t + \varepsilon_t$$

when the bank data used is aggregated across all banks, or

$$ratio_{it} = \alpha + \beta_1\, ratio_{i,t-1} + \beta_2\, macro_t + \beta_3 X_{t,i} + \varepsilon_t$$

when individual data for a panel of banks (with $X_{t,I}$ denoting individual bank characteristics) has been used to estimate the regression coefficients. Having previously estimated the regression equations using historical data, the scenario values for the macro variables are used to predict the values of the dependent variables for deriving stress test outcomes.

APRA's 2020 Information paper on stress testing explains that there are at least three types of approaches which combine varying elements of top-down and bottom-up methods. One is where APRA provides a common scenario, and large banks use their own data, models, judgement etc (subject to some consistency requirements) to estimate likely earnings losses and reductions in capital and capital ratios. A second is a pure bottom-up approach in which banks undertake their own internal stress tests using their own scenarios. The third is where APRA itself estimates the effects of its assumed scenario on each bank, and can provide a check of results of bank estimates under the first approach.

APRA has been using stress tests as a core prudential tool in its supervisory approach since the Global Financial Crisis of 2007-9, and in 2020 used a "severe downside" scenario for assessing banking system capability for coping with the Covid 19 crisis effects on the economy. This scenario included assumptions of a GDP fall of 20 per cent in 2020, unemployment rising to over 13 per cent, house prices falling by over 30 per cent and commercial property prices by over 40 per cent. These assumptions reflected underlying assumptions of recurring economic and social restrictions in response to Covid outbreaks throughout 2021, and international borders not being properly re-opened until 2022. A weak economic recovery was assumed reflecting low confidence and consequences of business failures.

It is worth noting that such scenarios must make assumptions about how banks react to the development of the crisis envisaged. Generally it is assumed, for the purposes of the test, that they do not respond by raising new capital or cutting back on lending. These assumptions provide results that are, in some sense, a "worst case" outcome for bank capital strength in a situation in which bank lending is able to be sustained.

From its 2020 severe downside scenario, APRA estimated that aggregate bank profitability would fall from $24 billion p.a. to a loss of $37 billion p.a. in the worst year, with the average CET1 ratio falling from 11.6 per cent to 6.6 per cent. (One factor contributing to the CET1 ratio fall, in addition to losses depleting capital, is that declining credit quality causes the risk weights applied to loans to increase thus, somewhat paradoxically, causing RWA to increase). The fact that the Australian banking system appeared able to "ride out" such a severe economic crisis scenario was a source of some comfort to the prudential regulator.

## 24.6 Predicting and Improving Supervisory Ratings

A number of studies, such as the 2019 Federal Reserve paper by Gaul et al have examined the extent to which statistical models such as a Logit model using as inputs specific financial statement data (reported

to the regulator) are able to predict high CAMEL ratings. It would appear to be possible to use such an approach to determine relatively accurately whether supervisors would give a "high" versus "low" rating.

There is also a significant academic literature which attempts to predict bank financial distress and failure by reference to market information as well as bank characteristics, such as capital adequacy, liquidity, business risk measures etc. Some of the variables examined include: price to book ratios, share price volatility, credit spreads on bank debt (including credit default swap spreads), ratings by credit rating agencies. Kerry JRMFI (2020) examines the extent to which various market based metrics are more useful signals of failure than are accounting based metrics. There would appear to be scope for incorporating some of these variables into supervisory ratings models – unless it is believed that the subjective ratings somehow appropriately incorporate such information. That does not appear to be the case. Sarin and Summers in a 2017 Brookings Institute paper for example examine the lack of close relationship in recent years between standard regulatory/supervisory measures of risk for large banks and market data and argue that "more effective than increasing capital requirements will be steps to assure prompt response to situations where markets suggest capital shortfalls."

## 24.7 Macro-Prudential Regulation

Interest in macro-prudential regulation was stimulated by the Global Financial Crisis (GFC). Although the term had been in use for a decade or more, the concept itself is not well defined. But it can be broadly interpreted as policies designed to achieve financial system stability and preventing adverse spillovers onto economic activity. It differs from (micro) prudential regulation which focuses upon the health of an individual financial institution in recognizing that the whole is more than the sum of the parts, and that the interactions between otherwise healthy financial institutions can contribute to instability of the financial system. It differs from monetary policy in not being focused upon activities designed to achieve desirable outcomes for particular economic aggregates (inflation, output growth etc), but upon financial system characteristics which may hinder achieving such desirable outcomes due to instability.

Macro-prudential regulation has two dimensions. In the cross-section dimension it is concerned with how the structure of the financial sector affects its response to shocks to the system. Do interrelationships and institutional practices, amplify or dampen the effects of shocks? In the time-series dimension, the focus is upon whether excessive risk-taking can emerge over time to threaten economic and financial stability.

Examples of problems arising in the cross-section dimension are easy to find from the GFC. A complex web of bilateral counterparty exposures in over the counter (OTC) derivative markets meant that the failure of one institution would impact a large number of other institutions. Because market participants do not know the exposures of others, unwillingness to enter new exposures can occur if there are concerns about the possible failure of any significant institution.

One consequence of this has been regulatory desire to shift OTC derivatives onto organized exchanges, or involve Central Clearing Counterparties (CCCPs) for OTC trading. Under such arrangements, bilateral trades are novated to a central clearing house, generating a "hub and spoke" type of arrangement for exposures where the CCCP (the hub) manages its counterparty exposures by netting offsetting trades and appropriate margining policies. Individual institutions which have entered trades with a counterparty which subsequently fails are thus not exposed to default risk.

Another example can be found in the consequences of many large institutions making extensive use of high leveraged, collateralized borrowings such as by repurchase agreements (repos). This led to what has been described as a "margin-price" spiral, with institutions finding that they were exposed to interrelated "asset-liquidity" and "funding-liquidity" risk. When asset prices fell, counterparties who had lent funds by way of repos, made margin calls or refused to continue providing funds. Borrowing institutions were thus faced with a need to sell assets, but with such responses being widespread, this put further downward pressure on asset prices, prompting further margin calls, asset sales and so on in a downward spiral.

A consequence of this has been greater regulatory attention on liquidity management, reflected in new proposals related to both funding arrangements and liquid asset holdings. On the latter score, the objective is to ensure adequate holdings of gilt-edged securities which can be sold in a crisis without leading to an increase in the credit-risk spread and reduced asset prices which prompted the margin-price spiral. (Macro-economic policy can adjust system wide liquidity to offset pressures on the level of official interest rates arising from such sales). On the former score, the objective is to ensure that institutions which fund themselves with non-stable sources of funding have sufficient liquid assets to cope with outflows of such funds.

Because the transmission of shocks through the financial system depends upon the network of financial arrangements, and because failures of large important institutions have greater spillover effects, there is considerable interest in developing network models of the financial system. In such models, key institutions and their financial links to others are identified. Then, by tracing the consequences of a failure or stress of a key institution, their role in amplifying or mitigating shocks can, hopefully, be assessed. Such

analysis can underpin the determination of additional capital requirements for systemically important financial institutions – in order to reduce their chance of failure. It can also assist regulators in determining what are the most suitable responses to prevent transmission of a shock.

The time-series dimension of macro-prudential regulation is the determination of whether there are forces building-up over time in the financial system which increase its susceptibility to crisis. Looking at past financial crises, there are a mix of macro-economic fundamentals and financial market indicators which appear to be important. Financial crises appear to be preceded by such developments as large and persistent government deficits, large and persistent current account deficits on the balance of payments, and high inflation. But also important is the behaviour of asset prices in the form of stock market bull runs and housing price "bubbles", as well as the development of high leverage and risk-taking.

Recognizing whether such developments are indicative of unsustainable conditions or reflect "fundamental" factors is particularly difficult. Over past decades, Central Banks have been reluctant to act against asset price inflation, but that is now tending to change, with "leaning into the wind" strategies becoming more accepted.

The other development is in terms of trying to moderate practices in financial markets which might generate such developments. Executive remuneration is one such area, where concerns that bonus-based remuneration has giving inappropriate incentives for excessive short-term risk taking. Another area lies in the interaction of regulatory and bank risk-management decision making. As a "boom" develops, increased asset valuations can improve the credit ratings of bank customers and provide banks with incentive and rationale to provide increased loan funding, thus exacerbating the boom. Removing such "pro-cyclicality" is an important component of the ongoing regulatory reform agenda.

# 25. Financial Consumer Protection: Issues and Australian Experience

## Contents



## 25.1 Introduction

Financial Systems perform valuable economic services for end-users such as individuals, businesses and governments. These include providing opportunities for saving and investing, facilitating access to finance, payments services, risk management. These take the form of financial products and services provided to customers involving transactions creating explicit or implicit contracts between financial firms and their customers. Where well informed parties decide to voluntarily engage in what they perceive to be mutually beneficial transactions, economic efficiency is promoted. Unfortunately that is not always the case particularly where transactions involve individuals who may have limited financial literacy, are operating with imperfect information, and face significant resource/transactions costs in undertaking financial activities.

As a result financial consumers are exposed to a number of potential risks in making financial decisions which they may not fully understand and which may have substantial adverse effects on their well being. These can include fraud, being sold financial products unsuitable for their circumstances, being sold overpriced products, being given incorrect advice, not being aware of the risks associated with particular financial products. (See for example, (Akerlof & Shiller, 2015). While, in principle, legal remedies may exist to deal with such situations ex post, financial consumers will not generally have the financial resources to utilise the legal process against large financial firms, or may find that the counterparties have disappeared such that no compensation is possible. Moreover, because many financial products and services are credence goods (Dulleck & Kerschbamer, JEL, 2006), whose likely value is not ascertainable until some later date – if ever, the potential for financial consumer loss can be high.

A further issue arises from the effects of unequal bargaining power, imperfect information, customer inertia, and inadequate competition on the sharing of benefits from transactions. Financial institutions may capture the bulk of the gains from trade. For example, the bank may need a 10 per cent return on a loan to make normal profits and the customer willing to pay up to 11 per cent, but the rate charged may be much closer to 11 than 10! Ideally competition amongst lenders would shift the rate down, giving more benefits to the customer willing and able to investigate available options, but competition is not always that robust or effective.

Consequently, governments and their regulatory agencies take a range of actions aimed at providing financial consumer protection and ensuring “fair” treatment. While the basic problems are the same world-wide, different approaches can be found internationally reflecting factors such as historical experiences, institutional arrangements, legal systems, state of financial and economic development.

There are three main considerations which need to be taken into account in designing Financial Consumer Protection (FCP) policies).

The first is that FCP policy should be structured to reflect what we know about behavioural biases of individuals – not based on a hypothetical assumption of informed, rational, economic, utility maximizing individuals. Even though some “homo-economicus” may exist (and drive market outcomes) they need little protection beyond adequate disclosure. But for the majority, reliance on disclosure, education and advice (the standard economics prescription) is inadequate – other interventions are also required.

The second theme is that the types of product and service providers to financial consumers vary dramatically in terms of size, ethics, objectives etc. Approaches should be tailored where possible to reflect the resulting potential differences in consumer risk. Regulations based on problems arising

from one group of providers will, unless appropriately tailored, have compliance and other adverse impacts on others for whom they may not be necessary. "Principles – based" regulation, giving flexibility to providers of financial products and services to meet desired standards in various ways most suitable to them has merit here. However, unlike "black letter law" it can create uncertainty for firms as to whether regulatory requirements are being met and whether the firm is thus inadvertently exposed to risk of prosecution and penalties. It can also be subject to regulatory evasion by unscrupulous operators which can be difficult to prosecute.

Third, the location of FCP responsibility needs to take account of the institutional structure of regulatory agencies and legal powers. In Australia, for example, responsibility rests with ASIC the securities and market conduct regulator, whereas in some countries (such as the US, Canada, China) specialised FCP agencies have been established. There is unlikely to be any unique best model for allocating FCP responsibility, and its mandate and powers will need to reflect the nature of the legal system and thus the opportunities for individuals to seek redress and the deterrence effects from such actions.

## 25.2 Why Financial Consumer Protection?

What is special about financial consumer protection? Why is it different to consumer protection in general? There are two main reasons. First, confidence in the financial sector is important for economic development and growth, and this can be undermined if financial consumers are poorly treated. Second the potential for purely redistributive, unethical or immoral, activities is potentially greater in the world of finance than elsewhere.

The two reasons are interrelated. Economic development generates increasing household involvement with the financial sector. Financial development leads to increasing complexity of financial products and services. However, financial literacy is generally low (Lusardi and Mitchell, JEL, 2014), creating opportunities for miss-selling and overcharging to occur and to become significant problems, particularly given individuals' gullibility and greed. Some providers of financial products, services, and advice may have questionable ethics, poor governance, and misaligned incentives. Resulting financial failures, miss-selling, scams, and consumer losses reduce confidence and cause sub-optimal use of the financial sector which impedes economic growth and development.

On the second point, redistributive activities can range from pure theft to simple overpricing of financial products. At the pure theft end of the spectrum, one might place practices such as placement of underpriced company shares to outside investors or friends of the management, diluting the equity of existing shareholders. However, ambiguity arises because such placements may provide a faster and cheaper way of the company accessing finance, ultimately to the benefit of all shareholders. At

the other end of the spectrum apparent overpricing of financial products could instead simply reflect different perspectives on the risk involved and compensation appropriate for bearing that risk.

It is these ambiguities which make the issues of financial consumer protection both interesting and challenging. (See for example Campbell (AER, 2016).

These issues are particularly pertinent at the current time due to the dramatic changes to financial systems being wrought by technology. "Fintech", the application of new practices and development of new financial products and services based on digital technology, creates new challenges for governments and regulators. There are opportunities for significant improvements in economic and social welfare from fintech, but there are also significant risks to financial consumers – since likely success or failure of many of the innovations is extremely difficult to predict.

A number of these issues and international approaches to financial consumer protection have been considered by international agencies. For example, the World Bank conducted a Global Survey on Consumer Protection and Financial Literacy in 2013, finding that 72 per cent of financial regulators surveyed had a dedicated financial consumer protection unit. Staff from the World Bank produced a paper in 2014 on establishing a financial consumer protection function in regulatory agencies.

## 25.3 Forms of Financial Consumer Protection

There is a large range of forms of financial consumer protection activities found in varying forms internationally. These overlap with measures aimed more directly at investor protection which also encompasses protection of informed and wholesale investors. These include:

### Measures to protect financial consumers from entering into unsuitable financial contracts

- Regulators having powers to ban the sale or provision of certain financial products or services, or alternatively being required to provide explicit approval for supply or regulating allowable design features.
- Limiting the sale of particular financial products to only certain types of counterparties such as wholesale or sophisticated customers and excluding "retail" customers.
- Requiring provision of sufficient information about product features to facilitate informed decision-making and precluding deceptive advertising
- Restricting remuneration arrangements of agents in the financial sector to ensure better alignment of their incentives with the interests of financial consumers
- Imposing legal obligations on product and service suppliers to take into account customer interests (such as responsible lending obligations)
- "Nudges" via government specification of default products or other means

- Regulation of product/service comparison web-sites
- Financial literacy initiatives

## Measures to improve the quality of financial products and services available

- Requiring minimum skill and knowledge levels for certain types of financial market participants such as financial advisers
- Licensing requirements for providers of financial products and services
- Imposing limits on allowable fees and charges
- Prohibiting inclusion of clauses in financial contracts which are unlikely to be clear to the customer and provide the supplier with options which could be exercised to the detriment of the customer

## Measures to reduce potential losses to financial consumers when bad outcomes occur

- Government provision of deposit insurance or higher priority for retail depositors in event of a bank failure
- Restrictions on ability of non-resident financial firms to provide financial products and services to domestic financial consumers
- Requirements for segregation of client money
- Required establishment of industry-funded compensation funds to provide compensation for customer losses due to certain activities of members of the industry.

## Measures to substitute for individual legal action to resolve problems

- Requirements for internal dispute resolution schemes for firms providing financial products
- Industry-wide external dispute resolution schemes
- Provision for class-action law suits
- Regulator initiated prosecutions and remedies

## Regulatory Structures and Complexities

These measures can come under the responsibility of different types of government agencies, including securities regulators, prudential regulators, central banks, consumer protection agencies etc. In some countries, a relatively recent innovation has been the establishment of *Financial Consumer Protection Bureaus*.

Because of the novelty of approaches to provision and design of financial products and services arising from fintech, governments and regulators are faced with the prospect of designing new types of regulations to deal with these innovations. One response in a number of countries has been the

creation of *"regulatory sandboxes"* aimed at facilitating limited trials of novel products and services by innovators.

*Other issues include:*

Increasing opportunities for cross border provision of financial products and services to individuals – how do regulatory approaches to this differ?

International agencies (Basel, IOSCO, IAIS, IADI, FSB) have provided prudential and other standards for regulation of banks, insurance, markets etc. But no one clear international agency for financial consumer protection.

## 25.4 A Wide Range of Issues - Examples

Financial consumer protection issues range from large-scale systemic problems through to more specific problems affecting individuals, or small numbers of consumers. At the large scale end there have been a number of major mis-selling issues over recent decades, shown in Table 1.

In the UK for example there were in the 1980s - 1990s major mis-selling episodes involving personal pensions and also endowment mortgages. In the 1990s stretching into the 2000s the UK also had major problems associated with sales of payment protection insurance, which has led to banks making provisions for compensation currently in the order of £20 billion.

In the US the most obvious example is the sub-prime mortgage scandal starting in the 1990s and ultimately triggering the global financial crisis which emerged in 2007 and 2008. At that time the Madoff Ponzi scheme was also exposed.

In Asia during the 2000s, both Hong Kong and Singapore experienced the mis-selling of "mini-bonds" which involved very complex credit link note structures. In Europe there has recently been a spate of problems with widespread use of foreign currency loans in some countries where homebuyers have taken out loans in foreign currencies of economies with significantly lower interest rates. The borrowers are therefore exposed to risk of currency devaluation and ultimately large increases in the cost of their borrowing.

It is worth noting that Australia had a similar foreign currency loan scandal several decades ago. In fact, that case was arguably even worse because it involved dealers at the originating banks having the authority to switch the borrower between different currencies, thus incurring bid- ask spreads and transactions costs as well. Most recently, widespread problems with "misbehaviour" by Australian financial institutions in their dealings with retail customers have been publicised via the Hayne Royal Commission.

Table 1: Some major miss-selling scandals internationally

| When/where | Name | Features |
|---|---|---|
| 1980s-90s (UK) | Personal Pensions Miss-selling | Introduction of personal pension schemes led to large commission based casual salesforce encouraging individuals (often family/friends) to shift from defined benefit company pension schemes to personal defined benefit schemes |
| 1980s-90s (UK) | Endowment Mortgages | Property mortgages involving either interest only or final balloon payments of principal and interest attached to savings plans invested in stock market. Sold on "promise" that invested amount would grow sufficiently to at least meet required final mortgage payment. |
| 1990s – 2000s (UK) | Payment Protection Insurance | Sold in conjunction with new mortgages, loans, credit cards, offering protection to meet loan obligations if loss of income due to unemployment, illness etc. Highly profitable for providers - claims payouts / premiums around 15 per cent. Inappropriate for many borrowers, marketed as "essential". FSA actions from 2006, GBP 20 billion estimated compensation bill at February 2014. |
| 1990s-2000s (USA) | Subprime Mortgages | Mortgages sold to borrowers without adequate repayment prospects or initial equity position, with some originators misstating borrower financial position. "Teaser" initial interest rates with subsequent major upward adjustment, and premised on assumption that increased property prices would enable refinancing of mortgage on new terms. |
| 1990s-2000s (USA) | Madoff Ponzi Scheme | Fraudulent managed investment scheme where high stable returns reported. New investor contributions were used to make distributions to or credit returns to accounts of existing investors. |
| 2000s (HK & Singapore) | Minibonds | Complex credit- linked note structure issued by a special purpose vehicle related to Lehmans and sold by banks to over 40,000 investors. Projected returns were high, but would diminish if there were default events of a small number of high quality companies/sovereigns, through a credit default swap agreement. However, investor capital was invested in risky CDOs (rather than risk free securities) such that much value was lost when Lehmans collapsed – although subsequent recoveries of principal amount have been quite high. |
| 2000s (Europe) | Foreign Currency Loans | Home-buyers offered loans in foreign currencies where interest rates are significantly lower and being exposed to the risk of home currency devaluation and substantial increases in the ultimate cost of the borrowing. |
| | | |

These are extreme cases. (See also Reurink, JES, 2018). But there are many examples, brought to prominence by the financial crisis, of unsuitable products, miss-pricing, conflicted advice, financial firm failures and investor losses. In Australia, for example, the financial crisis exposed a variety of problems. They included:

- Failures of Agribusiness managed investment schemes where projections of returns were excessively optimistic and investor assets were not adequately protected. Indeed, investors often borrowed funds from an associated company of the management firm which remained owing when the scheme failed.
- Margin Lending arrangements which involved a securities lending structure whereby ownership of the equities involved was transferred to the lender (rather than retained by the borrower) and title the transferred to the lender's financiers. When the lender went into insolvency due to operational risk events, the borrowers faced substantial losses (although eventually, for reputational reasons, the large banks which financed the margin lender provided compensation).
- Sales of unsuitable CDOs and Credit Linked Note products to retail (and other) investors.
- Freezing of unlisted mortgage and property funds which offered withdrawal facilities but held mainly illiquid assets (a repeat of similar events at the start of the1990s)
- Failures of finance companies and other financial firms raising funds by issue of debentures and engaging in related party loans (often for property development).
- Managed fund frauds where investments were made offshore and funds unrecoverable.

Notably, the losses experienced by retail (and other) investors from such events did not lead to government compensation – since they involved investments and activities outside of the prudentially regulated sector. Having a clear demarcation of the boundary between prudentially regulated and non-regulated sectors has been one strength of the Australian system.

Since then numerous examples of bank and other financial institution misbehaviour affecting retail financial consumers were brought into prominence by the Hayne Royal Commission which is discussed in Chapter 7.

## 25.5 International Developments

The world-wide experiences have meant that Consumer Financial Protection has emerged as a prominent issue in the global regulatory agenda, with the G20 producing a set of high level principles (Table 2) and other international agencies (and national authorities) paying increased attention to the topic. The World Bank, for example, has produced guidance on good practices for financial consumer

protection on an industry basis. But what guiding economic philosophy should underpin the process is a matter for debate.

*"This renewed policy and regulatory focus on financial consumer protection results inter alia from the increased transfer of opportunities and risks to individuals and households in various segments of financial services, as well as the increased complexity of financial products and rapid technological change, all coming at a time when basic access to financial products and the level of financial literacy remain low in a number of jurisdictions. Rapid financial market development and innovation, unregulated or inadequately regulated and/or supervised financial services providers, and misaligned incentives for financial services providers can increase the risk that consumers face fraud, abuse and misconduct. In particular, low-income and less experienced consumers often face particular challenges in the market place."* G20 High-Level Principles on Financial Consumer Protection (Oct. 2011)

Table 2: G20 High Level Principles

| | |
|---|---|
| Legal, Regulatory & Supervisory Framework | FCP an integral part of the framework, reflect financial system and user features, good legal underpinnings, appropriate regulation of product /service providers and agents |
| Role of Oversight Bodies | FCP oversight bodies with mandates, authority, independence, accountability |
| Equitable, Fair Treatment of Consumers | Fairness should be an integral part of governance / culture of providers and agents |
| Disclosure and Transparency | Provision of key information expected on product benefits, risks, terms and conflicts of interest. Honest promotional material. Standardised disclosures allowing comparisons. |
| Financial Education and Awareness | Promote financial literacy and information on rights. Implement OECD INFE principles |
| Responsible Business Conduct of Providers and Agents | Customer best interests should be an objective and reflected in remuneration structures. Provider accountability for actions of agents. |
| Protection of Consumer assets against Fraud and Misuse | Information, control and protection mechanisms expected to protect consumer assets. |
| Protection of Consumer Data and Privacy | Control and protection mechanisms expected to protect consumer information and clarify permissible uses. |
| Complaints Handling and Redress | Jurisdictions should ensure accessible mechanisms. Providers and agents should have mechanisms for complaint handling and redress, and recourse available to independent process |
| Competition | Promote competitive markets to give consumer choice and ability to switch, and to promote product development and quality |

## 25.6 Alternative Philosophies and Approaches

At the risk of caricature, Figure 1 indicates a spectrum of ideological / philosophical positions which can be adopted as the basis for financial consumer protection policies. At one extreme is the "free markets" / libertarian approach, consistent with the world of introductory economics textbooks. Markets should be allowed to operate freely, individuals should take responsibility for their actions, and have access to the legal system for the resolution of disputes. In this view, decisions of informed individuals will promote efficiency, and "rule of law" and reputational considerations will deter unethical behaviour by suppliers of financial products and services. Governments may need to ensure adequate information is provided, and if individuals are unable to assess the worth of financial products and services, it could be expected that skilled advisers would be available, for a fee, to assist.

Starting from this philosophical position, which influenced the development of Australia's FCP framework following the Financial System (Wallis) Inquiry in 1997, until recent changes, the main ingredients of policy are disclosure, education and advice (which I'll refer to as DEA). Of course, for the policy to work what is really needed is "perfect" DEA, although "good" DEA, however that might be defined, would probably be seen as adequate by most. In practice, both in Australia and elsewhere, achieving "good" DEA has proven problematic.

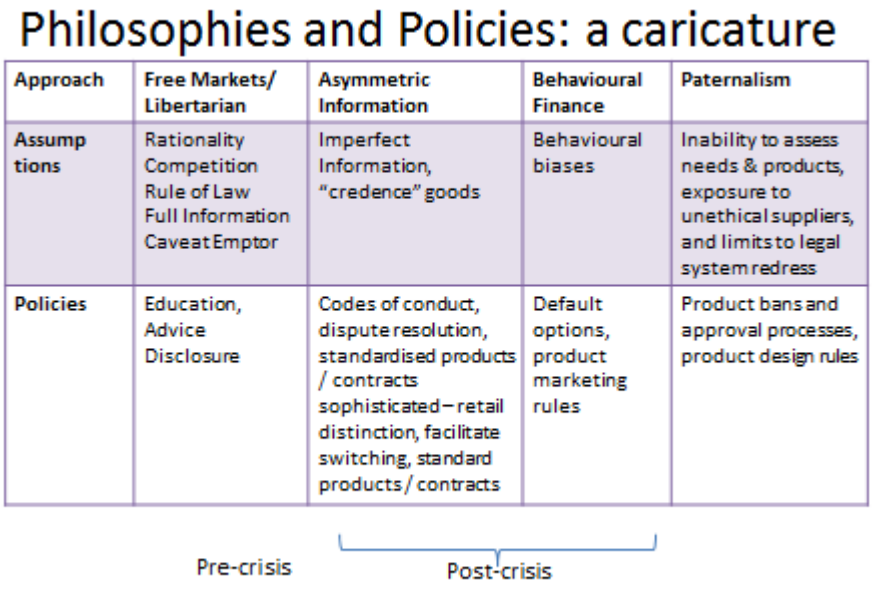
The problems are inherent in all parts of the DEA approach which had been used in Australia. First disclosure documents are used more as a legal protection device by financial product producers than as information documents, making them large and, generally, unintelligible to the typical individual. There is considerable work also to be done in identifying the best way of presenting information about risks, costs, expected returns etc in ways that resonate with readers. In 2019 ASIC acknowledged (in a joint report with the Dutch regulator) that disclosure should not be the default mechanism for trying to achieve financial consumer protection (and in some cases "disclosure and warnings can backfire").

That is compounded by the fact that financial literacy standards, even though relatively high by world standards, are inadequate for even moderately complex financial products. Lusardi and Mitchell (2014) have recently surveyed the evidence on, and developments in, financial literacy and conclude that "researchers have demonstrated that low levels of financial knowledge are pervasive, suggesting that it will be quite challenging to provide the tools to help people function more effectively in complex financial and credit markets requiring sophisticated financial decision making." They note that we have little evidence on what types of financial decision making can be improved by enhanced financial literacy

Finally, the financial advice industry has been characterised by conflicts of interest, conflicted remuneration structures with reliance on commissions from product suppliers rather than up front

fees, and with many advisers employed by large financial product producers such as banks and life insurance firms. The level of qualifications has often been inadequate, quality of advice has often been poor, and recent advice scandals have involved advisers placing individuals into products inconsistent with their desired objectives and risk tolerance.

The problems exposed have meant that regulatory approaches have moved somewhat along the spectrum shown in Figure 1.



Philosophies and Policies: a caricature

| Approach | Free Markets/ Libertarian | Asymmetric Information | Behavioural Finance | Paternalism |
|---|---|---|---|---|
| Assumptions | Rationality<br>Competition<br>Rule of Law<br>Full Information<br>Caveat Emptor | Imperfect Information, "credence" goods | Behavioural biases | Inability to assess needs & products, exposure to unethical suppliers, and limits to legal system redress |
| Policies | Education, Advice Disclosure | Codes of conduct, dispute resolution, standardised products / contracts sophisticated–retail distinction, facilitate switching, standard products / contracts | Default options, product marketing rules | Product bans and approval processes, product design rules |



Figure 1: Approaches to Financial Consumer Protection

As well as the demonstrated failings of the DEA approach (although better DEA is always sought) two factors (as well as lots of bad experiences) are intertwined in influencing that shift away from the perfect markets paradigm. One is the increasing recognition of the pervasiveness of asymmetric information in financial markets, which is particularly relevant due to the inter-temporal nature of financial contracts. Assessing the reliability of a counterparty's promised future commitment to pay, or the risks associated with contracts with uncertain payoffs, or the true value of a financial product or service, are fundamental problems for financial decision-making. This is compounded by a second factor of widespread deficiencies in financial literacy which mean that individuals are generally unable to make such an assessment even if provided with large amounts of information relevant to such risks. A third factor is that relying on *ex post* compensation for wrongdoing by suppliers of financial services and products is problematic due to the imbalances of economic power and knowledge between suppliers and consumers, and high costs of litigation relative to potential compensation. Consequently, if the expected costs of wrongdoing, miss-selling, or overcharging (relative to true

worth) are low relative to potential benefits, deterrence effects may be inadequate to achieve good social outcomes. This problem is amplified by the fact that many financial products may be thought of as "credence goods" in which the purchaser relies on the credibility of the seller or adviser and is unable, perhaps even with the benefit of hindsight, to assess the true worth of the product or service purchased (Dulleck & Kerschbamer, 2006).

The second factor influencing a shift in focus is the increasing body of evidence that most individuals do not act like the "homo economicus" of the textbooks. Rather than rational beings making self interested decisions which maximize utility, most of us are subject to a range of behavioural biases and, given limits to our information processing ability, tend to act in accordance with various heuristics or rules of thumb. This means that decisions made may not be in one's best interest, and such decisions may be easily influenced by the way in which financial products are constructed and marketed. It is sometimes said that consumers do not "buy", but are "sold" financial products.

The problem that recognition of these factors gives rise to, is how to design FCP policies without going to the other extreme of government paternalism (fixing prices, banning products etc) – which will typically involve significant economic inefficiencies.

The behavioural economics approach raises the question of to what extent appropriate policies might instead involve removing some financial products and services from the choice sets available to individuals, or appropriately designing the "choice architecture" to influence or "nudge" individuals towards making decisions policy-makers believe would be in their best interests. That "libertarian paternalism" approach (Thaler and Sunstein, 2009) assumes that individuals are not the rational economic man or woman of the economic textbooks, on which so much of financial regulation has been inappropriately based, but are behaviourally biased. And to the extent that is true, it raises the question of how best to also design financial literacy and education programs which recognise the pervasiveness of behavioural biases.

Several approaches consistent with the imperfect information and "liberal paternalism" perspectives have been adopted in Australia (although not explicitly referred to as such), and some examples follow.

Recognising the problems individuals face in assessing financial risk, most countries provide a "safe haven" for savings in the form of insured or guaranteed bank deposits. This provides FCP against counterparty risk of institutions inside the prudential perimeter. Australia, now does this, but prior to the financial crisis did not have such a scheme, relying instead on the assumption that depositor priority would be sufficient to both protect investors and remove uncertainty and consequent risk of "runs". While depositor preference may have provided sufficient protection, it certainly did not

provide adequate comfort to depositors during the financial crisis – with few even aware of their priority position and some uncertainty existing about the extent of implied government guarantees.

The dilemma with providing a "safe haven" via deposit insurance is, of course, that it creates moral hazard – individuals no longer need to assess the riskiness of institutions covered. This puts increased onus on the regulators to ensure, via regulation and supervision, that excessive risk taking creating threats to the taxpayer or insurance fund does not occur. Particularly in the absence of risk-based deposit insurance premiums, an expected consequence can be tougher regulation and more intensive supervision.

Recognising the fact that behavioural biases lead individuals to discount the future too heavily, and thus make inadequate savings for retirement, many countries – Australia included – mandate compulsory long term pension savings (superannuation) out of employee incomes and provide tax incentives for such savings. This can, itself, generate other FCP concerns. In Australia, for example, when individuals reach retirement age and can access accumulated savings, they may lack sufficient expertise to manage those funds and, potentially be prey to unscrupulous counterparties. This was the case in Australia involving the "Storm Financial" advice scandal, where retirees were induced to use retirement savings (often augmented by funds from remortgaging their home) as the investor's equity in highly levered margin lending arrangements. When the stock market collapsed in 2007-8, substantial losses and hardship resulted. As another example, Self Managed Superannuation Funds (where individuals manage investment of their own retirement savings) have grown significantly in Australia, potentially exposing such individuals to sellers of unsuitable investment products. (A recent example of the problems which can arise has been the UK case of sales of "mini-bonds" (small denomination bonds of corporate issuers) to ISA's (Individual Retirement Savings Accounts) where investors may not be aware of the credit risk and are not adequately diversidied.

## 25.7 Challenges in the Design of FCP Policies

Financial regulators face three main challenges in designing appropriate protection regimes for consumers of financial products and services such as savings and investment products, borrowings, payments services, insurance, and financial advice. One is the potential for "moral hazard", where government guarantees and support reduce consumer incentives for assessing and taking responsibility for risks. A second is identifying an appropriate perimeter within which additional protection beyond that afforded by the normal "rule of law" may be warranted. The third is understanding the determinants of consumer behaviour such that legislation and regulation can be fashioned appropriately to lead to desired outcomes.

More generally, policy involves both ex ante (prevention) and ex post (redress) aspects. They are inter-related via the role of deterrence. In general, the likelihood of undesirable practices occurring will depend on: the probability of exposure and punishment, which in turn depends upon individual access to courts, regulator mandate and resources, and "gatekeepers" (such as accountants, auditors, trustees, custodians, advisers) as well as the size of potential punishment (fines, licensing restrictions, reputation effects).

The legal/regulatory framework is crucial in this regard. For example, when can redress be sought? Will a court rule on compliance with strict "terms and conditions" (even if unlikely to have been understood by the individual) or by applying a "reasonable expectations" doctrine? How are abusive practices defined and what duty of care is required of the product supplier?

Also important is the range of ways by which redress can be sought, ranging from individual legal action, through legislated dispute resolution schemes and government agency (enforcement) roles. The Australian approach has placed significant emphasis on requirements for both internal and external dispute resolution schemes, but another significant development has been the emergence of class actions and litigation funders. While these provide a mechanism for poorly resourced individuals to jointly seek redress, they also create potential problems of opportunistic lawsuits.

Another challenge for FCP policy is that financial product/service suppliers range from unregulated individuals (eg payday lenders) to large global financial institutions. Moreover, suppliers can be "for profit", cooperatives / mutuals, government owned, each with different incentives and therefore potential for creating FCP problems. One size of regulation is unlikely to fit all, and supplier culture, ethics, integrity, governance, incentive structures are all relevant.

This raises two related issues. The first is the merits of "principles – based" regulation versus a "black letter law" approach. The former gives flexibility to different types of providers of financial products and services to meet required standards in different ways most suitable to them. The "externality" of regulation targeted at one group of providers adversely affecting others for whom it is not necessary is removed. However, unlike "black letter law" it can create uncertainty for firms as to whether regulatory requirements are being met and whether the firm is thus inadvertently exposed to risk of prosecution and penalties. It also can make prosecution more problematic compared to cases where explicit regulations have been breached.

The second issue concerns the culture, governance, and incentive structures of financial service providers. In an ideal world, providers would act in a "fair" manner, not exploiting consumer lack of knowledge or behavioural biases for gains at the expense of the consumer. Of course, in the free markets paradigm, fairness does not emerge as an issue, since it is assumed that transactions are

entered into because they are believed to be mutually beneficial. We do, however, know that not all individuals adhere to ethical standards which incorporate "fairness" as a consideration, even though psychological evidence suggests that fairness is a potentially important influence on decision-making of many individuals (Fehr and Gachter, JEP, 2000). Unfortunately, there is also substantial evidence that fairness considerations can be driven out of decision making considerations, and replaced by pure self-interest, by the institutional arrangements within which transactions are made.

Some would argue that "fairness" can get indirectly incorporated into corporate cultures by the need to preserve a reputation as a good counterparty. If repeat transactions with the same customer (or others who are aware of that customer's experience) are desired, unfair treatment can threaten reputation and subsequent business. But that perspective relies on two assumptions – neither of which are necessarily appropriate for many financial transactions. First, many financial transactions are one-off or infrequent (such as taking out a mortgage to buy a house) so that the potential for information acquisition by the customer by learning by doing is limited. Second, many financial products and services are arguably "credence" goods, where quality and value added cannot be ascertained by the customer, even after the contract has expired.

And, digressing somewhat, even if the customer can assess that a product is not suitable after entering into the transaction, there may be impediments to switching to another supplier. Exit fees are one such impediment, and one response to this in Australia has been to ban exit fees on variable rate mortgages.

The need to ensure "fairness" makes corporate culture an important factor in FCP considerations. However, achieving a desired culture in a competitive world is a problematic issue for policy makers. One response, applied in Australia, is to impose requirements on financial firms to behave fairly. As well as general prohibitions on "unconscionable conduct", lenders are now required to ensure that loans are suitable for the characteristics of the borrower – switching the onus for assessing product suitability from the borrower to the lender.

Probably the most problematic area is that of remuneration structures, and particularly in the area of financial advice. In Mid 2012 the Australian government introduced Future of Financial Advice (FOFA) reforms involving introduction of explicit fiduciary duty for advisers and prohibition of conflicted remuneration structures such as commissions and volume based payments. In December 2013 the new government proposed amendments "weakening" some of the provisions, but tightening of requirements initially followed. These included the introduction of new licensing requirements for financial advisers, including educational requirements. These, including a specific exam, commenced in 2019, and were overseen by FASEA (the Financial Adviser Standards and Education Authority)

created under 2017 legislation. However in 2020 the government announced that FASEA would be abolished and a financial adviser disciplinary panel created in ASIC.

In 2020-21, the coalition government also attempted to remove or weaken the Responsible Lending Obligations (RLOs) which protect individual borrowers. However this was met with significant opposition and did not proceed through Parliament.

In Australia FCP is an ASIC responsibility v ACCC (general consumer protection) v separate FCPB (USA, China, others). Issues it addresses include: unconscionable conduct, miss-selling, disclosure, product/security design etc. ASIC issues Regulatory Guides, class orders, enforceable undertakings, banning, fines, court actions (civil v criminal) etc. ASIC has recently been granted Product Intervention Powers (PIP) enabling it to impose a temporary ban unsuitable products and services, and legislation has also introduced manufacturer and distributor product design and distribution obligations. Legislation has also Design and Distribution Obligation (DDO) responsibilities for producers and distributors of financial products and services requiring them to identify the target markets and the suitability of the products and services for those markets.

One area of concern has been the activities of some debt management firms offering credit repair and debt negotiation services to financial consumers who find themselves in with excessive debt obligations to one or more providers of finance. In some cases, the fees charged by unscrupulous operators have led to a significantly worsened position for their clients. Indeed, a 2019 Senate Committee Report stated that “these services rarely improve a consumer's financial position”. Until a change in regulation as a result of legislation in April 2021, providers of these services did not require an ACL. The changed regulations provide ASIC with powers to take action against such firms where necessary, and should (hopefully) inhibit activities of potentially unscrupulous operators.

Conditions of AFSL and ACL require internal dispute resolution schemes and membership of external schemes. There has been a recent merging of several schemes into Australian Financial Complaints Authority (AFCA).

## 25.8 Royal Commission

While the Hayne Royal Commission was about misbehaviour/misconduct in the financial services sector, that is essentially the same as examining failings in financial consumer protection. The Royal Commission identified a range of inappropriate behaviours and provided a suite of recommendations which are discussed here. Chapter 7 provides more detail on the Royal Commission.

## 25.9 Conclusion

Designing effective or optimal CFP policies is challenging. The main lessons from Australia's experience I would argue are: (1) the inadequacy (albeit importance) of a DEA approach; (2) the importance of establishing a clear demarcation line between prudentially regulated institutions and products (where government support is expected) and the remainder of the financial sector where *caveat emptor* is the dominant principle. The challenges however are that (1) prudential regulation occurs also for financial stability reasons and may potentially lead to a wider range of products than desired being captured within that boundary, and (2) establishing a suitable set of CFP arrangements outside that boundary which reflect imperfect information, behavioural biases, and realistic assumptions about financial literacy is difficult.

# 26. Deposit Insurance and Bank Resolution

## Contents

## 26.1 Introduction

A deposit insurance scheme is a (generally) government run (or sponsored) arrangement whereby certain types of deposits (or depositors) are protected from loss otherwise arising from the failure of a bank. Typically, the amount protected is limited to some maximum specified amount per depositor. The deposit insurance scheme is also intrinsically linked to *resolution* of failing banks discussed later in this chapter.

Government run deposit insurance schemes have become commonplace around the world. As at end 2018 a survey by IADI (the International Association of Deposit Insurers) had information on 113 respondents operating globally.[1] Figure 1 indicates that the establishment of deposit insurance schemes is a relatively recent phenomenon globally, with 80 per cent of the schemes being created in the three decades since 1986. International organisations such as the IMF, World Bank, and more recently the FSB have generally encouraged the creation of deposit insurance schemes as a necessary part of a "safety net". The two oldest existing schemes are the FDIC established in the USA in 1933 and a scheme for cooperative banks established in Germany in 1934.[2] (The World Bank also has a database of deposit insurance schemes globally, providing data on their features as at 2013)

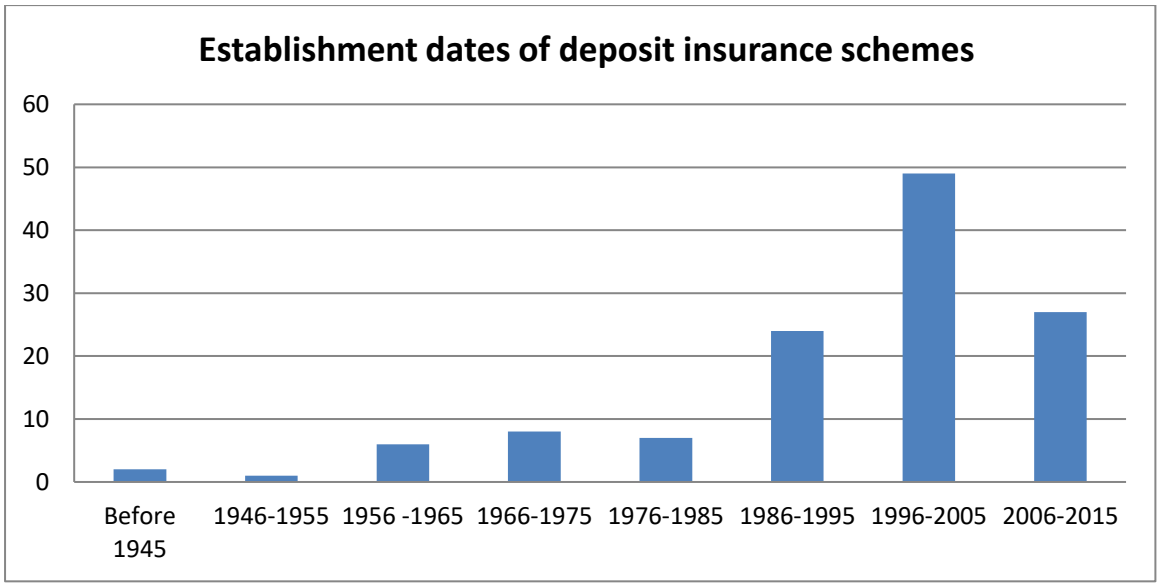



FIGURE 1: GLOBAL GROWTH OF DEPOSIT INSURANCE SCHEMES (SOURCE: WWW.IADI.ORG)

Explicit deposit insurance schemes provide a guarantee that some specified set of deposits will be repaid if a bank or savings institution covered by the scheme fails. This may involve the creation of an

[1] In some countries more than one scheme operates catering for different types of depository institutions, and not all countries responded to the survey.
[2] There was a deposit insurance scheme established in Czechoslovakia in the 1920s. In the USA there had been some State based schemes in the 19th century. Calomiris and Jaremski (ARFE, 2016) provide some historical information.

insurance fund by a government or some association of savings institutions, or the scheme may (as in the case of Australia's Financial Claims Scheme (FCS)) involve an explicit government guarantee. Membership is typically mandatory and very few are privately created and administered (although some governments have created schemes and provided for private sector administration). Private schemes face the problem of confidence in their ultimately solvency when needed to make payments. Mandatory membership is to avoid the problem of adverse selection.

Generally, covered deposits are limited to some maximum amount per depositor (requiring aggregation across a range of possible accounts), although there have been cases (generally temporarily following a financial crisis) where all deposits are covered.

Such guarantees involve a potential cost (in the form of payments made to eligible depositors of a failed bank) to the deposit insurance scheme or governments/taxpayers. There are also operational costs associated with running a scheme and, in the event of a failure, making payments. There will need to be access to a pool of funds to make guarantee payments virtually immediately to ensure covered depositors speedy access to their funds. This could involve either the building up over time of a fund from fees levied on banks, or having access to funds from the government which may then be recouped by a levy upon remaining banks. The former is generally referred to as *ex ante* funding and the latter as *ex post* funding. Of the schemes covered in the IADI 2019 survey, only 12 per cent use *ex post* funding, one of which is Australia.

In practice, there may exist "implicit insurance" where public expectations are that government will prevent losses to depositors. As has been observed by some: "There are two types of countries: those that have explicit deposit insurance and those that have insurance but don't know it!" It is often argued that large TBTF (Too Big To Fail) institutions are perceived by the market to have implicit insurance (and thus a competitive advantage) from the government.

In general, such insurance schemes only cover bank (ADI) deposits and not money market mutual funds (known in Australia as Cash Management Trusts), or other non-bank financial institutions (such as finance companies) whose liabilities may be close substitutes for bank deposits.

## 26.2 The Australian Financial Claims Scheme (FCS)

Australia did not have a deposit insurance scheme until the introduction of the Financial Claims Scheme in 2008. There had been a number of state-based protection schemes (guarantee funds) for credit unions, funded by levies on credit unions, prior to their transition to the ADI framework under APRA, when those schemes were abolished (if not already terminated). The government and regulators had consistently argued that the existence of depositor preference was sufficient to provide protection to depositors, and also that that there was no government guarantee over banks. The

credibility of a "no government guarantee" rhetoric was reduced by the government response to the 2001 failure of the large HIH Insurance Company involving provision of compensation to policy holders, and further reduced by the introduction of a blanket guarantee in 2008 during the financial crisis. The HIH Royal Commission Report (summarised here) recommended the introduction of a policy-holder protection scheme, prompting the Treasurer to commission a Study of Financial System Guarantees in 2003 to investigate what financial products might warrant protection schemes and what features might be appropriate.

The FCS was introduced in Australia in October 2008, following the crisis caused by the Lehman Brothers collapse. Its introduction had been planned anyway, but with very different features – particularly a planned cap on the eligible deposit amount of $20,000. In the event, it was introduced with no limit on eligible deposit amount, which was very quickly scaled back to a $1 million and 4 years later in 2012 to the current $250,000 cap. Table 1 provides details of the evolution of the FCS. (See also this 2009 Parliamentary Inquiry).

The FCS is run by APRA and covers deposits in ADIs and claims on general insurance policy holders. There are no *ex ante* fees, and thus no insurance fund is built up from which claims would be paid. Rather, APRA has access to the government budget to meet any claims, and can then impose a levy (which could be risk-based) on industry participants to repay those funds. To date, there have been no calls on the scheme. Details on the scheme can be found here.

The logic behind not charging *ex-ante* fees consists of several parts (but is not accepted by some commentators who argue the merits of such fees on grounds of avoidance of moral hazard). One is that, should an ADI fail and payouts by APRA be required, APRA stands ahead of virtually all other claimants on remaining assets of the failed institution and is thus virtually certain to be fully compensated for amounts paid out. A second, related reason, is that the balance sheets of the major banks involve only around 30 per cent of their liabilities taking the form of insured deposits. An unthinkable fall in value of bank assets of around 70 per cent would be required before APRA was called upon for payouts – and presumably would, as prudential regulator, have taken actions well before that to prevent such an occurrence. A third consideration is the difficulty in setting a sensible fee schedule when the industry has four giants and many much smaller participants. Fees charged to the latter do little towards financing the costs of a failure of one of the large institutions, and the costs of failure of a small institution would need only very small fee contributions by the large banks. Moreover, it is to be expected that APRA would resolve a failing institution via merger with a healthy institution to avoid the actual failure. To the extent that encouraging such a merger would require some subsidisation, APRA has scope to do so under the conditions of the FCS legislation.

TABLE 1 A TIMELINE OF INTRODUCTION AND CHANGES TO THE FINANCIAL CLAIMS SCHEME

| Date | Action |
|---|---|
| **April 1997** | The Wallis Report investigates the implementation of a deposit insurance scheme but deems it unnecessary due to alternative deposit protection mechanisms in place. - *FSI, 1997* |
| **May 2001** | Government introduces the HIH Claims Support Scheme, a compensation scheme for policy holders of the failed HIH insurance company |
| **September 2002** | APRA provides a submission to the HIH Royal Commission including an argument for consideration of a broad financial sector deposit insurance scheme. *Future policy directions for the regulation and prudential supervision of the general insurance industry, 2002* |
| **April 2003** | HIH Royal Commission recommends introduction of a policy holder protection scheme. - *Report of the HIH Royal Commission, 2003* |
| **March 2004** | The Davis Report commissioned by the Treasurer assesses the case for government support for individuals affected by the failure of prudentially regulated institutions and the potential design characteristics of any such scheme. *Study of Financial System Guarantees, 2004* |
| **November 2005** | Council of Financial Regulators recommendation for introduction of a Financial Claims Scheme Council of Financial Regulators – Failure and Crisis Management in the Australian Financial System, 2005 |
| **June 2008** | Announcement of planned introduction of a Financial Claims Scheme capped between $20,000 and $50,000, Banking sector argued for low cap and introduction of post-funded, $20K cap, financial claims scheme (also coverage of general insurance) scheduled for parliamentary approval week of Lehmann crisis. Legislation to give APRA priority claim over failed institution assets for recouping insurance payouts |
| **September 2008** | The failure of US investment bank Lehman Brothers (which filed for chapter 11 bankruptcy protection) severely disrupted global financial markets and governments and regulators worldwide responded by introducing government guarantees over bank debt, enhancing depositor insurance, and introducing other support and protection mechanisms. |
| **October 2008** | The Australian Government introduced the Financial Claims Scheme in conjunction with a guarantee scheme for bank debt. The guarantee of deposits was initially unlimited but reduced to a cap of $1,000,000 on 28 November 2008. |
| **7 February 2010** | Government announces Guarantee scheme for new debt issues and large deposits to be closed on 31 March 2010 |
| **December 2010** | Government announces that the Financial Claims Scheme is to remain as a permanent feature of the financial system |
| **May 2011** | The Council of Financial Regulators (CFR) releases their recommendations for the Financial Claims Scheme following a review of the scheme. The most significant recommendation stemming from the review is a reduction in the cap to between $100,000 and $250,000 |
| **September 2011** | Government announces a reduction in the Financial Claims Scheme cap to $250,000 to apply from 1 February 2012. |
| **October 2012** | Treasury "Post-Implementation Review — Financial Claims Scheme for General Insurance Policyholders" |
| **August 2013** | Government announces plans to introduce an ex ante levy of 5-10 basis points on insured deposits at ADIs to be paid into a Financial Stability Fund |
| **November 2014** | Financial System (Murray) Inquiry recommends retention of ex post levy rather than ex ante fee approach; agreed to by Government, September 2015 |
| **May 2017** | Announcement of the Major Bank Levy on 5 largest banks (6 basis points on liabilities other than insured deposits), motivation as budget revenue source, justified by some as implicit guarantee fee |

## The Wholesale Debt Guarantee of the GFC

Also introduced at the same time as the FCS in 2008 was a Wholesale Debt Guarantee (WDG) Scheme, designed to enable Australian banks to continue accessing the international debt markets which had

been badly disrupted. For a fee, Australian ADIs were able to obtain a Federal government guarantee over new bond issues (and deposits exceeding $1 million) of up to 5 years maturity. This scheme, run by the Australian Office of Financial Management (AOFM) was closed to new issues in 2010. The total guaranteed reached a maximum of $170 billion. (More information is available in the 2016 RBA Bulletin article by Schwartz and Tan and here).

Many other jurisdictions implemented similar schemes, and there was considerable debate over the appropriate pricing of the fees charged. The guarantee fee was set at 70 basis points for AA rated borrowers and 100 (130) basis points for A (BBB) rated borrowers. The usage was dominated by the four majors who were the only AA rated issuers, and smaller banks claimed that the fee structure disadvantaged them. Luoung et al (PBFJ, 2018) examine the effect of the WDG scheme on bank funding costs and find that usage reduced overall funding cost and, perhaps more importantly, that some funding benefits remained subsequently consistent with the scheme having increased perceptions of implicit government guarantees.

## NZ approach

New Zealand has been one of a few developed countries without a deposit insurance scheme, and the authorities have long held the view that it is undesirable, and that encouraging market discipline by depositors and other creditors is preferable. They have instead advocated an "Open Bank Resolution" model which involves applying a sufficient "haircut" to deposits and other liabilities of a troubled bank to restore it to an acceptable level of solvency and pursuing options for merger or other resolution arrangements while the bank remains open for business. The approach is likely to require at least a temporary government guarantee over deposits (and other liabilities) to prevent a run on the bank, and has not yet been put to the test. Some point to the dominance of the New Zealand banking market by the major Australian banks and APRA regulation of those banks as enabling the NZ authorities to adopt such a "free market" approach.

While this has been the position advocated for a significant time, the GFC led to the situation in October 2008 where a wholesale funding guarantee was introduced (on less favourable terms than Aust), together with a retail funding guarantee. This was on an opt-in (by the bank) basis, was fee based, and included (non-regulated) finance companies. It involved a $1 million cap until October 2011, and there were a number of failures of finance companies which led to taxpayer costs

Since 2012 the approach has reverted to reliance on open bank resolution (OBR), but this approach is under review as at 2021 with deposit insurance up to $50K for all licensed deposit takers (funded by levies) proposed to be implemented.

## 26.3 Theory

The typical arguments advanced in support of deposit insurance schemes reflect a number of features of banking. Foremost among these is the perceived susceptibility of banks to runs, arising from issuing at call deposit liabilities to finance longer term loans, as reflected in the model of Diamond and Dybvig. But also relevant is the risk of contagion (of a run at one bank inducing a run at others) arising from the inability of depositors to discern whether causes of problems at one bank are purely "local" (ie confined to that bank) or "global" (affecting all banks). A further rationale is financial consumer protection concerns arising from the pervasiveness of imperfect information and inability of some depositors to be able to assess and/or understand the risk of loss from holding bank deposits. Finally, disruption to economic activity (and the personal costs) associated with a bank closure and inability to access funds used for payments purposes are also relevant.

The objectives can thus be listed as:

- Prevention of runs
- Reduce risk of contagion
- Protection of uninformed depositors
- Prevent payments system disruption
- Early access to funds during resolution process

However, it is important to remember that the introduction and design of a deposit insurance scheme is a political act, raising the possibility that this does not reflect purely economic logic, but may reflect some form of "political bargain" generating benefits for some influential stakeholders. Calomiris and Jaremski (2016) examine, *inter alia*, the role of political factors in explaining the introduction of deposit insurance. They suggest that private interest theories (whereby deposit insurance introduction reflects a political bargain involving benefits to some favoured groups) dominate public interest theories (in which considerations of economic efficiency gains from increased banking stability prompt deposit insurance introduction).

However, also drawing on economic theory, there are potential costs associated with the existence of deposit insurance. The most commonly heard is the potential for moral hazard. This has several ingredients. One is that bankers, acting in the interests of owners may be induced to take on higher levels of risk. The second is that depositors will pay less attention to bank risk-taking and thus exert less market discipline. (Adverse selection may also be an issue if deposit insurance enables poorly skilled managers to establish banks and thereby increase the overall risk being covered by the scheme).

Calomiris and Jaremski (ARFE, 2016) provide a recent survey of the numerous studies of whether deposit insurance induces greater risk taking in banking, and argue that there is significant evidence that this is the case. Those studies cover a wide range of countries and types of schemes, and one lesson is that the characteristics of a scheme and the institutional framework within which it operates is relevant for whether moral hazard effects arise.

To assess the moral hazard argument, it is important to identify what the counterfactual situation might be. One extreme possibility is that in the absence of deposit insurance, depositors can fully assess bank risk taking and will respond by demanding appropriately higher deposit interest rates. The other extreme possibility is that depositors believe (wrongly) that bank deposits are perfectly safe, and provide deposits at the risk free interest rate regardless of bank risk-taking.[3] In practice, there may be a mix of both "aware" and "unaware" depositors and other creditors, but for the moment assume only one type.

In the latter case of no risk awareness, introduction of a deposit insurance scheme will have no effect on the interest rate received by depositors, and nor will it have any effect of inducing greater risk taking by banks, if it is assumed that pre-introduction depositors only demand the promise of the risk free rate of return. To the extent that the bank owners encourage risk taking, it arises from the existence of limited liability, not the existence/non-existence of deposit insurance.

Figure 2 illustrates this outcome using a simple option analytic framework relating payoffs to stakeholders at the end of one year, when deposits are due for repayment. Depositors provide $D_0$ of deposits at the risk free rate ($r_F$) regardless of whether deposit insurance exists or not. The payoff to shareholders in both cases is the same – if bank asset value is below $D_0(1+r_F)$ and the bank fails, they get nothing but otherwise have the excess over that value. Their payoff is described as a call option over the bank's assets with a strike price of $D_0(1+r_F)$, and their incentive to increase the value of the call option would lead them to take greater risk via investing in more risky assets, or increasing bank leverage.[4]

In this (simplistic) case, depositors benefit from no longer being exposed to risk for which they were previously uncompensated. The bank receives no benefit from the deposit insurance (deposits cost the same) but depositors are protected from loss when the bank fails, with the insurer (government) instead bearing the loss. It is thus to be expected that the insurer will demand compensation for taking

[3] For simplicity, the analysis is assuming that bank deposits provide no other services (such as use in payments) which could lead (in the absence of specific fees being charged) to payment of an interest rate below the risk free rate.

[4] In this framework, increasing leverage implies withdrawing equity from the bank. While the consequent reduction in the current assets of the bank reduces the value of the call option, that reduction is less than the value of equity they have recouped.

on this risk by charging a fee to the bank, and the "actuarially fair" fee should increase with the degree of bank risk-taking. Introducing deposit insurance with appropriate risk related fees means that banks no longer profit from the mispricing of risk by their depositors. In this case of "unaware depositors", the introduction of deposit insurance does not create or aggravate moral hazard which already existed because of limited liability.[5]

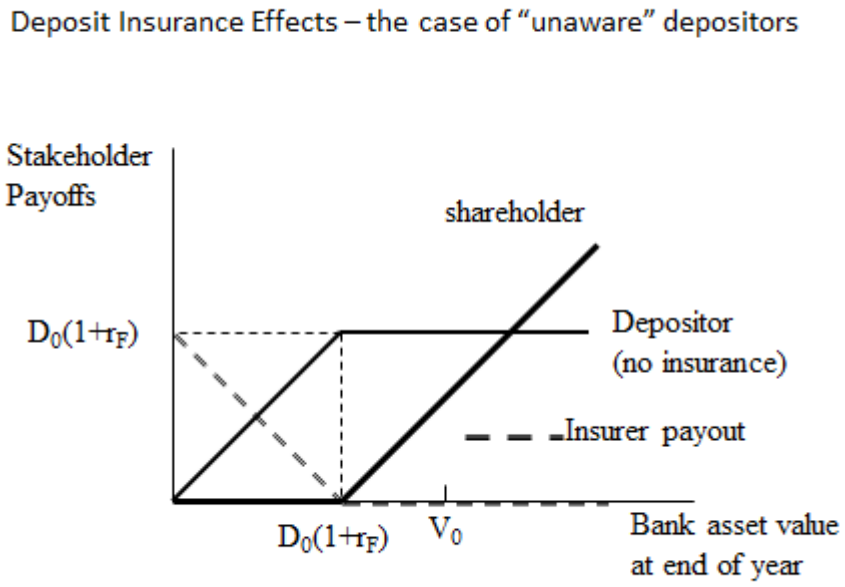



FIGURE 2: DEPOSIT INSURANCE AND MORAL HAZARD

In the alternative extreme case, the "aware" depositors previously received an appropriate risk premium in the deposit interest rate (R), and the bank had no incentive to increase risk because depositors would simply demand a higher risk premium in deposit rates. Introducing deposit insurance leads depositors to now accept the lower risk free deposit interest rate ($r_f$). If there is no charge for the provision of deposit insurance, the bank shareholders gain from the higher value of their implicit call option arising from its lower strike price ($D_0(1+r_f)$). Depositors gain nothing, since their protection against loss has come at the expense of the reduction in the deposit interest rate. The gain to the bank shareholders is equal to $D_0(R-r_f)$ which is the change in the intrinsic value of the option, plus any change in the time value of the option (measured at $V_0$, the current bank asset value).

One consequence of this is that, in the case of 'aware" depositors, the introduction of deposit insurance provides a benefit to banks due to the better terms on which they can access deposit funds. Arguably that creates a case for a fee, equivalent to the implicit fee which depositors had been

[5] This point is made by Fegatelli (JFS, 2010)

charging for the implicit put option they had been granting to bank shareholders[6] via demanding higher deposit interest rates. In this case, there is a moral hazard effect due to the introduction of deposit insurance, since the market discipline of the "aware" depositors has now disappeared.

arguments.

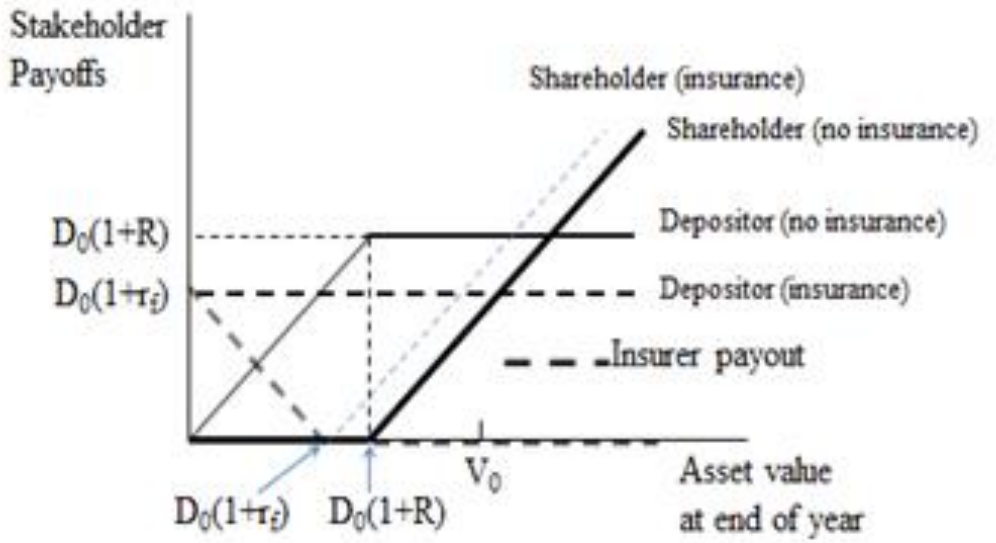



FIGURE 3: DEPOSIT INSURANCE INTRODUCTION WITH "AWARE" DEPOSITORS

Between these two extreme cases a more realistic situation may be where in the absence of deposit insurance, depositors are aware that bank deposits entail some risk (perhaps based on average historical experience) but are unable to identify more risky from less risky banks. Ignoring the "lemons" problem inherent in this scenario (or assuming that there is some impediment to individual bank risk taking that prevents the average risk level from being driven continuously higher) bank deposit rates would involve some risk premium over the risk free rate. Then the introduction of deposit insurance would induce depositors to accept a risk free interest rate, generating a benefit to the bank shareholders, and potentially encouraging individual bank risk taking (if prior impediments have disappeared).

A general approach to the moral hazard problem is that the imposition of risk related fees for deposit insurance, allied with supervision (and risk based capital requirements) can in principle, if not in practice, limit moral hazard concerns. While that may be so, introduction of risk related fees does not

[6] The put option is the right of the shareholders to put the assets of the bank to the depositors at a strike price of $D_0(1+r_D)$ which they would exercise in the case of bankruptcy, enabling payment of the promised amount to depositors.

necessarily remove the benefit that banks receive from the introduction of deposit insurance and may support the "political bargain/ private interest" theory explaining the creation of deposit insurance schemes. Note that the benefit which banks get from the introduction of deposit insurance is the amount $D_0(R-r_f)$. This reflects the lower deposit interest rate demanded and thus the lower probability of bank failure associated with the bank risk profile prior to deposit insurance introduction. A more general characterisation of this benefit could refer to the fact that deposit insurance schemes reduce the risk of bank runs and thus enable banks to operate with less liquid assets, ie undertake greater maturity transformation, and thus potentially (dependent on assumptions about competition) have higher profits

In the context of Figure 3, a bank with initial assets with market value $V_0$ and deposit funding of D, now promises depositors a lower future payoff. In addition, it has an option to put the assets to the insurer at a strike price of $D_0(1+r_f)$. "Risk related" insurance premia are typically thought of, and modelled as, the appropriate fee for the new put option (at strike of $D_0$ $(1+r_f)$) which the insurer is providing to the bank. That is, most discussions of deposit insurance pricing do so in the context of considering the value of an option at the strike price incorporating the current deposit interest rate, rather than incorporating the additional benefit from the introduction of a deposit insurance scheme. One reason for doing so is perhaps that it is difficult to assess by how much the introduction of a deposit insurance scheme has changed deposit interest rates. Another is that, in practice, there is potentially a mix of "aware' and "unaware" depositors, such that market discipline might be exerted by some even in the absence of deposit insurance. This relates to the limits placed on insured deposits on the grounds that informed depositors should be able to assess risk and thus do not require such protection. (In practice, large banks typically will have significant amounts of non-deposit debt financing which, depending on priority (preference) arrangements, may be of junior ranking to depositors and thus have incentives to monitor bank risk taking.

Gropp and Vesala (2004) have argued that the introduction of explicit deposit insurance may actually reduce moral hazard if there are specific groups of creditors who are excluded from coverage. If its introduction credibly signals the end of implicit insurance then banks which have large uninsured debt financing, are not TBTF, and have low charter value may reduce risk taking due to increased monitoring by those now exposed to loss from failure. They test these arguments using the case of introduction of explicit deposit insurance schemes in four European countries between 1996 and 1999, and find support for their argument.

## 26.4 Deposit Insurance Characteristics

As noted earlier, deposit insurance schemes are generally government run (or initiated) and compulsory. While an *ex ante* premium is a common way of funding schemes, use of risk-related fees is less common. Of the 124 schemes surveyed by IADI in 2016, half had flat rate premiums, and while others had differential premiums, the nature of their relationship to assessments of bank risk varies widely. IADI (2020) examines how differential premium systems work in practice.

*Ex ante* funding leads to the creation of a fund, providing the insurer with resources to compensate depositors of a failed bank or to facilitate a transfer of the business to another viable bank. The determination of what, if anything, should be a target size for the fund, and how premium rates might be adjusted if the fund is at its target size, are open questions. IADI has a 2018 discussion paper on this topic.

As with any insurer, there will be a desire to monitor the extent of risk taking by the insured entity, such that deposit insurers will be accorded various inspection and other powers. Moreover, because the payment of insurance occurs when a bank needs to be resolved (liquidated, placed under receivership, merged with a stronger entity, etc) the insurer will need to have close relationship with the bank supervisor – and often both supervision and insurance functions will be undertaken by the same entity. (This is also obviously beneficial in enabling the insurance function to assess the riskiness of banks). (The insurer will also have to deal with a number of practical complications involved in actually providing compensation to eligible depositors).

The caps on amount covered vary across jurisdictions. The GFC led to significant increases in the size of caps. In the USA for example, the cap was increased in 2011 from USD 100,000 to USD 250,000, while in the EU (which is integrating national schemes) the cap was generally increased to EUR 100,000 from amounts often in the order of EUR 25,000. Whereas it is common in general insurance to impose an "excess" (the insured is liable for first $X of loss) or provide partial insurance cover (eg covering X% of loss), this has been shown by UK experience in the GFC to be unwise. One reason is that those mechanisms are designed to reduce moral hazard behaviour by the insured, which is less relevant in the case of uninformed depositors in banks. But more relevant, such provisions will increase the incentive to "run" if a bank is thought to be at risk of failure.

Closure / Resolution rules (discussed later) are important for the operation of deposit insurance schemes. In principle, if a bank is unable (or likely to be unable) to meet deposit obligations, the supervisor/insurer takes over the bank and pays covered depositors. In practice, there may be "forbearance", when regulators delay dealing with a troubled bank in the hope that it will recover, with delayed closure incurring at cost to the fund or the taxpayer. Ideally, there will be intervention

before a point of insolvency is reached and a takeover arranged by another bank. This has the advantage that deposit accounts (and the bank's assets) can be transferred to the acquiring bank, reducing complications of actually providing funds to depositors. However, if the bank is insolvent or there are substantial concerns about the true value of the assets, this may require some subsidy which the insurance fund will generally be allowed to pay – if it is the cheapest way of resolving that bank.

It is important to note that the insolvency of a bank could occur with no losses to depositors or the deposit insurance fund. Insolvency occurs if liabilities exceed assets, but only part of those liabilities may be deposits, and there may be priority rules in place which mean that depositors rank above other creditors in a liquidation. That is the case in Australia. In addition, prompt action by a supervisor/insurer should lead to closure of a bank which is "non-viable" but not yet insolvent. In practice there have been numerous cases in the USA and elsewhere that involve banks reporting healthy capital adequacy positions to the regulator, but failing within a few months later with a significant deficiency of assets and imposing costs on the insurance fund. While that could sometimes reflect an event which had occurred in those few months, more often it reflects a recognition that loans or other assets have previously been significantly overvalued in the accounts, or perhaps the uncovering of a fraud which has been underway, but hidden, for some time.

Table 2 provides an illustration of some recent (2016) US bank failures for which data is available, which shows reported deposits and assets as reported in the last provided Call Report (perhaps only 1-2 months prior to failure) and the estimated loss to the FDIC (payouts to insured depositors less recoveries) from the failure. Note that in all but one case, assets exceeded deposits (by 10 per cent in one case)[7] but the FDIC incurred significant losses from the failure (upwards of 10 per cent of reported assets, and in one case 50 per cent).

**TABLE 2: SOME RECENT US BANK FAILURE COSTS (SOURCE: FDIC)**

| Institution Name | Total Deposits $000 | Total Assets $000 | Estimated Loss ($000) @ 12/31/2016 |
|---|---|---|---|
| ALLIED BANK | 64,713 | 66,336 | 6,880 |
| THE WOODBURY BANKING COMPANY | 21,122 | 21,426 | 5,225 |
| FIRST CORNERSTONE BANK | 101,040 | 103,307 | 12,482 |
| TRUST COMPANY BANK | 20,148 | 18,998 | 10,931 |
| NORTH MILWAUKEE STATE BANK | 61,493 | 67,115 | 11,846 |

[7] Information is not provided on total liabilities.

Among the innovations introduced globally as part of Basel 3 have been requirements that for inclusion in regulatory capital, hybrid securities issued by banks are required to have "bail-in" features. This means that such securities would convert into equity or be written down if a bank was getting close to insolvency. This should, in principle, reduce the calls upon deposit insurance funds by ensuring resolution of banks well before assets became insufficient to meet insured deposit liabilities. In practice, there is little experience with "bail-in" and to date smaller banks and deposit takers have not been issuers of such securities. (In the USA issuance of explicit "bail in" securities is uncommon. The Dodd-Frank Act introduced the Orderly Liquidation Authority which gives the FDIC the ability to intervene and place a troubled systemically important financial institution into resolution and allocate losses according to a specified schedule – thus providing a form of "bail-in").

It is important to make a distinction between explicit deposit insurance which provides guarantees over a subset of (essentially retail) deposits and implicit insurance - the possibility that governments might "bail-out" troubled banks by providing funds or guarantees which prevent other stakeholders from losing money. It is widely argued that this is particularly likely for banks which are "Too Big To Fail (TBTF)", and removing adverse effects of perceptions that TBTF is a reality has been a major part of the post –GFC agenda. Relevant measures have included, higher capital ratios and loss absorbing capacity requirements for systemically important banks, levies on such banks as compensation for TBTF and/or giving incentives to shrink in size.

**Deposit Insurance in the EU** (Bocuzzi & De Lisa provides background)

Experiences in the GFC have led to a number of marked changes in banking policy in the EU involving the establishment of the European Banking Union. This includes a Single Supervisory Mechanism (SSM), a Single Resolution Mechanism (SRM) and a unified European Deposit Insurance Scheme (EDIS). An integrated banking system, but with national deposit insurance schemes, raises the question of whether depositors in local branches of foreign banks are covered under the local deposit insurance scheme or the bank's home country scheme, and resulting consequences for which national scheme bears the costs of a failure. (This issue was prominent following the failure of "IceSave", the business name of branches of the Icelandic bank Landsbanki operating in the UK and the Netherlands when the parent failed in October 2008. The UK and Dutch schemes paid out IceSave depositors up to the cap involved in the Iceland scheme, anticipating recouping those costs from it, which turned out to be a long and complex process).

The EDIS, which keeps national schemes in place, is expected to be fully operational by 2024. Initially it involves reinsurance arrangements among national deposit insurance schemes before transitioning

via coinsurance arrangements to a situation in which the EDIS is the recipient of fees charged and provides funds for payouts in cases of bank failure. National schemes still have an operational role (making payouts, resolution procedures etc), but coverage levels and fees are set at the EU level.

The EU has also been developing a single resolution fund to replace national resolution funds of its members. Such resolution funds are separate from explicit deposit insurance schemes and are established by levies on non-insured liabilities of member banks. They have been introduced to avoid costs to the taxpayer associated with resolving a troubled bank, such as would occur by an injection of government funds (a bail out) to ensure its survival. In general the resolution funds available are anticipated to be available for supporting (subsidising) the acquisition of failing institution by another entity, or compensating creditors who would incur greater losses than under normal insolvency proceedings. In the EU case, resolution funds could only be used to recapitalise a failing institution if there has been a bail-in of at least 8 per cent of total liabilities.

## 26.5 Merton's (1977) Derivation of Value of Deposit Insurance

Merton used an option pricing approach to derive a "fair" price for provision of deposit insurance, and there have been numerous adaptations of that model by researchers since. He assumed a bank funded only by insured deposits and equity, with the amount promised at time T to deposits of B. (Thus, $Be^{-rT}$ is the market value of the deposits if guaranteed –where r is the risk free rate). T is assumed to be the date of next inspection (eg one year) at which time the bank will be found to be either solvent or insolvent. Depositors essentially have a risky deposit worth B (if the bank is solvent) or less (the bank's assets) if the bank is insolvent, plus they have a put option from the insurer, giving them the right to put the bank assets to the insurer at a strike price of B (the promised payment). Together, these generate a risk-free deposit paying B.

Denote the market value of total bank assets by V, and asset volatility by σ. Using the Black-Scholes formula, the value of the put option is:

$$G(T) = Be^{-rT}N(x_2) - VN(x_1)$$

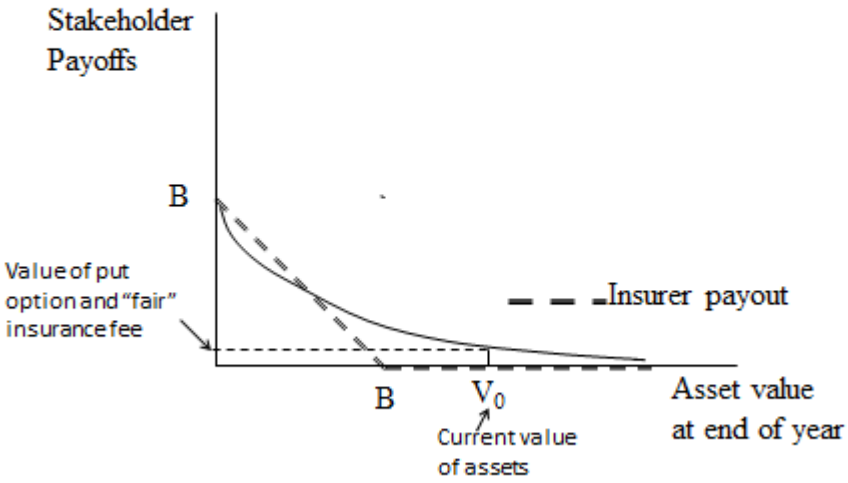
where: $x_1 = \{\log(B/V)-(r+\sigma^2/2)T\}/\sigma\sqrt{T}$; $x_2 = x_1 + \sigma\sqrt{T}$

Denoting g = G(T)/D as the value of guarantee per dollar of current deposits, then substitute $De^{rT} = B$ in $x_1$ to give

$$g = N(h_2) - (1/d)N(h_1)$$

where $d= D/V$; $h_1 = \{\log(d) - \tau/2\}/\sqrt{\tau}$; $h_2 = h_1+\sqrt{\tau}$; $\tau = \sigma^2T$

Merton provides illustrative figures. For d = 0.95, T=1, $\sigma^2$ = 0.006, g = 0.01209 ($1.20 per $100). For d =0.90, the value falls to $0.32 per $100).




## Applying Merton's Approach

There are obviously a large number of significant simplifying assumptions in Merton's model which raise the question of its applicability in reality. First, what is the appropriate value of T (the expiry date of the option)? In practice, deposits are at call or specific maturity such that there is no one date corresponding to the hypothesised option expiry date. A standard approach has thus been to assume that T is the time till the next supervisory examination (occurring on an annual basis).

Second, how is it possible to estimate σ (the asset volatility). In theory this can be derived approximately from equity volatility for listed banks using the leverage adjustment

$$\sigma_E = (A/E)\,\sigma_A$$

where E is equity market value and A is the market value of assets. The latter is, however, unobservable so that generally the book value of assets is used or it is approximated by summing the market value of equity and the book value of other liabilities. Marcus and Shaked (1984) note that the value of deposits plus equity equals the value of assets plus the value of deposit insurance, such that the simple leverage adjustment is not correct and asset volatility needs to be estimated as part of the solution of simultaneous equations.

Third, in general, only some proportion of deposits is insured. A bank could become insolvent but, depending on the structure of its liabilities and preference arrangements, have sufficient assets to

repay depositors or the deposit insurer in full. Ronn and Verma (1986) analyse this situation (see later also) and relate option derived values for deposit insurance in the USA to actual FDIC rates. They argue that the option based approach, being based solely on market and balance sheet data, avoids judgemental decisions by the FDIC.

Fourth, early intervention by a supervisor is a possibility. Saunders and Allen (1993) have modelled this as the insurer writing a callable put.

## 26.6 Deposit Insurance Scheme Price and Coverage: International Comparison

The conventional wisdom is that the value of the put option provided to bank owners "should" be reflected in the insurance premium charged. It should be linked to asset riskiness (positively) and capital ratio (negatively). As with any insurer, auditing of risk taking, value of assets insured, etc can be expected. There is a tendency for insurance premia to be charged *ex ante*. In general, policy makers prefer to limit insurance and encourage market discipline by uninsured stakeholders. Alternative approaches involve regulating risk taking directly or by linking the required capital position to some risk measure. Table 3 shows information from the FSB on the nature of schemes in a number of major countries. That is a little dated, particularly for member countries of the EU where an EU-wide scheme is being implemented. Table 4 shows the size of insurance caps (as at 2018) for a number of countries.

**TABLE 3: DEPOSIT INSURANCE SCHEME CHARACTERISTICS GLOBALLY**

| | Premiums | | | |
|---|---|---|---|---|
| **Jurisdiction** | **Risk-based** | **Rate** | **Assessment Basis** | **Back-Up Funding** |
| Argentina | Yes | 0.015-0.3% | Eligible deposits | Borrow in market and require advanced premium payments |
| Australia | N/A | N/A | N/A | post-funded scheme, standing appropriation from Parliament, up to A$20.1 billion per failure |
| Brazil | No | 0.0125% | Covered deposits | Special premiums, advances, private sector loans |
| Canada | Yes | 2.8 , 5.6, 11.1, 22.2 bp | Covered deposits | Can borrow from the Government or markets |
| France | Yes | | Eligible deposits | Borrowing in market and additional premiums |
| Germany | Yes | 0.016% | Liabilities of protected depositors | Extraordinary contributions from institutions; borrowing in market |

| | | | | |
|---|---|---|---|---|
| Hong Kong | Yes | 0.0175-0.049% | Covered deposits | Stand-by credit facility from the Exchange Fund |
| India | No | 0.1% | Eligible deposits | RBI supplementary financing |
| Indonesia | No | 0.2% | Average monthly deposits | Government lending and recapitalization facility |
| Italy | N/A | N/A | N/A | |
| Japan | No | | Eligible deposits | Borrowing from central bank or market |
| Korea | No | | Eligible deposits | Borrowing from the market, or government |
| Mexico | No | 0.4% | A proxy of total bank liabilities | Ability to impose extraordinary premiums, Borrowing |
| Netherlands | N/A | N/A | N/A | Apportions costs ex-post over the banks. |
| Russia | No | 0.4% | Eligible deposits | Bond issuance, extra premiums, federal budget |
| Singapore | Yes | 0.02-0.07% | Covered deposits | Private sources or central bank |
| Spain | Yes | 0.002 basis points | Eligible deposits | Central bank can provide funding but requires passage of a law |
| Switzerland | No | | | Banking sector sources, borrow from market. |
| Turkey | Yes | 11 - 19 bp | Insured deposits | Advance payments from banks, Treasury, CB |
| United Kingdom | N/A | N/A | N/A | Levies on other deposit takers, borrow from market, government |
| United States | Yes | 2.5 - 45 bp | consolidated total assets minus equity | line of credit from Treasury. Authority to borrow |

- *Source: Financial Stability Board, Thematic Review on Deposit Insurance Systems*

**TABLE 4: DEPOSIT INSURANCE SCHEME CAPS: IN USD AT YEAR-END 2018**

| Jurisdiction | Per depositor per institution (USD) |
|---|---|
| Argentina | 12,000 |
| Australia | 180,000 |
| Bangladesh | 1,192 |
| Brazil | 64,519 |
| Canada | 73,529 |
| Chinese Taipei | 97,615 |
| European Union | 114,943 |
| Hong Kong SAR | 64,103 |
| Hungary | 100,000 |
| Indonesia | 139,860 |
| Japan | 90,098 |
| Korea | 44,719 |
| Lao PDR | 5,677 |
| Malaysia | 60,445 |
| Norway | 230,189 |
| Russian Federation | 20,152 |
| Singapore | 55,314 |
| Sweden | 105,897 |
| Switzerland | 100,000 |
| United States | 250,000 |
| Vietnam | 3,213 |

- *Source: IADI, APRA*

More (albeit dated) information on deposit insurance systems around the globe can be found from the World Bank WPS6934. There are still many emerging economy countries without explicit deposit insurance. Most countries that had an explicit scheme had ex ante fees (although only 75 per cent of high income countries did so). Around 30 per cent of countries charged risk based premiums rather than non-risk-based premiums (with little variation by country income level)

Official Views on the merits of ex ante funding and the complications provided by depositor preference are somewhat opaque.

- "may be merits to the broader adoption of *ex-ante* funding arrangements, and IADI should consider whether a pre-funded DIS needs to be more explicitly advocated in its guidance" FSB (2012)
- IMF recommended in recent FSAPs (eg Canada and Brazil) that introduction of depositor preference should be considered, EU has mandated it.

- "The treatment of depositors in the creditor hierarchy can have a profound impact on the costs incurred by the deposit insurer and the failure resolution regime more generally" (IADI, 2014).
  - IADI Principle 16.2 "The deposit insurer has at least the same creditor rights or status as a depositor in the treatment in law of the estate of the failed bank".

### Recent Relevant Developments

- EU and UK have recently introduced depositor preference
- EU Single Resolution Fund – levy on "non-covered" liabilities less own funds (equity)
- Bail-in debt requirements (TLAC), FSB proposals for G-SIBs endorsed by G20 (Nov 2014)
  - TLAC must exclude insured deposits and liabilities preferred to normal senior unsecured creditors
- Significant concern over "national depositor preference" and implications for subsidiarisation v branch requirements for foreign banks and eligibility of foreign branch deposits for coverage by national deposit insurance schemes

## 26.7 Deposit Insurance Pricing; Depositor Preference and Australia

Australian complications for pricing and scheme design include

- Size distribution of ADIs (market share)
- Depositor Preference
- Non-deposit funding
- Size of failure
- Scheme coverage
- Mechanics of operation

A result has been a choice of *ex post* funding for the Financial Claims Scheme, with the structure of depositor preference arrangements a major factor in that choice. The essential argument is that:

(a) There are many subordinated creditors who rank behind insured depositors and APRA, in their stead, as claimants on the failed bank's remaining assets

(b) The composition of bank balance sheets makes it highly unlikely that APRA would not recover all funds paid out to insured depositors. The "fair price" of insurance is thus extremely close to zero.

(c) To the extent that subordinated creditors demand higher interest rates to compensate for the risk involved, they are effectively providing insurance against loss to insured depositors and APRA. The banks are paying for that via the higher interest rates paid, so to impose deposit insurance fees would be a duplication.

(d) However, if subordinated creditors assume there is implicit insurance, then their required returns will not involve an appropriate risk premium in interest rates paid by the bank. A case may exist for some form of government insurance levy, but this would not be on insured deposit amounts alone. The risk is one of entrenching perceptions of implicit insurance.

## Depositor Preference Types

There are many variants of depositor preference, with a simple categorisation based on the simplified balance sheet shown Table 5 as follows (where $\underset{>}{S}$ represents "seniority").

- *Tiered Depositor Preference*
  - Insured deposits $\underset{>}{S}$Uninsured Deposits $\underset{>}{S}$ Other Creditors
  - Deposit insurer may inherit insured deposit seniority
- *General Depositor Preference*
  - Insured deposits $\underset{=}{S}$Uninsured Deposits $\underset{>}{S}$ Other Creditors
  - Deposit insurer may inherit depositor seniority
- *No Depositor Preference*
  - Insured deposits $\underset{=}{S}$Uninsured Deposits $\underset{=}{S}$ Other Creditors
  - Deposit insurer may have no seniority
  - Deposit Insurance Pricing

| | | | |
|---|---|---|---|
| Assets | A | Insured Deposits | $D_i$ |
| | | Uninsured Deposits | $D_u$ |

| | | | |
|---|---|---|---|
| | | Other Creditors | C |
| | | Equity | E |

**FIGURE 4: SIMPLIFIED BANK BALANCE SHEET**

Precise information on depositor preference regimes globally is not easy to determine but table 7 provides some information

**TABLE 5: DEPOSITOR PREFERENCE REGIMES AND INSURER PRIORITY GLOBALLY**

| | ***Depositor Preference Regime*** | | | |
|---|---|---|---|---|
| | Tiered | Insured Only | General | None |
| ***Deposit Insurer Priority*** | $D_I \overset{S}{>} D_U \overset{S}{>} C$ | $D_I \overset{S}{>} D_U \overset{S}{=} C$ | $D_I \overset{S}{=} D_U \overset{S}{>} C$ | $D_I \overset{S}{=} D_U \overset{S}{=} C$ |
| Ahead of Uninsured Depositors and General Creditors | EU<br>UK<br>Indonesia | Hong Kong<br>Switzerland | Australia<br>Singapore[a] | |
| Equal to Uninsured Depositors and ahead of General Creditors | | | USA<br>Malaysia<br>Russia<br>China<br>Taiwan[b] | |
| Equal to Uninsured Depositors and General Creditors | | | India | Canada<br>Brazil<br>Japan<br>Norway<br>Sweden<br>Korea |
| [a] Preference over deposits by other banks [b]Article 38 of Deposit Insurance Act | | | | |

## Amending the Merton Model for Depositor Preference[8]

The Merton model assumes all deposits insured, but this is easy to amend for insurance of only part of liabilities and different preference arrangements. Let the end of period promised amounts be represented by:

$B_i$ = insured deposits, $B_u$ = uninsured deposits, $B_c$ = other creditors

If there is no depositor preference and the bank fails, the insurer pays out insured depositors ($B_i$) and receives share ($B_i/(B_i+B_u+B_c)$) of bank assets. This is equivalent to $B_i/(B_i+B_u+B_c)$ of put option on bank assets as shown in Figure 5

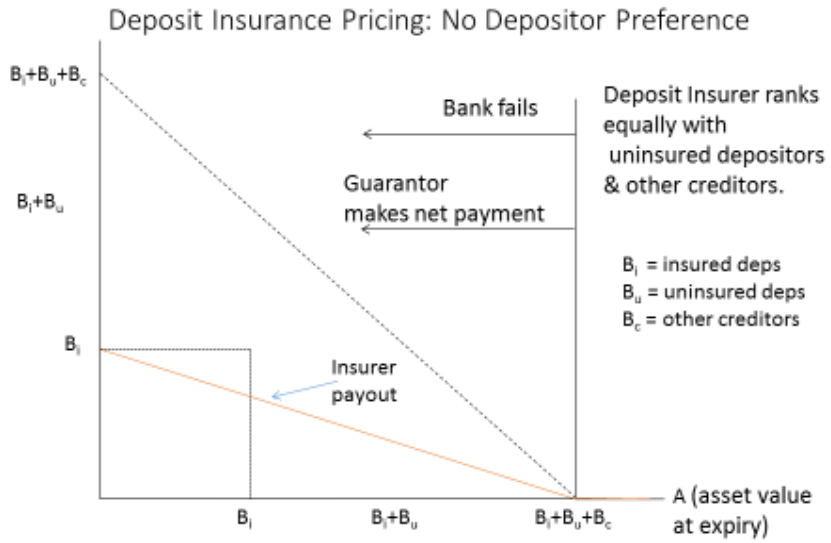



**FIGURE 5: INSURER PAYOUT WITH NO DEPOSITOR PREFERENCE**

The fair value of deposit insurance under these conditions, and in the following cases, is easily estimated by using the appropriate adjustment to the Merton Model for the option payoff depicted.

If there is general depositor preference the insurer pays $B_i$ and gets $B_i/(B_i+B_u)$ of bank assets if $A < B_i+B_u$ and $B_i$ otherwise as shown in Figure 6.

[8] For more detail see Davis (JBR, 2020)

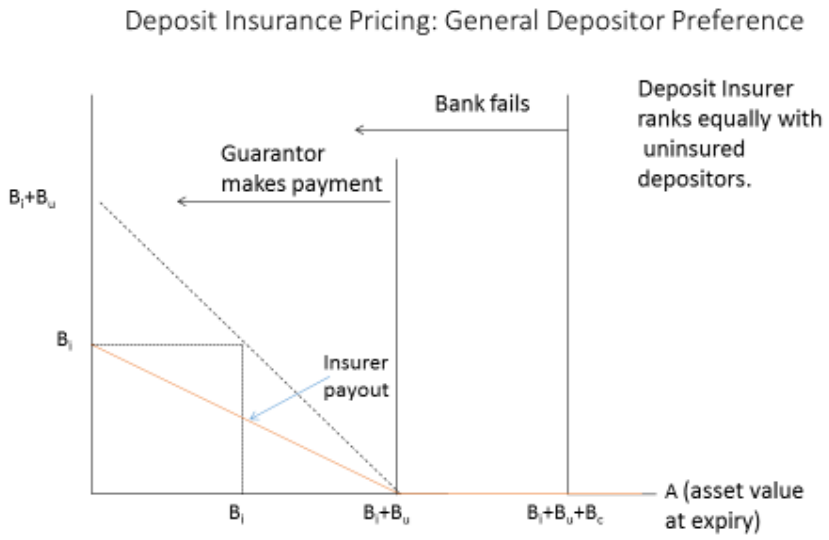



**FIGURE 6: THE EFFECT OF GENERAL DEPOSITOR PREFERENCE**

It should be noted that If depositor preference applies (and all equal), the fair value *per dollar of insured deposits* is independent of the proportion of deposits guaranteed. Suppose there is partial coverage of x proportion of deposits: $D_p = xD_t$. Then upon failure the insurer payout is

$(G_p) = x(A-D) = xG_t$

Where $G_t$ = payout if all deposits covered and $G_p/D_p = g = G_t/D_t$

Note this result could be from either insurance of x% of each deposit or x% of total deposits insured, however there will be different implications for stability and depositor monitoring.

If there is tiered depositor preference then the payout of the insurer is as shown in Figure 7

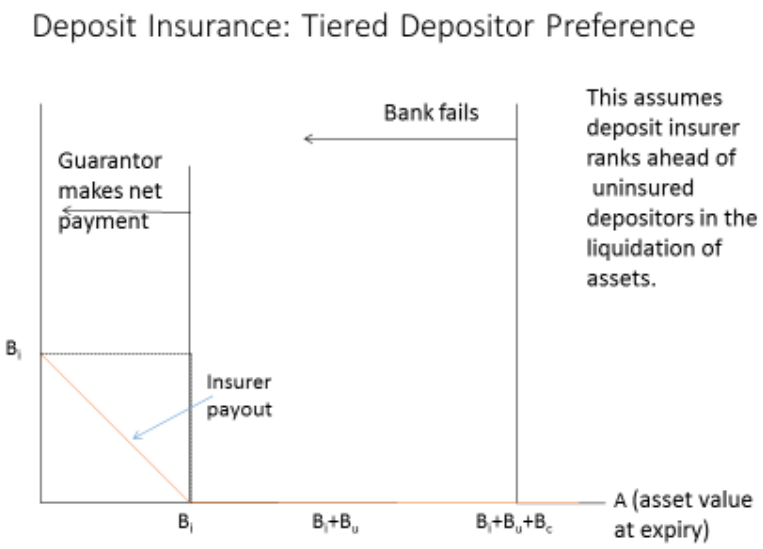



**FIGURE 7: THE EFFECT OF TIERED DEPOSITOR PREFERENCE**

The differences between the payout situations is shown in Figure 8.

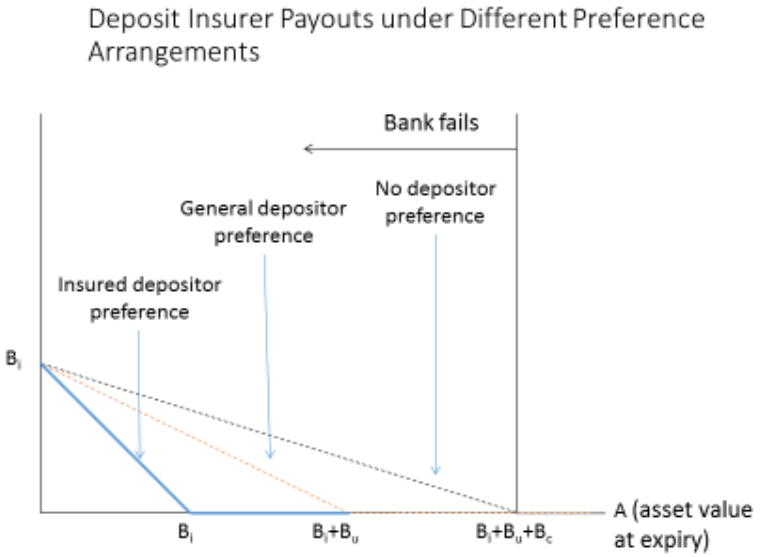



**FIGURE 8: DEPOSIT INSURER PAYOUTS UNDER DIFFERENT PREFERENCE ARRANGEMENTS**

It is relatively straightforward to estimate the effects of different types of depositor preference on the fair value of deposit insurance using the Merton model. Table 6 illustrates for various assumptions about key parameters. If can be seen that the impact of general depositor preference is very

significant, reducing the fair value in relatively realistic cases such as columns (c) and (d) by about 80 per cent compared to the no-preference case. When tiered preference is assumed the effect is even more dramatic.

TABLE 6: PREFERENCE EFFECTS ON FAIR VALUE OF INSURANCE

| | Cases | | | |
|---|---|---|---|---|
| **Funding Mix** | (a) | (b) | (c) | (d) |
| Insured Deposit (Di)% of assets (BV) | 0.8 | 0.8 | 0.8 | 0.7 |
| Uninsured Deposit (Du)% of assets (BV) | 0.15 | 0.1 | 0.05 | 0.1 |
| Other Creditors (C)% of assets (BV) | 0 | 0.05 | 0.1 | 0.15 |
| Equity % of assets (BV) | 0.05 | 0.05 | 0.05 | 0.05 |
| **Depositor Preference Assumptions** | Fair Value per $100 of insured deposits | | | |
| No depositor preference | $1.02 | $1.02 | $1.02 | $0.89 |
| General Depositor Preference | $1.02 | $0.29 | $0.05 | $0.004 |
| Tiered Depositor Preference | $0.005 | $0.005 | | $0 |

## Consequences

Under depositor preference, non-preferred creditors should demand higher returns. They "provide insurance" to depositors against loss and insurer fees for explicit deposit insurance would be double payment!

But this is not the case if there is implicit insurance (perceptions of bail out). The appropriate solution is not fees for explicit deposit insurance, but fees for implicit guarantees which would be based on total (not insured) liabilities and reflect subsidy via lower funding costs. (The Australian Major Bank Levy can be justified in this way – although motivated more as a revenue raising exercise by the government).

## Complications

The regulatory agenda including bail-in requirements and other prudential requirements etc is aimed at reducing implicit guarantees, but (arguably) not yet successful

Increased use of collateralised funding by banks and encumbered assets could be expected to affect deposit insurance pricing. There are less assets available for the deposit insurance scheme to access

in order to compensate depositors, but there is also less deposit funding (due to use of collateralised funding). The fair value needs to be calculated by reference to the value of unencumbered assets relative to insured deposits. (Encumbrance occurs via: covered bonds, repo financing, netting of derivatives, central bank liquidity support).

Bail-in AT1 and Tier 2 capital requirements also complicate matters. There is another layer of bank creditors subordinated to insured (and other) depositors, with obvious, if hard to quantify, implications for the value of explicit limited deposit insurance guarantees. Assuming that bail in will occur when capital is still positive, the effect of introduction of such liabilities is to further reduce the fair value of explicit deposit insurance, through reducing either the bank probability of default or loss given default for insured depositors.

## Australian Pricing Results

Calculations for the fair price of deposit insurance under the Financial Claims Scheme give actuarially fair premiums ≈ 0, reflecting balance sheet structures, capital ratios, and depositor preference.

Such values were calculated in the Study of Financial System Guarantees for a $50K cap, where there was assumed to be no priority of APRA over uninsured depositors. While the current cap is $250K, APRA has priority over uninsured depositors. For the major banks, insured deposits are about 30 per cent of total assets. (Note that Table 6 gives a zero value even when that ratio is 70 per cent)! Given APRA's priority position it would require a fall in asset values of around 60-70 per cent before APRA would not recoup all it had paid out! For smaller ADIs the proportion of insured deposits is much higher, but so generally is their capital ratio, giving very small values for any fair value estimate.

Any insurance scheme is problematic in Australia with such a skewed size distribution of ADIs, and most potential failures are handled by APRA involving exit by takeover. To the extent that APRA needs to make payouts, it is able to draw on up to $20 billion from the government budget, for which it can then impose an *ex post* levy on other ADIs.

### Ex ante v ex post premium payments

In thinking about this issue, it is important to recognise that the main difference is whether the scheme operates with a positive target balance (from ex ante fees) or a zero target balance (and having ex post levies). Regardless of the type, if a payout occurs, there is then a period during which fees are required to adjust the size of the fund back to its target balance. In that sense, the common argument that an ex post levy will impose strains on the banking industry at an inappropriate time after a failure has occurred is misleading. One benefit of the ex post approach is that it does not involve the build up of a fund which has to be managed by bureaucrats.

It is also sometimes suggested that ex post levies are more likely to involve moral hazard since they may not be risk related, but there is no reason that this cannot be done. Others raise issues of fairness – that the failed institution has not contributed to the fund. If that institution has been exploiting the guarantee then that argument perhaps has some merit, although the shareholders lose all their equity value. If the failure is simply down to "bad luck" which could have happened to any of the institutions then there is no issue of fairness.

### Systemic Risk and Deposit Insurance Premiums

Acharya, Santos, Yorulmazer (FRBNY, Oct 10) argue that premiums should increase with probability of joint bank failure (correlation of bank returns and similar asset portfolios). The reason is that a failed bank can be sold to another bank, liquidated (sold to investors), or "bailed out" by government (under resolution mechanisms as discussed in the next section). However, only other banks can extract full value from assets such that the sale proceeds are likely to be less if multiple failures have occurred and there are fewer surviving banks. Other banks unable to afford purchase of failed large bank, so liquidation leads to loss on asset value. If the government compares cost of bailout (taxpayer cost) with cost of liquidation (insurance cost less asset sales) then in crisis, asset sale value less, which increases likelihood of bailout. Allowing for social costs leads to higher than "actuarially fair" premiums and relatively larger gap if banks adopt correlated positions This leads to a conclusion that larger premiums should apply for bigger banks, and that with regulatory intervention and "bail-out" possibility, higher premiums are required to induce low correlation and cover all expected costs of failures.

## 26.8 Bank Resolution

> "A bank resolution occurs when authorities determine that a failing bank cannot go through normal insolvency proceedings without harming public interest and causing financial instability. To manage the bank's failure in an orderly manner, authorities use resolution tools that
>
> - ensure continuity of the bank's critical functions
> - maintain financial stability
> - restore the viability of parts or all of the bank
>
> Meanwhile, any part of the bank that cannot be made viable again goes through normal insolvency proceedings." (European Commission)

When failures of financial institutions occur the business of winding-up the institution is generally quite complex. Assets, such as loans, may be illiquid and hard to value and maximising the recovery value may require specialised skills. Creditor priorities can complicate matters and law suits are commonplace. Insolvency processes can take many years, such that even if there are sufficient assets to meet the claims of some stakeholders, there can be inordinate delays in those funds being received.

While financial firms outside of the prudential regulatory perimeter will usually be resolved via the usual liquidation processes applicable to all businesses, special arrangements exist for those within the prudential perimeter. Approaches vary internationally, but there are common practices as discussed in this 2018 FSI Insights paper and the FSB's 2019 Thematic Review on Bank Resolution Planning. In Australia, APRA, the prudential regulator, has powers to appoint external managers to expedite the resolution of such financial institutions. Indeed, it has powers to intervene before an institution declares that it is at a point of insolvency. The European Union has introduced a single resolution board to coordinate resolution of banks registered in various member countries but operating across country boundaries.

The Global Financial Crisis identified a range of problems in the failure management and resolution powers of financial regulators globally. While Australian regulators were not confronted with the need to manage the exit of failing or failed prudentially regulated institutions (banks or other ADIs, insurance companies, friendly societies, superannuation funds), the international experience focused attention on whether APRA's powers were adequate. With the development of international standards against which national financial systems are judged, and the need for international regulatory coordination in dealing with complex institutions operating across national borders, appropriately strengthening APRA's powers became important. Deficiencies in APRA's resolution powers had been previously noted in the Study of Financial System Guarantees (2004) and in the IMF's 2006 FSAP of Australia.

Historically (from its creation in 1998), APRA had intervention powers to investigate, give directions, require enforceable undertakings, amend licence conditions and, in extreme situations appoint an external manager. There was some strengthening of APRA's powers following the introduction of the Financial Claims Scheme in 2008 and legislation in 2010. These changes *inter alia* made it possible for APRA to obtain access to government budget funding associated with the FCS to deal with a failing institution, including to facilitate a takeover and achieve an open resolution or close the institution and pay out covered depositors or policy holders.

## 26.9 APRA's "New" Resolution Powers

In March 2018 legislation was passed clarifying and extending APRA's resolution powers, although the APRA capability review recommended in July 2019 that APRA needed to report to government on its ability to resource the development and implementation of its resolution frameworks and capabilities. The process of developing the new legislation was slow, with consideration of a 2012 Treasury

consultation postponed until after the AFSI (Murray) Inquiry – which in November 2014 recommended rapid progression of such legislation.

The Treasury 2012 consultation paper recommended strengthening of APRA's powers with a focus on its:

- Directions powers (to require structural or other changes at a regulated institution)
- Group resolution powers (to deal with NOHC situations)
- Powers to help resolve foreign bank branches in Australia

in line with the FSB's Key Attributes of a Resolution Regime document.

Details on the expansion of APRA's powers can be found in the 2017 Bill introducing the legislation. As well as the items listed above, the legislation enhanced the "statutory manager" regime by which an APRA appointed (or a judicial) manager can take control of a regulated institution, and clarified APRA's winding up powers (and their interaction with the FCS). It provided APRA with the power to appoint statutory managers to (life and general) insurers in addition to the judicial manager regime.

Importantly, as explained in the concluding comments of the Bill, the ACT "formalises the ability of ADIs, general insurers and life companies to convert or write off certain of their financial instruments if a trigger event occurs", providing a statutory basis for a "bail in" regime.

There are virtually no examples of APRA's use of its resolution powers either before or after the 2018 Act. That include use of its directions powers which can be kept confidential. However, the threat of their use can give teeth to the use of "moral suasion" whereby suggestions by the regulator to an institution to consider merging with a stronger institution, or to raise capital, or reducing dividend payouts to conserve capital, need to be heeded. Many of the vast number of mergers between Australian credit unions over recent decades have no doubt been influenced by suggestions by APRA or its predecessors that this might be a "good idea". Following the GFC, the takeover of BankWest by CBA in late 2008, which may have prevented the former bank's failure[9], would have been subject to discussions between the banks and the regulator (as well as needing regulatory approval).

While there are no cases providing evidence on how APRA would effect a resolution of a failing institution, there is much evidence from other jurisdictions. Historically, although less relevant in the age of internet banking, the regulator would take over an insolvent bank on close of business on Friday, and reopen on the Monday, arranging a takeover or transfer of business to another bank over the weekend. That could involve government financial support if that is least cost option, although other banks may see value in the franchise and thus be willing purchasers (even though book value is

[9] Nathan Lynch from Thomson Reuters provides a perspective here

negative). Alternatively the bank might be placed under government (temporary) ownership, followed by a restructure, which puts "bad loans" into an asset management company ("bad bank"), and sells the remaining "good bank" (assets and liabilities). Because the "good bank" will have assets less than liabilities, the sale will necessitate government subsidy.

As part of its resolution framework, APRA has instituted "living wills" requirements for regulated institutions. These involve pre-specified plans drawn up by the management and boards of institutions which specify recovery plans for dealing with adverse financial shocks (without public sector support) and resolution plans when failure is likely to occur. Avgouleas et al (JFS 2013) analyse resolution plans and argue that they are particularly relevant for G- SIFIs where inconsistencies in national laws can hinder resolution, and that a major benefit may lie in lessons from their development prompting organisational restructuring. Requirements for recovery plans were introduced for the largest Australian banks in 2011. Figure 9 (from APRA) illustrates the role of recovery and resolution plans, where the plans need to incorporate appropriate "trigger points" (metrics) at which they become relevant, realistic recovery options and consideration of execution risks. In its forward plan for 2020 APRA included consultation on development of a new prudential standard on resolution and recovery planning, but this has been deferred due to the Covid-19 crisis.

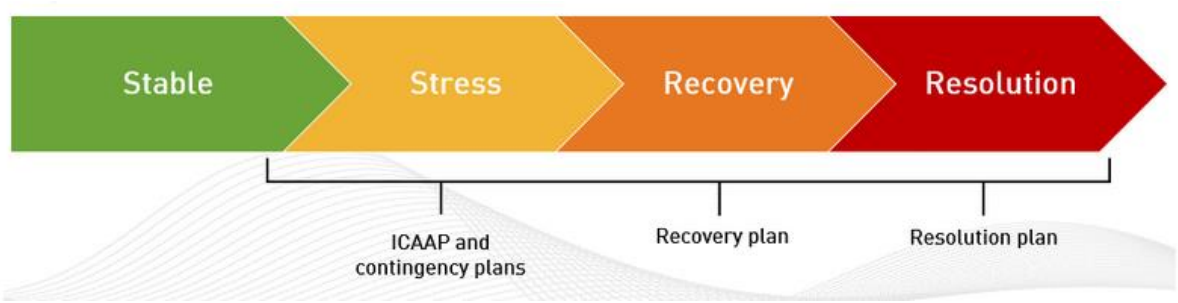



FIGURE 9: THE CRISIS CONTINUUM (SOURCE: APRA)

## Regulatory Accountability

APRA has considerable discretionary power in dealing with financial institutions it believes to be potentially at risk of failure. Clearly this power should be accompanied by accountability and performance assessment to determine whether those powers are used appropriately.

At a broad level, the prudential regulator can make two types of errors – failing to identify and act early enough in the case of a troubled institution, or alternatively wrongly identifying a sound institution as troubled and imposing unwarranted interventions on its activities. At a more specific level, reallocations of wealth and social costs associated with resolution of a failed institution should be subject to public purview – at least after the event.

How should such accountability be achieved, and what information should be made publicly available. Clearly, speed and secrecy are important in dealing with a troubled financial institution (and legislated secrecy provisions prevent disclosure of directions made, or other actions, by APRA in dealing with financial institutions which are in financial distress). But ex-post disclosure of the processes, terms and conditions involved in final resolution of a failed institution should arguably be mandatory (but are not).

Another consideration is the extent to which rules might be preferable to discretion in some circumstances. For example, APRA can appoint a statutory manager to an ADI if it considers that it "may become unable to meet its obligations; may suspend payment; or it is likely that the ADI will be unable to carry on business in Australia consistent with the interests of depositors or financial system stability in Australia". This involves a judgment call on the part of APRA, which must be based on information available to it, and which could lead to either forbearance (about which much discussion occurs in the US context) or premature intervention (which may be more likely in Australia) by the regulator. Similar issues arise in the application of "bail-in" provisions where APRA has considerable discretion to decide that a Point of Non-Viability (PONV) threatens, rather than simply relying on the banks capital ratio declining to a specified level.

Such uncertainty over regulatory response is likely to influence managerial decision making within regulated financial institutions which are at risk of becoming financial distressed. Whether requiring APRA to undertake such actions when certain pre-specified, verifiable, triggers (such as some significant breach of minimum capital requirements) would have preferable effects on decision making in regulated institutions warrants consideration.

Following the 2019 APRA Capability Review the Government is in the process of streamlining and improving effectiveness of the accountability regime for APRA.

## 26.10 Trans-Tasman Banking Regulation and Supervision

Subsidiaries of the four major Australian banks are also the major banks in New Zealand. This raises obvious questions about responsibility for supervision, and resolution arrangements should a bank failure threaten. Authorities in both countries cooperate via the Trans-Tasman Council on Banking Supervision (and other forums) to share information and ensure appropriate collaboration in supervision, crisis-planning, and bank resolution planning. There is a Memorandum of Understanding between APRA and the RBNZ setting out a framework for cooperation.

In terms of supervision, New Zealand has required the operations of Australian banks in New Zealand to operate by way of a separately capitalised subsidiary, rather than by a branch. This is compatible with supervision of the NZ operations by the Reserve Bank of New Zealand (RBNZ) which is the

prudential regulator. Whereas before the GFC the RBNZ based its approach on disclosure and market discipline and potential exposure to penalties of bank directors and management, it has since moved more into line with the Australian approach – and was ahead of the world in terms of introduction of liquidity requirements. But unlike Australia, NZ long eschewed permanent adoption of a deposit insurance scheme, other than for a short period after the GFC until 2011. In 2020 it is in the process of introducing such a scheme, signalling the end of a stated (but untried) approach to dealing with a bank failure known as Open Bank Resolution (OBR). Under this approach, all creditors (depositors included) would face a haircut to the value of their claims sufficient to ensure bank assets exceed its liabilities, thus recapitalising the bank and in theory enabling it to continue operations. OBR was never put to the test, and many were of the view that it would not work since, even though the government would guarantee the remaining value of claims, runs to other banks were likely.

The relationship between APRA and RBNZ is not without its potential stresses. The RBNZ wants the Australian bank subsidiaries to be well capitalised, which requires the Australian parents to invest funds in those subsidiaries as equity capital. At the same time, APRA wants the Australian banks to be well capitalised at both the Level 1 (Australian banking) operations and the Level 2 (Global banking) operations. While equity investments in the NZ subsidiaries have no implications for the level 2 capital position, exclusion of those investments in calculating the level 1 capital position, reduces the protection to Australian depositors.

In December 2019 (after a long consutation period) the RBNZ released its decision to increase the total capital requirement of the large banks from 10.5% to 18% of risk weighted assets, and the CET1 ratio to 13.5% (although the Covid crisis has led to the start date being deferred from July 2020 to July 2021). Because equity investments in NZ subsidiaries must be deducted in calculating CET1 for the level 1 activities, this increase in NZ requirements will reduce level 1 capital for Australian activities. Also in 2019 APRA reviewed its prudential standard (APS222) relating to (non-equity) exposures to related entities, and reduced the maximum allowable exposure from 50% of Total Capital to 25% of Tier 1 Capital.

## 26.11 Multinational Banks, G-SIFIs, and Resolution

At the global level, there are special complications involved in the resolution of large banks (and other financial institutions) which operate in multiple jurisdictions. While there are agreed conventions on supervisory responsibilities (foreign branches supervised by the home supervisor and foreign subsidiaries by the host supervisor), new issues come into play when resolution is needed.[10] These are

10 For the European Community the goal of a single banking market and extensive cross-border banking among member countries has led to the need to coordinate ways of dealing with troubled banks

particularly problematic where G-SIFIs which are TBTF are involved such that resolution requires use of "bail-in" and TLAC to allocate losses, reduce (hopefully) the risk of runs of short-term depositors/creditors, and maintain operational activities.

Bolton and Oehmke (RFS, 2019) is one paper which discusses the alternatives of Single-point-of-entry (SPOE) and Multiple-point-of-entry (MPOE) approaches to G-SIFI resolution. SPOE involves a single global resolution of the whole bank, while MPOE involves separate resolutions of operations in different jurisdictions. They argue that while SPOE is in principle, the more efficient approach, this requires cross-jurisdictional transfers of assets which national regulators may be unwilling to permit. Under MPOE, TLAC is determined in each jurisdiction, reducing efficient sharing of TLAC across national subsidiaries and potentially affecting the extent to which some operational activities (shared systems) occur at a global level or separately at national levels. In the absence of a supra-national regulator or credible commitments of national regulators to agree to SPOE (which are less likely if there is heterogeneity of, or imbalances in, the global bank's activities across jurisdictions), finding ways of achieving the most efficient form of combination of SPOE and MPOE is an ongoing task.

Bank supervisors and international agencies, and banks themselves, have focused on ways in which the myriad of G-SIFI's subsidiaries can be structured to facilitate efficient resolution. These may involve allocation (pre-positioning) of TLAC, together with allocations of specific operational activities, to particular entities within the organisation. These issues are further complicated by the choice (where allowed) for foreign activities to be conducted via a branch rather than subsidiary structure. The living wills of large G-SIFIs incorporate considerations of the alternative and likely forms of resolution.

involving both national and EU regulators. This has led to the creation of the Single Resolution Board which together with national resolution authorities forms the Single Resolution Mechanism

# 27 The Post GFC Regulatory Agenda

## Contents

## 27.1 Introduction

The GFC sparked a global agenda of regulatory reform, led by the G20 which tasked the recently formed Financial Stability Board (FSB) and the global standard setters (BCBS, IOSCO etc) with developing and implementing a better regulatory framework to ensure that such a crisis would not recur. The G20 Leaders' Statement from The Pittsburgh Summit of September 24 – 25, 2009 stated agreement:

> "to make sure our regulatory system for banks and other financial firms reins in the excesses that led to the crisis. Where reckless behavior and a lack of responsibility led to crisis, we will not allow a return to banking as usual.
> We committed to act together to raise capital standards, to implement strong international compensation standards aimed at ending practices that lead to excessive risk-taking, to improve the over-the-counter derivatives market and to create more powerful tools to hold large global firms to account for the risks they take. Standards for large global financial firms should be commensurate with the cost of their failure."

This concerted action reflected the failings in financial sector practices and regulation which led to the GFC. In this chapter the first item is to consider causes of the GFC and the failings identified. This in then followed by the specifics of the G20 reform response and consideration of its implementation in the subsequent years. Following that, several specific reforms are discussed. These include: the regulatory approach to systemically important financial institutions (SIFIs); the promotion of Central Clearing Counterparties (CCPs); and attention paid to systemic risk.

## 27.2 Origins and Features of the GFC

### Origins

The crisis can (at risk of oversimplification) be attributed to four major factors.

The first was the growth of financial products and practices which involved high leverage and were sustainable only under conditions of increasing asset prices and investor confidence. Sub prime mortgage lending in the US is the obvious example which triggered the crisis, but the problem was more pervasive due to the second factor of uncontrolled (and not well recognized) liquidity creation.

Financial engineering has prompted the growth of liquidity creation techniques based around collateralized lending (such as repos, securities lending, margin lending), where active securities markets for the collateral meant that lenders did not themselves feel exposed to significant liquidity or counterparty risk. Although asset price inflation was high Central Banks, focused on consumer price inflation targets and real sector activity, did not respond by attempting to restrict liquidity and "pricking the bubble".

A third factor was the growth of the, largely unregulated, "shadow banking" sector, involving investment banks, hedge funds, SIVs, conduits etc., and the construction of complex financial instruments and techniques which saw risk spread throughout the global financial sector and significant interdependencies created. Finally (the fourth factor), there was an absence of public information about the level and distribution of risk in the financial system. Inability to assess the risk positions of potential counterparties meant that a crisis induced response for many institutions was simply to cease extending credit.

## Financial Sector Shortcomings Identified by the GFC

The evolution of the crisis identified a number of important features of financial system behaviour which need to be borne in mind in policy responses and in designing future regulation.

First, consumers of financial products such as mortgage borrowers or investors generally do not have financial sophistication and knowledge which is adequate to assess the risk and return (or cost) of financially complex products.

Second, incentive and governance structures within financial institutions have been inadequate to prevent sales of unsuitable financial products.

Third, outsourcing of due diligence and risk assessment, including reliance on statistical models of risk assessment which use only "hard" information rather than "soft" information (such as loan officer opinion and assessment), has increased risk.

Fourth, even large, reputable, financial institutions will seek to avoid constraints imposed by regulations, as evident in the creation of SIVs and conduits using 364 day liquidity facilities to avoid capital requirements.

Fifth, risk management systems of banks have proven inadequate, reflecting problems with measuring risk, control systems, reporting arrangements and governance.

Sixth, liquidity creation by non-prudentially regulated institutions, involving massive growth in collateralized lending techniques, was not well recognized or controlled by monetary authorities.

Seventh, systemically important financial institutions exist outside the ambit of prudentially regulated institutions, and include investment banks and insurance companies who are important counterparties in risk transfer and in provision of liquidity.

Eighth, limited deposit insurance arrangements are inadequate for maintaining depositor confidence and dealing with systemic crises.

Ninth, opaqueness of financial institutions and inadequate information about details of complex financial products can quickly cause interbank and asset markets to "freeze", creating significant problems for both funding and asset liquidity.

Tenth, official liquidity support facilities need to be carefully structured so that market participants are not put off using them by the potential stigma of being perceived by the market as being weak, at risk, institutions.

Eleventh, risk based capital adequacy requirements appear to be insufficiently robust to financial innovation, prompting increased attention in the role of simple leverage ratios as a regulatory option.

Twelfth, globalization of finance has made the regulatory problem of dealing with multinational financial institutions extremely complex. Supervisory cooperation needs to be reinforced by improved alignment of national insolvency and resolution arrangements.

Thirteenth, the dramatic growth of the less-regulated non-bank sector ("shadow" banking sector) has meant that the macro-economic problems arising from a "flight to quality" to the banking sector and disruptions to proper functioning of the non-bank financial sector are particularly severe.

## Short Term Regulatory Responses

Crisis induced responses by Governments focused primarily on offsetting the immediate effects of the crisis rather than addressing the underlying causal factors.

First, there were actions to shore up public confidence in national banking sectors, involving broad extensions of deposit insurance, guarantees, and government equity injections into, or full or partial nationalizations, of banks.

Second, there were actions to unfreeze and/or restore liquidity to asset markets and financial institutions, via widening of acceptable collateral in Central Bank repurchase agreements, and Government purchases of particular types of assets (including mortgage backed securities). Central Banks have also increased aggregate liquidity through their open market operations to cater for the fear induced increase in demand for liquidity and to lower official interest rates to offset adverse effects on the real economy arising from higher credit spreads on private sector lending.

A third response was the "bail out" of systemically important non-bank financial institutions such as investment banks in the US. The interdependencies within the financial system have been reflected in their roles as prime brokers for hedge funds, significant counterparties in derivatives transactions, and providers of credit through collateralized lending techniques. Ultimately, the disruption to asset markets from disorderly failure was deemed (with the aid of hindsight from the Lehman example) to be unacceptable.

A fourth response was the introduction of new, temporary, regulations on financial markets and institutions. Particularly notable here has been the introduction of bans on short selling of (some or all) equities on national stock exchanges, driven by concerns about destabilizing speculation.

These responses (and the crisis itself) had significant short term, and potentially lasting, impacts on the competitive position of various financial institutions. Non-bank investment vehicles (finance companies, managed funds etc) suffered outflows, partly due to nervous investors being attracted to Government guaranteed deposits, but also reflecting the desire to avoid further losses on risky investments in such a bear market environment. Hedge funds (and others) using trading strategies based on taking short positions found their business models undermined by bans on short selling.

## 27.3 The G20 Agenda

The G20 leaders identified a large numbers of areas for reform including (with the number of specific items in brackets):

- Macro/lending/trade initiatives (10)
- Governance/resourcing of IFIs and International Cooperation (34)
- Dealing with Tax Havens etc (8)
- Prudential regulation (16)
- Scope of regulation (9)
- Accounting Standards (8)
- Credit rating agencies (3)
- Compensation and remuneration (3)

Focusing primarily on financial regulation, it is possible to relate identified causes of the crisis with specific regulatory agenda items affecting banks (discussed in earlier chapters), as shown in Table 1.

**TABLE 1:GFC CAUSES AND POLICY RESPONSES**

| Causes of Crisis | Regulatory Responses |
|---|---|
| Excessive leverage | Higher (and better) capital requirements |

| | |
|---|---|
| Risk taking incentives | Changes to required bank capital risk weights |
| Liquidity problems | New liquidity requirements (LCR, NSFR) |
| Depositor runs | New/higher deposit insurance limits, depositor preference |
| Too Big to Fail (TBTF) | Higher capital (loss absorbency) for "SIFI's"; specific taxes/levies |
| Taxpayer Bailouts v effective resolution | Better resolution powers / arrangements; living wills, "bail-in" debt / "CoCos" |
| Spill-overs /Contagion | Retail ring-fencing; Volcker rule; risk weights |
| Derivative Counterparty risks | Central Clearing Counterparties, margin requirements |
| Governance /Remuneration issues | Limits on banker pay, executive accountability |
| Asset price bubbles | Macro-prudential regulation (capital buffers, LVR limits) |
| Global imbalances/ liquidity | ? |
| Unsuitable/complex products | risk weights, banning powers, advice reforms, |
| Transparency/Opaqueness | Accounting Standards, Disclosure requirements, STC securitisation, trade repository reporting |
| Supervisory deficiencies | FSB/IMF Peer review, changes to powers/mandates |

The framework of the global financial regulation process is shown in Figure 1, which also highlights the role that specific domestic experiences and institutional arrangements play in translating international standards and recommendations into domestic regulations and cross-border regulatory relationships.

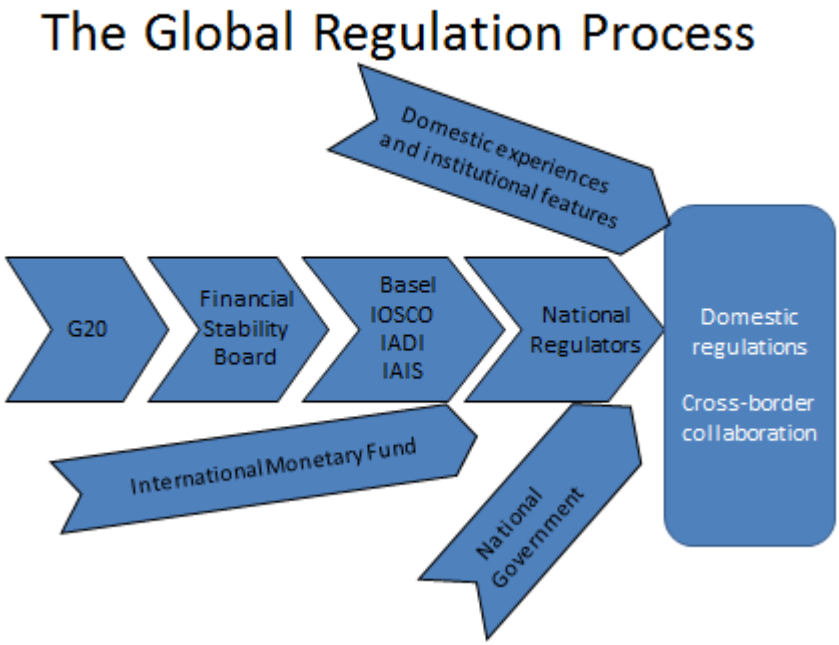



FIGURE 1:GLOBAL AND DOMESTIC REGULATION

## 27.4 The Current (2021) Status of Financial Regulatory Reform

In 2020 the Covid Crisis drew attention away from the financial regulatory reform agenda which the G20 adopted after the GFC. While it could be argued that most of the agenda was complete by the start of 2020, in its October 2019 report to the G20 the FSB highlighted the potential consequences for financial stability from rapid structural and technological change.

Nevertheless the "dashboard" summarising implementation status in G20 countries of major planks of the agenda was largely either "green" signalling that targets had been achieved or "yellow" signalling good progress. In terms of major areas:

- Basel III –measures not fully/largely completed internationally were the large exposures framework, implementation of a leverage ratio and implementation of the NSFR.
- Compensation/Remuneration – largely implemented
- OTC Derivatives – Trade Reporting was almost universal and Central Clearing adopted by most, however use of platform trading and margining arrangements had less adoption – primarily among lower income jurisdictions
- Resolution arrangements – TLAC had been adopted in most countries home to G-SIBs, bail-in was well advanced as was recovery and resolution planning requirements for systemic banks. Arrangements for dealing with failures of insurers was less advanced.

- NBFIs – while a small majority of jurisdictions had implemented agreed standards for MMFs and Securitisation, there were many still in the process of developing draft policies.

## 27.5 Macro-Prudential Regulation

Interest in macro-prudential regulation was stimulated by the Global Financial Crisis (GFC). Although the term had been in use for a decade or more, the concept itself is not well defined. But it can be broadly interpreted as policies designed to achieve financial system stability and preventing adverse spillovers onto economic activity. It differs from (micro) prudential regulation which focuses upon the health of an individual financial institution in recognizing that the whole is more than the sum of the parts, and that the interactions between otherwise healthy financial institutions can contribute to instability of the financial system. It differs from monetary policy in not being focused upon activities designed to achieve desirable outcomes for particular economic aggregates (inflation, output growth etc), but upon financial system characteristics which may hinder achieving such desirable outcomes due to instability.

Macro-prudential regulation has two dimensions. In the cross-section dimension it is concerned with how the structure of the financial sector affects its response to shocks to the system. Do interrelationships and institutional practices, amplify or dampen the effects of shocks? In the time-series dimension, the focus is upon whether excessive risk-taking can emerge over time to threaten economic and financial stability.

Examples of problems arising in the cross-section dimension are easy to find from the GFC. A complex web of bilateral counterparty exposures in over the counter (OTC) derivative markets meant that the failure of one institution would impact a large number of other institutions. Because market participants do not know the exposures of others, unwillingness to enter new exposures can occur if there are concerns about the possible failure of any significant institution.

One consequence of this has been regulatory desire to shift OTC derivatives onto organized exchanges, or involve Central Clearing Counterparties (CCCPs) for OTC trading. Under such arrangements, bilateral trades are novated to a central clearing house, generating a “hub and spoke” type of arrangement for exposures where the CCCP (the hub) manages its counterparty exposures by netting offsetting trades and appropriate margining policies. Individual institutions which have entered trades with a counterparty which subsequently fails are thus not exposed to default risk.

Another example can be found in the consequences of many large institutions making extensive use of high leveraged, collateralized borrowings such as by repurchase agreements (repos). This led to what has been described as a “margin-price” spiral, with institutions finding that they were exposed

to interrelated “asset-liquidity” and “funding-liquidity” risk. When asset prices fell, counterparties who had lent funds by way of repos, made margin calls or refused to continue providing funds. Borrowing institutions were thus faced with a need to sell assets, but with such responses being widespread, this put further downward pressure on asset prices, prompting further margin calls, asset sales and so on in a downward spiral.

A consequence of this has been greater regulatory attention on liquidity management, reflected in the introduction of the LCR and NSFR requirements related to both funding arrangements and liquid asset holdings. On the latter score, the LCR objective is to ensure adequate holdings of liquid, gilt-edged, securities which can be sold in a crisis without leading to an increase in the credit-risk spread and reduced asset prices which prompt a margin-price spiral. (Macro-economic policy can adjust system wide liquidity to offset pressures on the level of official interest rates arising from such sales). On the former score, the NSFR objective is to ensure that institutions which make long term loans and illiquid investments fund themselves with sufficient stable (long term) sources of funding to avoid funding problems should shorter term funding become less available.

Because the transmission of shocks through the financial system depends upon the network of financial arrangements, and because failures of large important institutions have greater spillover effects, there is considerable interest in developing network models of the financial system. In such models, key institutions and their financial links to others are identified. Then, by tracing the consequences of a failure or stress of a key institution, their role in amplifying or mitigating shocks can, hopefully, be assessed. Such analysis can underpin the determination of additional capital requirements for systemically important financial institutions – in order to reduce their chance of failure. It can also assist regulators in determining what are the most suitable responses to prevent transmission of a shock.

The time-series dimension of macro-prudential regulation is the determination of whether there are forces building-up over time in the financial system which increase its susceptibility to crisis. Looking at past financial crises, there are a mix of macro-economic fundamentals and financial market indicators which appear to be important. Financial crises appear to be preceded by developments such as large and persistent government deficits, large and persistent current account deficits on the balance of payments, and high inflation. But also important is the behaviour of asset prices in the form of stock market bull runs and housing price “bubbles”, as well as the development of high leverage and risk-taking.

Recognizing whether such developments are indicative of unsustainable conditions or reflect “fundamental” factors is particularly difficult. Over past decades, Central Banks have been reluctant

to act against asset price inflation, but that has changed, with "leaning into the wind" strategies becoming more accepted.

The other development is in terms of trying to moderate practices in financial markets which might generate such developments. Executive remuneration is one such area, where concerns that bonus-based remuneration has giving inappropriate incentives for excessive short-term risk taking. Another area lies in the interaction of regulatory and bank risk-management decision making. As a "boom" develops, increased asset valuations can improve the credit ratings of bank customers and provide banks with incentive and rationale to provide increased loan funding, thus exacerbating the boom. Removing such "pro-cyclicality" is an important component of changes incorporated in Basel 3.

## 27.6 SIFIs

### The Rationale for the SIFI Framework

In November 2011 the FSB and Basel Committee announced a framework for identification an additional regulatory requirements for SIFIs (Systemically Important Financial Institutions). 28 institutions were initially designated as G-SIBs. At the end of 2019, the list had 30 members (with a small number of exits and new entries) shown in Table 3, which were determined based on the updated assessment methodology which can be found here.

Underpinning the approach is the argument that the stronger Basel 3 capital requirements are not of themselves sufficient to address the negative externalities (the private decisions made assuming TBTF which are not socially optimal) arising from G-SIBS, or to protect the financial system from spillover risks. This is largely based on the cross-border implications which are not fully addressed by the Basel requirements, and hence the unit of focus is the consolidated global group. The objectives are to reduce probability of G-SIB failure by increasing going-concern loss absorbency, and reduce impact of any failure by improved global recovery and resolution arrangements. The FSB argues that the measures will also help to reduce TBTF funding advantages.

### Identifying SIFIs: The Indicator Approach

The FSB has adopted an "indicator approach" shown in Table 2, noting that the robustness of available quantitative models aimed at measuring systemic risk is yet to be demonstrated.

**TABLE 2: G-SIB INDICATORS**

| Category (weighting) | Individual indicator | weighting |
|---|---|---|
| Cross-jurisdictional activity (20%) | Cross-jurisdictional claims | 10% |
| | Cross-jurisdictional liabilities | 10% |

| | | |
|---|---|---|
| Size (20%) | Total exposures as defined for use in the Basel III leverage ratio | 20% |
| Interconnectedness (20%) | Intra-financial system assets | 6.67% |
| | Intra-financial system liabilities | 6.67% |
| | Securities outstanding | 6.67% |
| Substitutability/financial institution infrastructure (20%) | Assets under custody | 6.67% |
| | Payments activity | 6.67% |
| | Underwritten transactions in debt and equity markets | 6.67% |
| Complexity (20%) | Notional amount of over-the-counter (OTC) derivatives | 6.67% |
| | Level 3 assets | 6.67% |
| | Trading and available-for-sale securities | 6.67% |
| *Source: https://www.bis.org/basel_framework/chapter/SCO/40.htm* | | |

**TABLE 3: LIST OF G-SIBS NOVEMBER 2019**

| Bucket (LAC) | G-SIBs in alphabetical order within each bucket |
|---|---|
| 5 (3.5%) | (Empty) |
| 4 (2.5%) | JP Morgan Chase |
| 3 (2.0%) | Citigroup, HSBC, |
| 2 (1.5%) | Bank of America, Bank of China, Barclays, BNP Paribas, Deutsche Bank, Goldman Sachs, Industrial and Commercial Bank of China Limited, Mitsubishi UFJ FG, Wells Fargo |
| 1 (1.0%) | Agricultural Bank of China, Bank of New York Mellon, China Construction Bank, Credit Suisse, Group BPCE, Group Crédit Agricole, ING Bank, Mizuho FG, Morgan Stanley, Royal Bank of Canada, Santander, Société Générale, Standard Chartered, State Street, Sumitomo Mitsui FG, Toronto Dominion,UBS, Unicredit Group |
| Between 2018 and 2019, the number of G-SIBs increased by 1 to 30 with the addition of Toronto Dominion. Deutsche Bank moved from bucket 3 to bucket 2.<br>Source: FSB | |

## TLAC Requirements for SIFIs

To determining the appropriate size of total loss absorbency capacity (TLAC) requirements for G-SIBs, the FSB has attempted to quantify things in the following manner.

First, they attempt to estimate the *expected* impact of a failure and argue that this should be the same for G-SIBs and non-G-SIBs. Since the impact of an actual G-SIB failure will exceed that of a non-G-SIB, this implies that the probability of its failure would need to be correspondingly lower. Higher loss absorbency is required to ensure PD(SIB) <PD(non-SIB) such that expected impact is equivalent – based on regulator assessment of relative impact (which is 3-5 times greater for highest-scoring SIB)

To quantify the required increase in LAC, three approaches were used.

First, the BCBS has used an expected impact approach (from EL) calibrated using (historical) return on risk-weighted assets (RORWA) data, and a Merton model (using equity price data) to relate PD and capital ratios. The RORWA approach essentially uses a value at risk approach (data from many banks, many countries, many years) to identify what negative net income a bank might experience in a crisis, and thus what capital buffer would be needed to prevent capital falling below a regulatory minimum.

Second, the BCBS also considered the long-term economic impact (the LEI Report) by comparing the long-run economic costs and benefits of higher capital requirements. These gave an optimal (risk-

weighted) CET1 capital ratio of up to 13% if permanent effects of a crisis were moderate and permanent.

Third, by assessing funding implicit (TBTF) subsidies for G-SIBs implied from market data, it is possible to estimate the extra capital which would be required in their absence to achieve the same funding costs.

(There is a substantial literature which attempts to estimate the TBTF funding advantage. For example an FDIC Working Paper 2014-02 estimates uninsured deposit funding advantage for $100+ bill US banks at around 40 bp). A 2021 report by the FSB concludes that reforms directed at TBTF have had desirable effects in terms of improvements in resolvability of large banks and reducing the likelihood of government bail-outs, but that there remains scope for improvement.

## Regulatory Consequences for G-SIBs

Four consequences, as well as G-SIB public disclosure requirements (in addition to Basel 3 disclosures) flow from being designated a G-SIB

- Higher capital buffer requirements phased in from 2016
- Total loss absorbency capacity (TLAC) requirements from 2019
- Resolvability Requirements: group-wide resolution planning etc.
- Higher supervisory expectations (risk management etc)

In November 2015, the TLAC principles were codified in a "terms-sheet" for G-SIBs, to ensure that there is sufficient loss absorbing and recapitalisation capacity to ensure an orderly resolution and avoid tax-payer bail-outs. From January 2019 minimum TLAC must be greater than 16% of group RWA increasing to 18% by 2022. Regulatory capital buffers are additional to these requirements. The minimum TLAC is also required to exceed 6% of the Basel 3 leverage ratio denominator from 2019 and 6.75% by 2022. Regulatory capital in general counts towards meeting the minimum TLAC, subject to a number of requirements on intra-group arrangements. Eligible TLAC instruments must be contractually subordinated, junior in the statutory creditor hierarchy, or structurally subordinated, and externally issued TLAC must have a contractual trigger or statutory provision for the resolution authority to require write down or conversion to equity. It is expected that TLAC eligible debt liabilities (ie can absorb losses) and other non-regulatory capital TLAC eligible instruments will be at least 33 per cent of minimum TLAC requirement.

As well as the higher TLAC requirements, the FSB released in December 2016 a consultation document on Internal TLAC of G-SIBs (where members of a group meet TLAC requirements via obligations of other members of the group).

### Australian D-SIBs.

None of the Australian banks have been designated as G-SIBs, but APRA has declared the four major banks to be D-SIBs. This initially meant an additional 1 percentage point capital requirement (CET1 and total) for them. In 2019, APRA released new regulatory requirements for D-SIBs. These involve:

- An increase in Total Capital by 3 percentage points of RWA by 2024, but with APRA retaining a long term target of an increase of 4-5 percentage points.
- An expectation that most of the increase would occur in the form of Tier 2 instruments.

APRA was of the view that the impact of the new requirement would not significantly affect the pricing of Tier 2 securities and have an impact on the banks' overall cost of funding by around 5 basis points.

### Systemically Important Insurers:

July 2013 saw the initial designation of 9 G-SIIs by FSB/IAIS.[1] However, in 2017 it was decided not to identify SIIs until the IAIS had completed work on better identification of systemic risk in the insurance sector. In 2019 the IAIS released its framework for identification of systematic risk, but consideration of whether to identify G-SIIs has been deferred to late 2022.

## 27.7 Central Clearing Counterparties (CCPs)

> "Following its collapse, Lehman's uncleared derivative counterparties filed claims totalling $51billion in relation to its derivatives business. In the event, it was four years before the first payments were made…"
> "Lehman Brothers UK subsidiary had a $9 trillion cleared interest rate derivatives portfolio at LCH, comprising over 65,000 trades. In the period of extreme market turmoil following the firm's collapse, it took three weeks, rather than four years, for LCH to hedge and close out the entire $9 trillion position. It used only around a third of the collateral margin Lehman had deposited at the clearing house…" (Cunliffe, 2018)

### Introduction

Following the GFC, and concerns that inter-linkages arising from OTC derivatives trading amplified the effects of financial shocks, the G20 committed to introduction of Central Clearing Counterparties for OTC derivatives. IOSCO and CPSS produced "Principles for Financial Market Infrastructures" (see here), and requirements for use in various countries reflected in national legislation such as the

[1] At November 2016, G-SIIs were: Aegon N.V. ;Allianz SE; American International Group, Inc.; Aviva plc; Axa S.A.; MetLife, Inc.; Ping An Insurance (Group) Company of China, Ltd.; Prudential Financial, Inc.; Prudential plc.

Dodd-Frank Act in the USA and EC decisions for the EU. (A recent description of the European CCP ecosystem can be found here).

With a CCP requirement derivatives trading can still occur OTC, but **novation** of those positions to a CCP is required. The CCPs involve trades between OTC counterparties in derivatives being novated to positions with the CCP – just as occurs with novation to the clearing house in futures exchange trading. The CCP has identical and offsetting long/short positions with the original counterparties who each now have a position with the CCP rather than the original counterparty. The CCP is perfectly hedged against market risk, provided that the counterparties fulfil their obligations, but takes on the counterparty credit risk from the possibility that the losing participant fails to meet its obligations. As with a futures exchange, this exposure will be managed by margin requirements applied by the CCP.

Some derivatives markets had already operated according to such a model (Culp (2010) gives details[2], and the introduction of CCPs for other markets has been occurring over the past decade. The FSB produced a report in late 2019 detailing progress on derivatives market reforms, including CCPs.

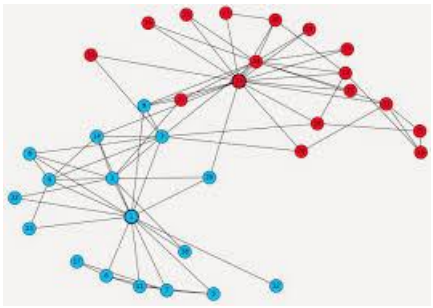
The objectives in requiring use of CCPs are:

- Reduce complexity of counterparty exposure relationships
- Ensure default risk managed by margining of positions by CCPs
- Reduce spillovers and "runs/flight" from dealing with individual institutions and systemic risk and disruption from resulting unwinding of positions

Figure 2 provides an illustration of the change in exposure linkages between derivatives traders resulting from introduction of a CCP. Rather than a complex cross-participant set of counterparty linkages, a CCP will result in a "spoke and hub" structure (with the CCP at the centre) or a "core/periphery" spoke and hub structure where major bank participants have exposures to their clients but none to other banks.

[2] Christopher Culp "OTC-Cleared Derivatives: Benefits, Costs, and Implications of the "Dodd-Frank Wall Street Reform and Consumer Protection Act"" *Journal of Applied Finance, 2, 2010*

# CCPs



From “spaghetti” network to “hub and spoke” or “hub & core & periphery”

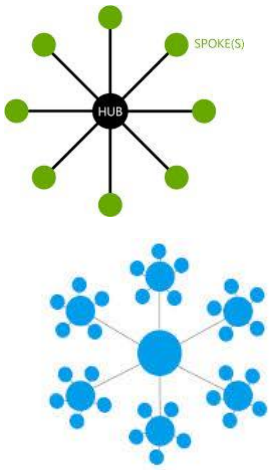



**FIGURE 2: THE EFFECT OF CCPS ON EXPOSURE INTERLINKAGES OF DERIVATIVES MARKET PARTICIPANTS (SOURCE: ?)**

There are a range of alternatives to CCPs which have been considered. One would be to require that derivatives markets be operated via trading on established platforms (such as occurs for equity derivatives or futures traded on an exchange), although this has not had substantial uptake. Another is mandatory Trade Reporting, whereby OTC trades are reported to a specified trade repository, which enables information on exposures of market participants to be aggregated and used.

One major complication in the establishment of CCPs is the fact that derivatives trading operates cross-border, raising the question of jurisdiction under which a CCP operates. One response to this has been national “deference” to requirements of other jurisdictions.

## Australian requirements

In September 2015 mandatory CCP in Australia for OTC interest rate derivatives in AUD, USD, EU,JPY, GBP for internationally active dealers was required. This had benefits of substituted compliance (for US/EU requirements) for Australian market participants. The authorities had preference for reliance on the market to transition to CCP for other contracts.

Licensed CCPs operating in Australia are ASX Clear (Futures), LCH.c Ltd, CME, and prescribed CCPs operating overseas are CME Clearing Europe, Eurex Clearing AG, JSCC, NASDAQ OMX Clearing AB, OTC Clearing HK.

There are perceived benefits from platform trading in some cases (consideration of mandatory obligation), which have implications for Australian Market Licence conditions including acceptance of prescribed facilities (overseas)

| CCP | Jurisdiction | Total pre-funded pooled resources[b] | Millions |
|---|---|---|---|
| ASX Clear | Australia | ASX Clear capital: | A$250 |
| ASX Clear (Futures) | Australia | ASX Clear (Futures) capital:<br>Participant contributions, first tranche:<br>ASX Clear (Futures) capital:<br>Participant contributions, second tranche:<br>ASX Clear (Futures) capital: | A$120<br>A$100<br>A$150<br>A$100<br>A$180 |
| CME Inc. Base service | United States | CME Inc. capital:<br>Participant contributions: | US$100<br>US$3 338 |
| CME Inc. Interest Rate Swaps service | United States | CME Inc. capital:<br>Participant contributions: | US$150<br>US$2 473 |
| Eurex Clearing | Germany | Eurex Clearing capital:<br>Participant contributions: | €50<br>~€3 340 |

(Ref: Carter & Garner, RBA Bulletin, June 2015)

## Australia and OTC derivatives

Trade reporting obligations were introduced Oct 2013 (Under Part 7.5A of Corporations Act, effective Jan 2013), and ASIC (2015), *Regulatory Guide 251 – Derivative Transaction Reporting*, February provides relevant information.

In September 2015 mandatory CCP use was introduced in Australia for OTC interest rate derivatives in AUD,USD, EU,JPY, GBP for internationally active dealers.

DTCC Data Repository (Singapore), was designated as a licensed trade repository in Sept 2014

The Council of Financial Regulators examined arrangements for CCPs as part of financial market infrastructure in 2019. The CFR proposes to change the roles of the Regulators so that operational licensing and related decisions sit with the Regulators and not the Minister.

ASIC is the primary regulator for Australian market licensees (AMLs), benchmark administrator licensees (BALs) and derivative trade repository licensees (DTRLs). It co-regulates CSFLs with the RBA. All such entities are regulated under the Corporations Act 2001(Corporations Act).

## Issues in CCP design, risk and regulation

There are a number of important considerations in the design of a CCP

- Separate CCPs for different assets?
- Can CCPs work well where derivatives are not standardised – what pricing models to use for

margining etc?
- In which jurisdiction should CCPs be located?
- What ownership/organizational structure for CCPs?
- Mutual or Stock (now mostly stock)
- Liability of participants
- Sufficient trading to make viable (cover costs)
- Liquidity for contract close-out in member default event
- Regulation of CCP?

These are addressed in Principles for Financial Market Infrastructures, 2012 (CPSS/CPMI – IOSCO) which address

- CCP recovery tools: for continuity in stress
- CCP resolution regimes
- TLAC of CCP's – for dealing with participant default
- Transparency/disclosure of risk management etc

Risk management considerations (default waterfall) are addressed by

- Individual margin requirements – cover default by that participant (Initial and variation margins)
- Default/guarantee funds – contributed by CCP & participants
- Recovery tools – promised ex-post contributions (assessments), haircuts to variation margin gains
- (regulatory requirements on TLAC)

## The CCP Failure Issue

In Sept 2018 a big default by a clearing participant at Nasdaq Clearing AB, a Swedish CCP (for power derivatives), decimated the default fund, requiring recapitalisation, and focusing attention on CCP solvency. See here for a short overview from the BIS.[3]

Figure 3 shows the effect of a participant default which gives rise to the risk management issues.

[3] Cross (RBA, 2021) examines causes of the few CCP failures to date.

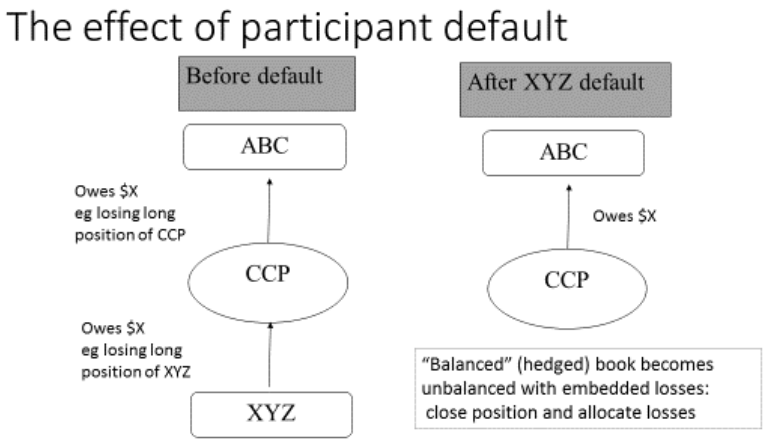



FIGURE 3: CCP PARTICIPANT DEFAULT (SOURCE : CARTER & GARNER, RBA BULLETIN, JUNE 2015))

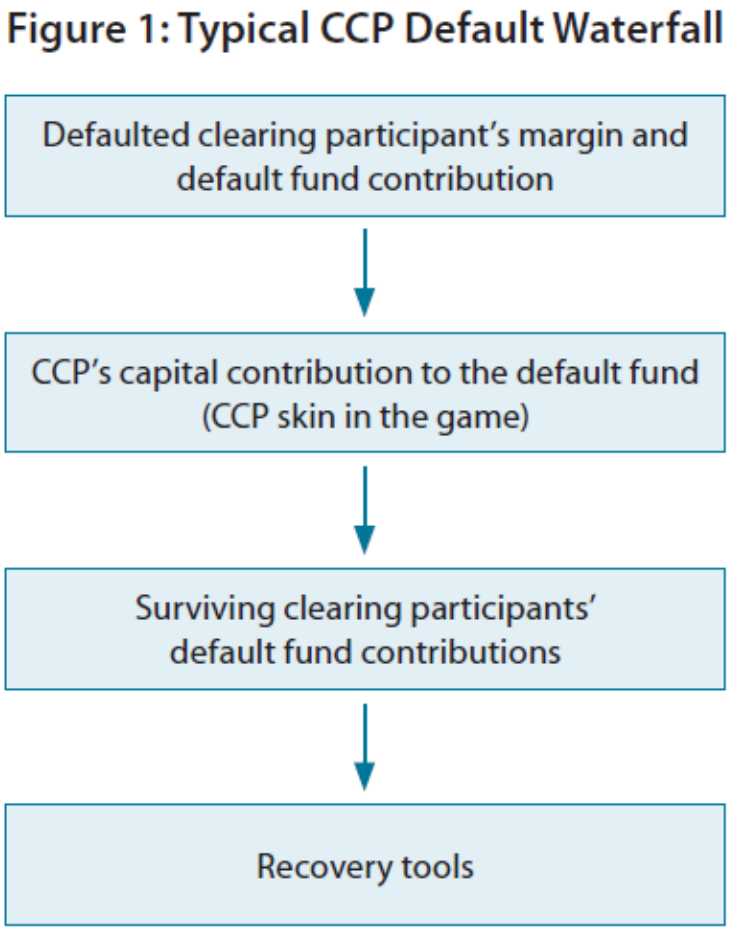



FIGURE 4: CCP DEFAULT WATERFALL ((SOURCE : CARTER & GARNER, RBA BULLETIN, JUNE 2015))

The structure of the default waterfall can affect CCP and participant incentives. The EU (EMIR) – requires CCPs to contribute amount of at least 25% of regulatory capital to default waterfall (and to be used prior to participants' pooled contributions). "ASX Clear (Futures) breaks participant

contributions to the default fund into two tranches and would apply additional rounds of CCP capital after each tranche was exhausted". "ASX Clear, … does not collect participant contributions"

Figure 5 illustrates the variety of capital buffer arrangements.

| CCP | Jurisdiction | Total pre-funded pooled resources[b] | Millions |
|---|---|---|---|
| ASX Clear | Australia | ASX Clear capital: | A$250 |
| ASX Clear (Futures) | Australia | ASX Clear (Futures) capital:<br>Participant contributions, first tranche:<br>ASX Clear (Futures) capital:<br>Participant contributions, second tranche:<br>ASX Clear (Futures) capital: | A$120<br>A$100<br>A$150<br>A$100<br>A$180 |
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| Eurex Clearing | Germany | Eurex Clearing capital:<br>Participant contributions: | €50<br>~€3 340 |

**FIGURE 5: CCP CAPITAL CONTRIBUTIONS IN DEFAULT (SOURCE: CARTER & GARNER, RBA BULLETIN, JUNE 2015)**

The design of participant obligations is relevant for CCP Risk and Regulation via:

*Participant Incentive Effects*

- Margin requirements –own risk management and reducing incentive for strategic default
- Prefunded default fund – monitor broader CCP risk management framework, manage exposure to CCP
- Incentives depend on relative risk due to CCP own contribution requirements, share of exposure (size)

*CCP Incentive Effects*

- Own resource commitments – CCP risk management processes

## Cross Currency Swaps and CCPs

A major issue in design of CCPs occurs when multiple jurisdiction currency contracts are involved. CCIRS used by Australian banks / securitisers, who Borrow/issue (eg) in USD and swap repayments into AUDv to "lock in" AUD cost of borrowing. Counterparties could be issuers of Kangaroo bonds etc.

Types of CCIRS (examples)

- Floating AUD to Floating USD (cross currency basis swap - most common). Includes market determined "basis spread" paid by counterparty making future non-USD interest payments which is typically positive
- Fixed AUD to Fixed USD, Fixed AUD to Floating USD, etc. These can be replicated using CCIRS plus interest rate swaps

## CCIRS

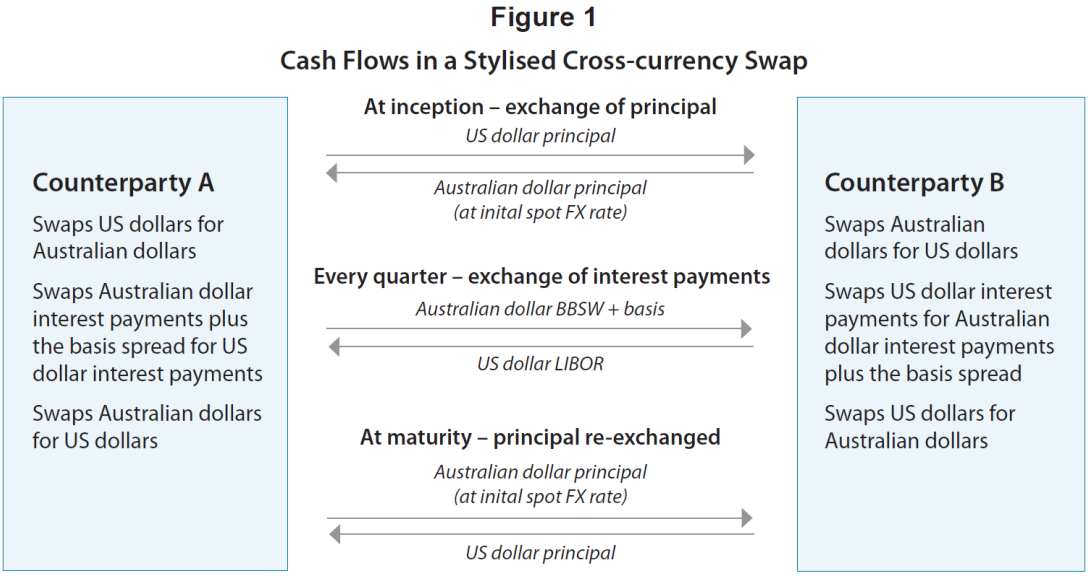


**FIGURE 6: CROSS CURRENCY INTEREST RATE SWAPS (SOURCE: ARSOV ET AL 2013)**

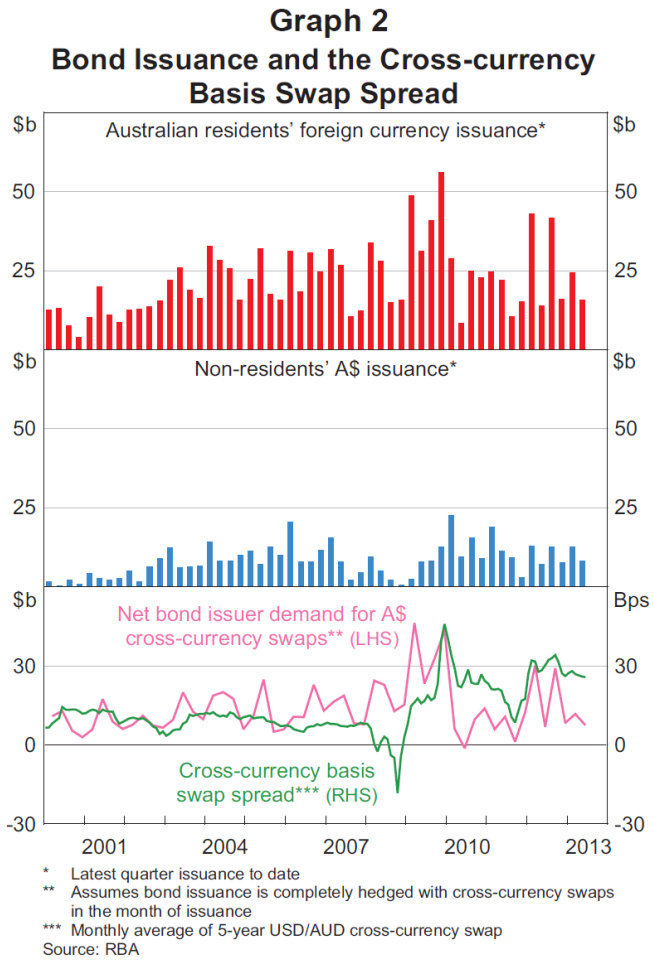


**FIGURE 7: THE CROSS CURRENCY BASIS SPREAD (SOURCE: ARSOV ET AL 2013)**

## CCIRS Features

Counterparty default risk management

- Limited range of large counterparties (large banks)
- Collateral requirements
- Principal resets (pay principal gains/losses at each interest rate reset and final principal exchange at then spot rate)

These are deliverable contracts – ie exchange of final principal amounts etc. which creates complications for CCP relative to settlement based on notional principal. Need to link to arrangements for physical exchange of both currencies

Australian legislation enables regulators to require CCPs for OTC derivatives, but only required for domestic interest rate derivatives. Other countries have not required CCPs for FX products

Without CCPs

- Collateral requirement considerations
- Initial as well as variation margins for non-CCP positions (Working Group on Margin Requirements, Basel / IOSCO)
- Higher capital requirements for OTC – non CCP positions

- Increased cost for users??

## The Duffie – Zhu analysis

Duffie and Zhu (RAPS, 2011)analyse whether the introduction of CCPs for OTC derivatives reduce netting and counterparty exposures? Not necessarily, they say – bilateral netting across multiple assets may involve greater netting than multilateral netting at individual asset level. It depends on structure of financial sector. Also relevant (Heath et al, RBA 2013) is the relative importance and structure of "core" and "periphery" institutions. The fragmentation of clearing services is the potential problem.

The Duffie and Zhu approach is captured in Figure 8 which shows that without the CCP two parties may net-off collateral requirements from trades in different markets. But a CCP for one market may limit the ability to undertake bi-lateral netting

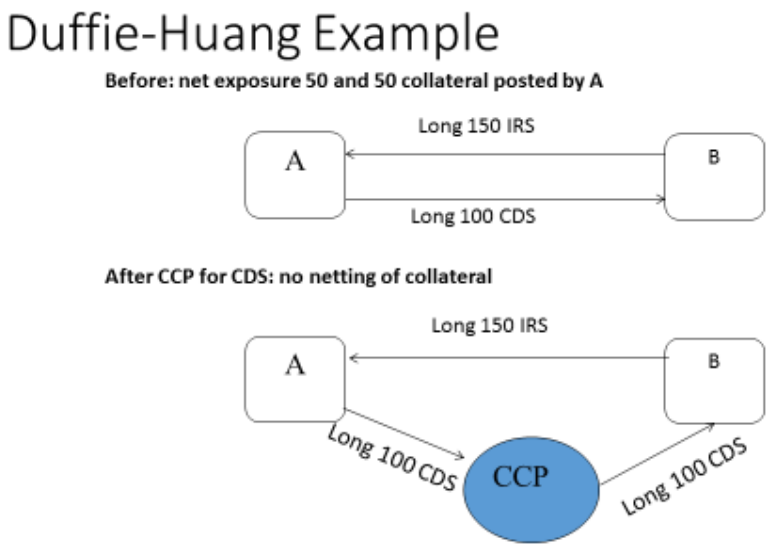


FIGURE 8: COLLATERAL AND NETTING

They note that

"introducing a CCP for a particular set of derivatives reduces average counterparty exposures if and only if the number of clearing participants is sufficiently large relative to the exposure on derivatives that continue to be bilaterally netted."

And that

"a single central clearing counterparty that clears both credit derivatives and interest-rate swaps is likely to offer significant reductions in expected counterparty exposures, even for a relatively small number of clearing participants."

Duffie and Zhu demonstrate these arguments with the following model

## The Model

N market participants, can novate positions in one derivative (CDS) to CCP, others (eg IRS) remains with bilateral clearing.

K asset (derivative) classes, $X^k_{ij}$ net amount j will owe to i on asset class "k"

This is a stochastic variable. Max($X^k_{ij}$, 0) is exposure of i to j in class k. Max(-$X^k_{ij}$, 0) is exposure of j to i in class k.

Assume E($X^k_{ij}$) = 0 and iid (normal) distributions for all k

$$\phi_{N,K} = \sum_{j \neq i} E\left[\max\left(\sum_{k=1}^{K} X_{ij}^k, 0\right)\right]$$ is Net exposure of i to all counterparties over all assets before any collateral is offered and is a measure of netting efficiency for bilateral netting

With normality and symmetry,

$$\phi_{N,K} = (N-1)\sigma\sqrt{\frac{K}{2\pi}},$$

If U is collateral per $ of exposure and c (b) are cost/benefit of collateral, average expected bilateral netting cost is $(c-b)U\phi_{N,K}$

$$\gamma_N = E\left[\max\left(\sum_{j \neq i} X_{ij}^K, 0\right)\right] = \sqrt{\frac{N-1}{2\pi}}\sigma.$$

Exposure of i to CCP introduced for class K (Ignoring any exposures from contributions to capital of CCP if others fail and CCP not fully margined)

Total exposure of i $\phi_{N,K-1} + \gamma_N$

Improvement in netting exposure if: $\gamma_N + \phi_{N,K-1} < \phi_{N,K}$

$$K < \frac{N^2}{4(N-1)}$$

$\gamma_N$ could be negative, but CCP doesn't post initial collateral to members, hence overstatement of collateral gains

In this simple case (symmetric, iid)

K = 2; gains from CCP clearing for one asset class if N is 7 or more

K=4, requires N of 15 or more for gains

Their results are summarised in the following propositions extracted from their paper

**Proposition 1.** The introduction of a CCP for a particular class of derivatives leads to a reduction in average expected counterparty exposures if and only if

$$R > \frac{2\sqrt{N-1}}{N-2}, \tag{8}$$

where $R$ is the ratio of the pre-CCP expected entity-to-entity exposures of the class in question to the expected entity-to-entity exposures of all other classes combined.

**Proposition 2.** For an arbitrary joint distribution of $(X_{ij}^k)$, each entity's total expected counterparty exposure with $C > 1$ CCPs clearing derivative classes separately is greater than or equal to its total expected exposures with a single CCP clearing all $C$ classes jointly.

More general specifications can allow for different variances and correlations etc

## 27.8 Systemic Risk

Systemic Risk has become an important topic for researchers and policy makers since the GFC. While it is intuitively apparent that the structure of a financial system can lead to interdependencies and spillovers which mean that shocks are amplified (rather than moderated) leading to crises, a precise definition is less clear. Also complicated is the issue of how to identify and measure the nature of interrelationships which could lead to crisis. A number of the policy changes considered earlier (introduction of CCPs, changes to capital requirements, special requirements for SIFIs) reflect attempts to change the structure of the financial system to increase its stability.

Haldane and May (Nature, 2011) focus on systemic risk resulting from network arrangements and refer to the recent "quest to understand the network dynamics of what might be called 'financial ecosystems'" (in contrast to the common economic/financial analysis focus on general equilibrium). In contrast to nature's ecosystems they note that government is involved in shaping the evolution (and, in reflection of the political-business interaction, refer to "survival of the fattest" ). Network considerations have become increasingly relevant they argue because of the growth of intra-financial sectoral linkages. Shocks to the financial system can be propagated by counterparty failures, generalized "market liquidity" shocks due to falls in asset prices, and through "liquidity hoarding" by financial institutions. Brunnermeier (JEP, 2012) illustrates how these latter two propagation mechanisms can interact via a "margin-price spiral". Asset price falls reduce the value of

those assets as collateral, sparking margin calls or demands for more collateral, and requiring closing out of positions or price-depressing sales of other assets to acquire liquid assets to provide as collateral.

## How is systematic risk measured?

One approach has been to try and "map" the financial system as a network, identifying key "nodes" and linkages. Tellez (RBA, 2013) undertakes such a task to derive an Australian Banking Network.[4] In doing so he focuses only upon large interbank exposures reported to APRA, which is about 6% of aggregate assets (and 1/3 of which was derivatives exposures). The major banks are (naturally) at the centre of the network with other Australian owned banks also significant, and with foreign owned banks and mutuals tending to be outliers with limited links to the two former groups. Only about five per cent of all possible pairs of ADIs have direct links between them, but many more are within two links of each other. A range of measures of network characteristics can be derived to identify the extent of linkages and key institutions within the network. As Tellez notes, networks can often exhibit "robust but fragile" properties such that most of the time shocks to the system are moderated, but in some case can be amplified leading to systemic problems.

Acharya et al (AER, 2012) implicitly focus upon bank capital (rather than liquidity) as being the key constraint on bank lending, and argue that systemic risk arises when the value of aggregate bank capital falls sufficiently to limit aggregate lending. In considering individual banks, this measure does not explicitly involve spillovers between banks or contagion, but focuses upon the extent to which a decline in a bank's capital value is correlated with an aggregate decline. They also use the market value of equity capital (rather than the book value favoured in regulatory models) which may be justified by the assumption that external raising of new equity capital is made difficult by the decline in equity prices (or, the unrealistic assumption that book and market values of equity are perfectly correlated via strict mark to market accounting).

Drawing on work by Engle and others at the NYU V-LAB they argue that systemic risk of a firm/bank can be measure (in real terms) as the product of: (a) real social cost per dollar of capital shortage (b) probability of a crisis (aggregate capital shortfall), (c) expected capital shortfall of the firm in a crisis. The measure of systemic risk for bank i at time t is

$SRISK_i = E_{t-1}$ (CapitalShortfall$_i$ |Crisis).

[4] Brassil and Nodari (RBA, 2018) provide a more recent analysis based on the Australian Inter Bank Overnight Cash (IBOC) market

This is only one among a wide range of systemic risk measures. Bisias et al (ARFE, 2012) provide a survey of 31 existing measures of systemic risk (and note that "regulators sometimes apply Justice Potter Stewart's definition of pornography, i.e., systemic risk may be hard to define but they know it when they see it"). They classify the measures surveyed under headings of: Network measures; Forward looking risk measures; stress test measures; cross-sectional risk measures; illiquidity and insolvency measures. Some examples include: Joint probability distribution characteristics (CoVaR); Illiquidity measures (actual v model based yields); Asset correlation measure (principal components); macro-indicators.

For policy makers, two dimensions of systemic risk appear to be particularly important. One is the *cross-sectional dimension* which is somewhat related to the network approach. It aims to identify how the structure of financial system affects responses to "shocks"? Does it amplify or moderate them? Among the relevant issues are: do institutions have similar exposures (ie the system is not diversified); are there spillover effects (liquidity issues; settlement failures etc); is there contagion risk? Macro-prudential policy measures include: CCP requirements; Activity restrictions / ring fencing / structural separation; SIFI imposts; Risk weight calibration (higher for financial sector counterparties).

In that regard, one development in recent years has been the introduction of Legal Entity Identifiers (LEIs) which is a global scheme to enable identification of entities & links. This reflects the problems which have been experienced in the GFC and other circumstances of difficulties in tracing interrelationships and potential spillover effects.

The *Time Series aspect* is more akin to the SRISK approach – how does systemic risk change over time. Policy thus focuses on preventing systemic risk build up over time, including analysis of financial-real sector interrelationships, causes of over-optimism, excessive risk-taking etc. Possible indicators include: Asset price inflation; Leverage trends; Credit growth; other historical predictors of financial crises. Macro-prudential policy measures include: asset price considerations in monetary policy; Counter-cyclical capital buffers; Loan/Valuation constraints; Dynamic loss provisioning; Margin requirement/haircut variations; Capital controls.