# 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.

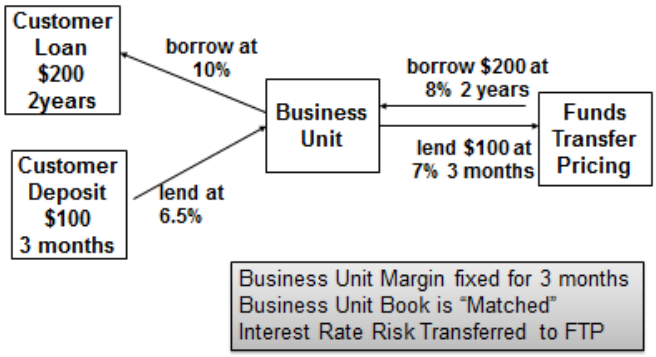
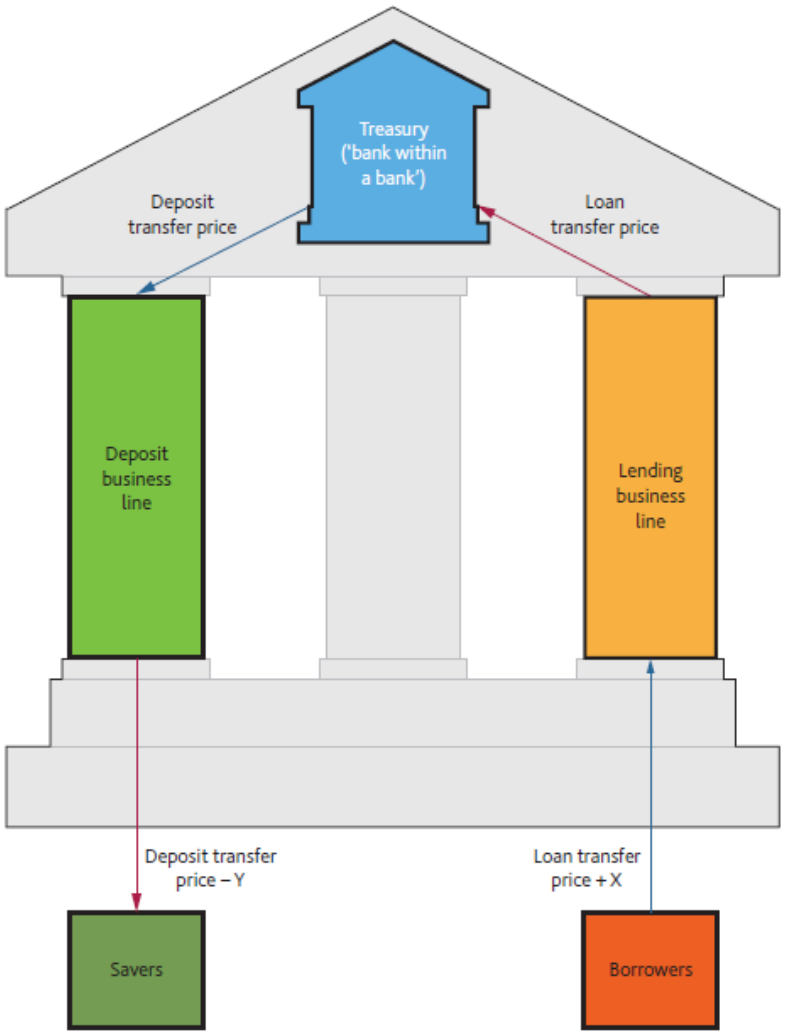



FIGURE 1: BANK FTP TRANSACTIONS WITH A BUSINESS UNIT

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 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.

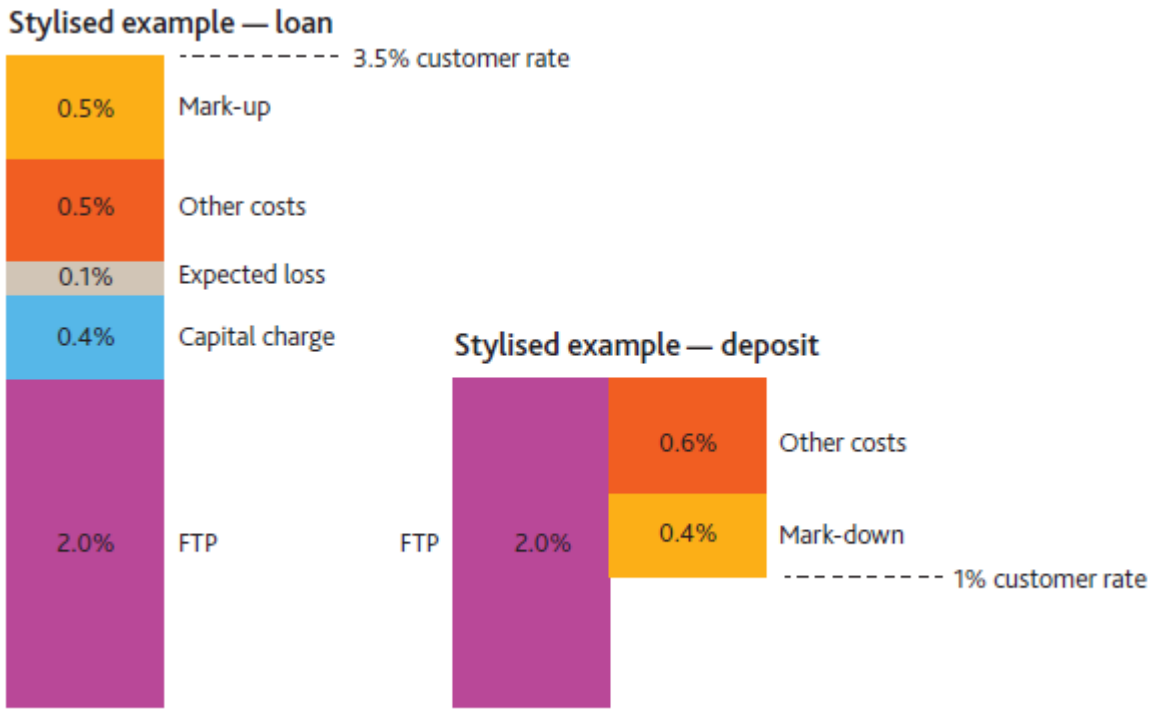



FIGURE 3: FTP AND PRODUCT PRICING (SOURCE: BANK OF ENGLAND 2014)

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.

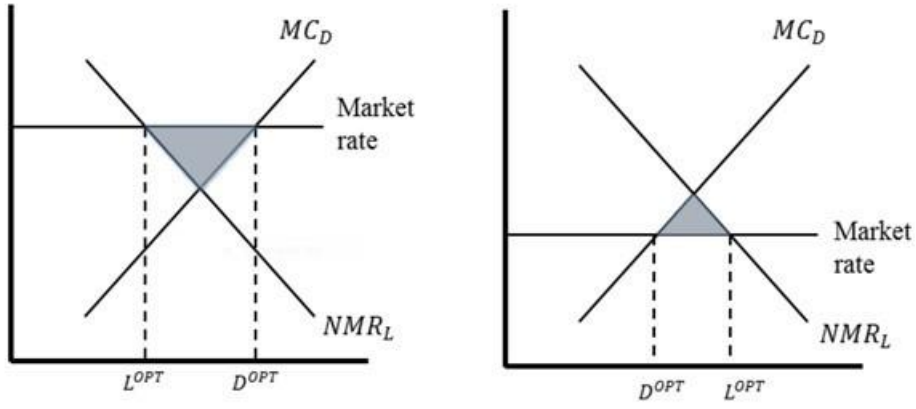
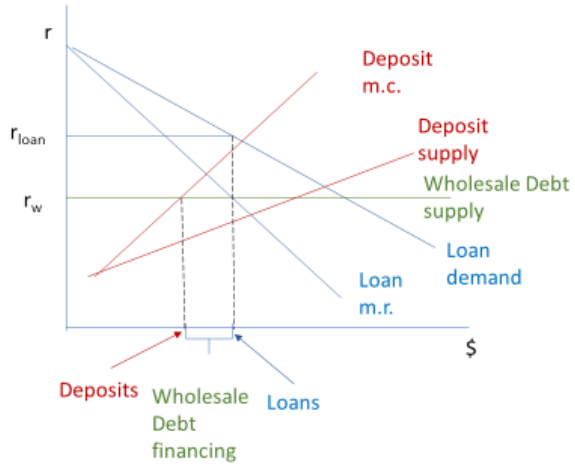



Figure 4:Optimal loan and deposit volumes under the separation theorem (*Source: Lindblom and Elliot (2017))*

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?

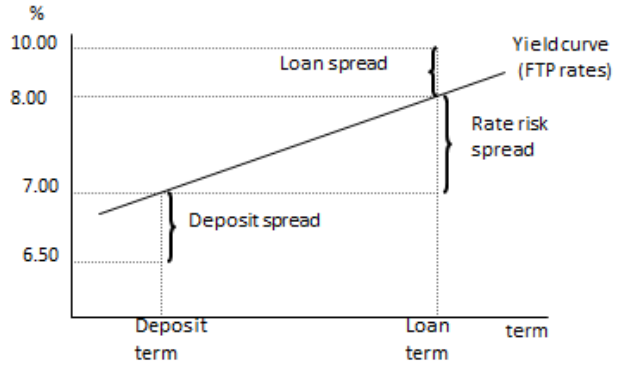



FIGURE 6: INTERPRETING THE NET INTEREST MARGIN

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).

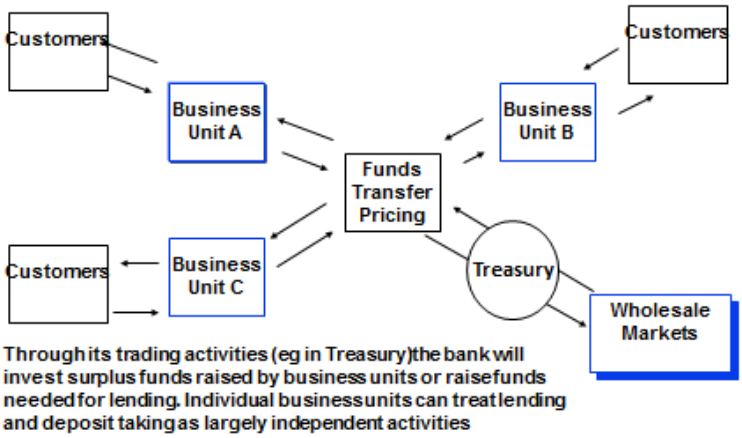



FIGURE 7: FTP AND THE BANK'S TOTAL BALANCE SHEET

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. These complications are recognised in the Figure 8 taken from Deloitte (2015).

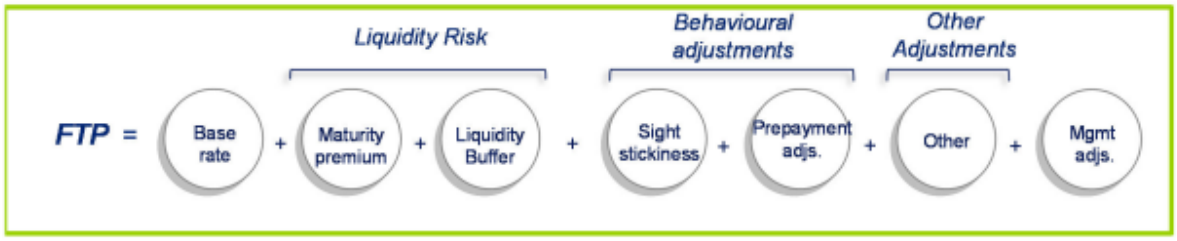



FIGURE 8: COMPONENTS OF THE FTP

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 fu nds. 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. Identifying the appropriate risk free securities and constructing the appropriate yield curve to get zero coupon rates at different maturities is an important element in this process. Dziwok (CTCF,2019) examines this in the context of Polish banking.

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, $D \neq L$, 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.

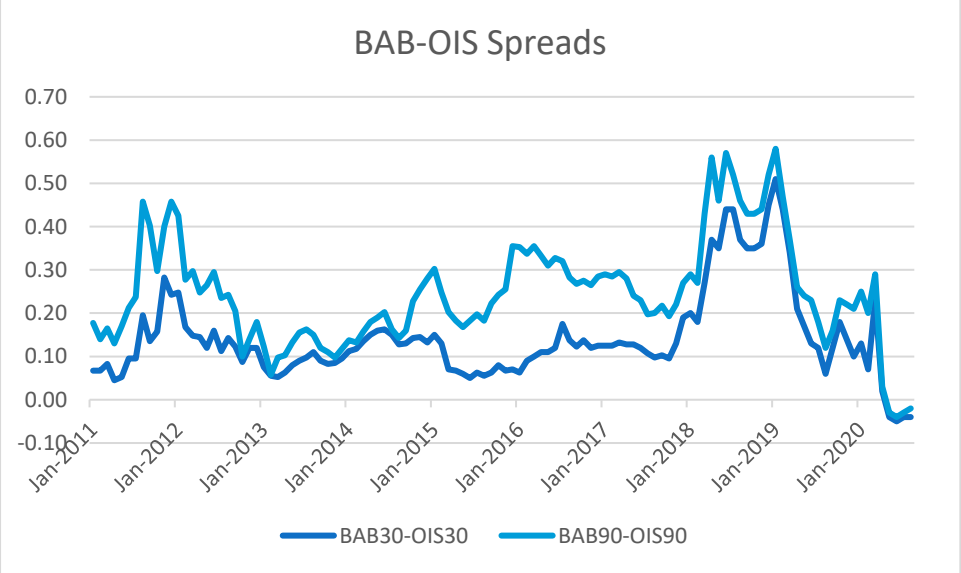
Second some assets such as residential mortgage loans will be "variable rate" where the bank has the discretion as to when and by how much to change the interest rate charged. This flexibility suggests that the "cash rate" might be a relevant transfer pricing rate for transfer of interest rate risk, 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 9 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 9: 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

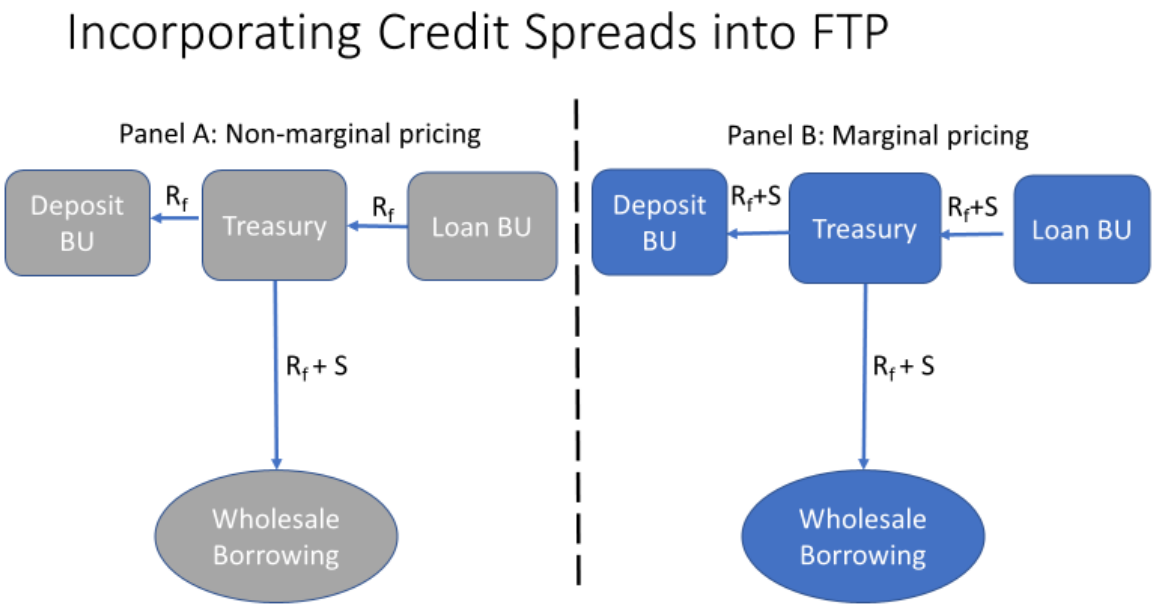
pricing, using the average historical cost of total deposit and debt funding, for the liquidity premium component of the transfer price.

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 10 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 10**




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.

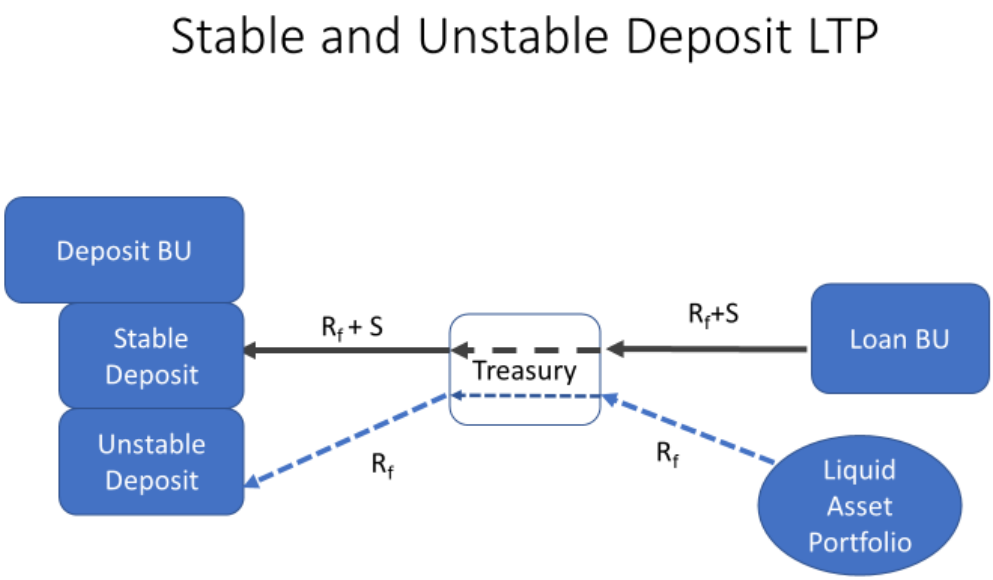
These regulations create different types of complications to be addressed in the LTP system. The LCR means that different types of short term sources of funds will require the bank to hold different amounts of high quality liquid assets (HQLA), rather than all those funds being available for lending 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 was 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 between 2015 and 2022. Rather than holding HQLA, the bank could 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 11 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 11: DEPOSIT LIQUIDITY AND FTP**




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 arose 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