

13. Payments Systems

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13.1 Introduction

The term “Payments Systems” embraces a wide range of activities including:

- 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” discussed 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 asset (in terms of the unit of account) 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. The June 2021 [Review of the Payments System](#) recommended more generally that there “should be separate authorisations for the provision of payments facilitation services and the provision of stored-value facilities”. This reflects that these are separate economic functions which could be provided by separate parties.

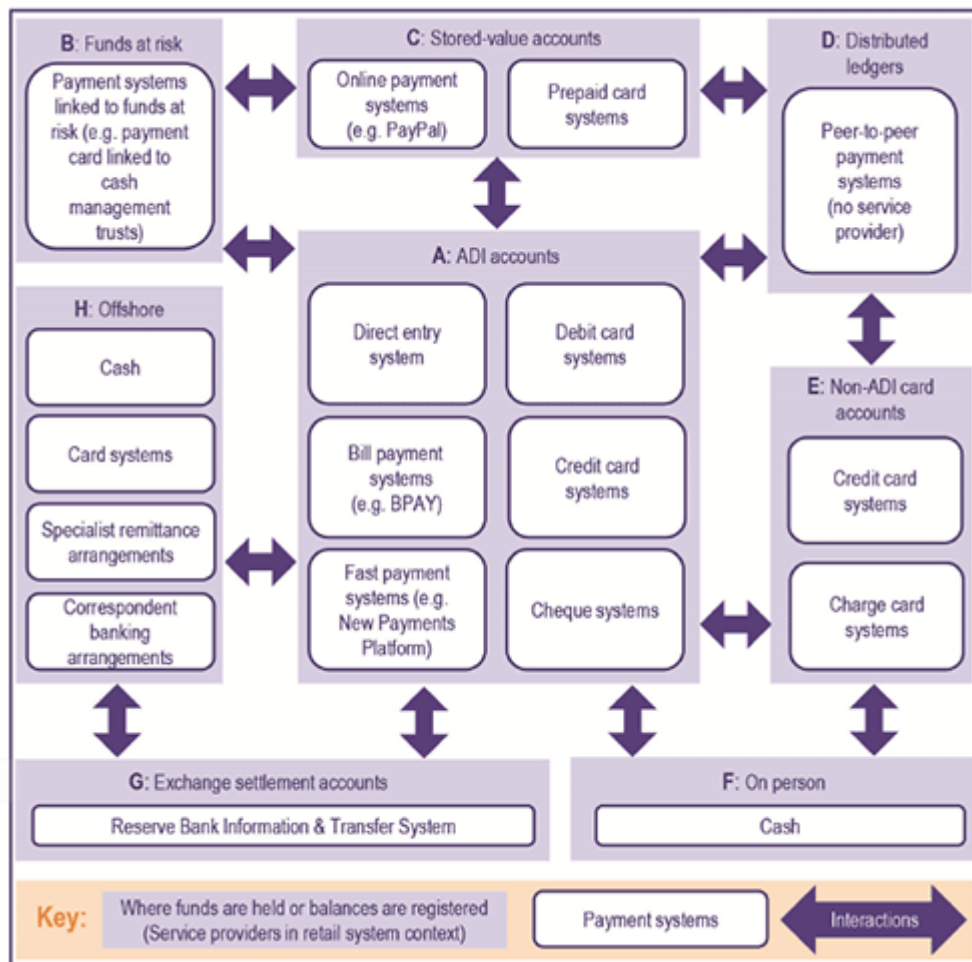


FIGURE 1: PAYMENTS SYSTEM OVERVIEW (FIGURE 10 [FSI FINAL REPORT](#))

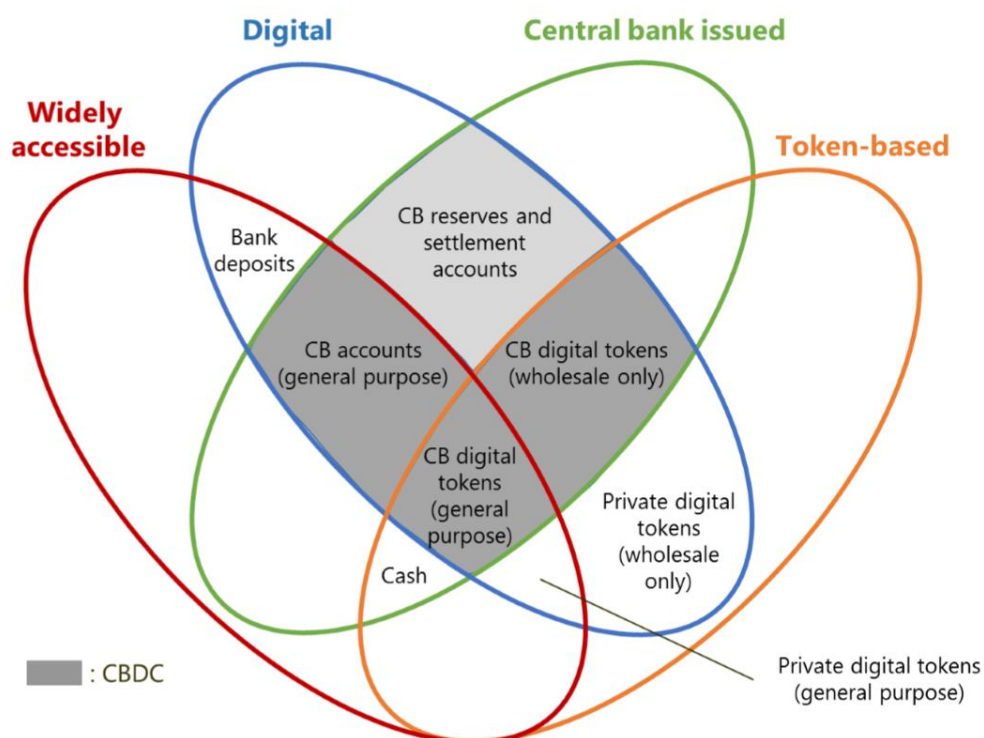
Another way of considering the variety of “means of exchange” is via the “money flower” shown in Figure 2. Among the distinctions outlined there, one worthy of note is the old distinction between “inside money” and “outside money” where the latter refers to “fiat money” issued by governments

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 aggregate 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 Bank³).

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.

The ongoing innovations in payments practices and possibilities has led to both the RBA and the government undertaking recent reviews of the payments system. The Government has proposed a [Strategic Plan](#) for the payments system while the Payments System Board [Review of Retail Payments Regulation](#) focuses more explicitly on specific issues affecting the system.

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 card initiated transactions increased to 63 per cent (19 for credit/charge cards) from respectively 26 and 15 per cent) of the number of transactions. There has been increased use of electronic technology for initiating small value transactions and growth in contactless payments (either via “tapping” or on-line transactions, including via mobile phone). 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 transactions⁴) while Internet banking and BPAY each account for about 2-3 per cent of consumer payments by number, as does PayPal.⁵ Automated payments (via direct debit and 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.⁶ 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 aggregate 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

⁴ Historically bank cheques were used where guaranteed settlement was needed such as in real estate transactions. The development of electronic settlement practices such as via [PEXA](#) is removing that role, as is gross real time settlement for other transactions.

⁵ The RBA has recently expanded its retail payments data collection, statistics from which can be found [here](#), and which is discussed [here](#).

⁶ 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

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.

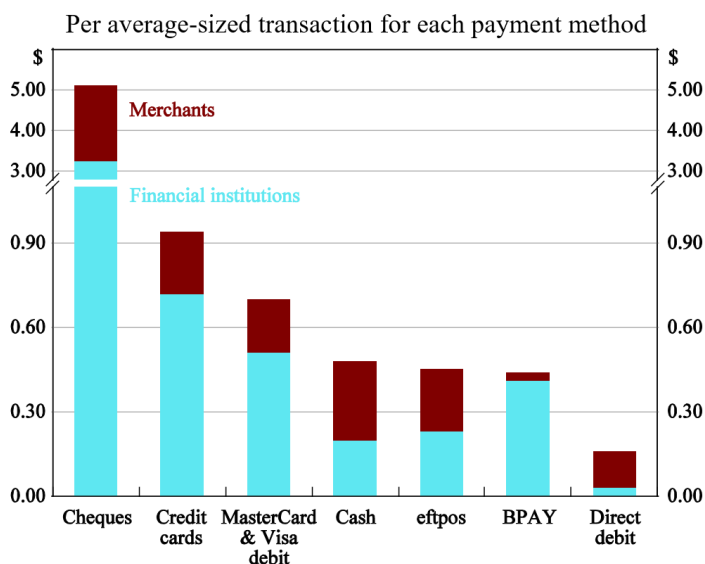


FIGURE 3: RESOURCE COSTS OF DIFFERENT PAYMENTS METHODS (SOURCE: [RBA](#))

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. https://www.auspaynet.com.au/
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. Later in the chapter, the interaction of the various systems in Australia will be discussed.

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”,⁷ 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.⁸ 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.⁹ 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.¹⁰

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.

⁷ 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. See [Covick and Davis](#) (A&F, 1990),

⁸ The payment of interest on bank deposits at the Central Bank also has a similar effect.

⁹ See, for example the BIS Committee on Payments and Market Infrastructures 2018 [Report](#) on Central Bank Digital Currencies

¹⁰ 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.

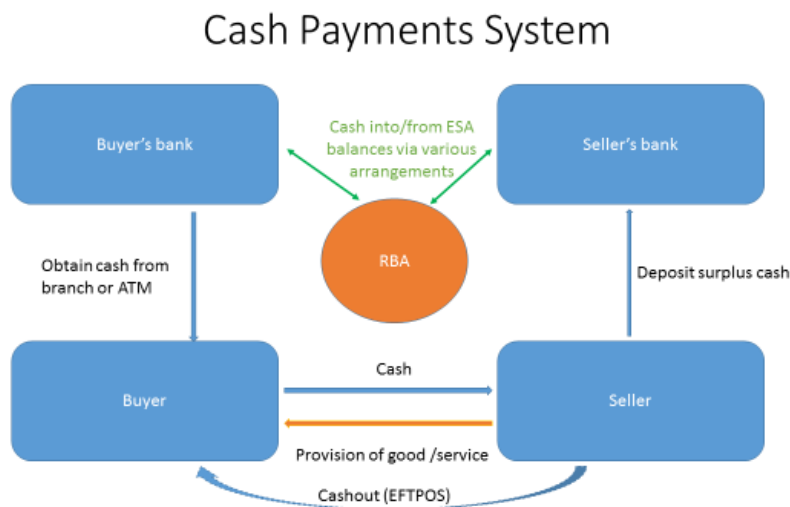


FIGURE 4: CASH PAYMENTS SYSTEM

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 (for example) where a merchant customer of the bank receives a payment via EFTPOS from a customer of a different bank. The interchange arrangements are complex and discussed later. (Banks will, of course, also be recipients of 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 Evers), 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. Generally, there is a wide range of transaction accounts across providers for individuals to choose from with a variety of different characteristics. [Canstar](#) lists 132 different accounts available for adults in NSW undertaking 20 or more transactions a month. No account keeping fees, no transactions fees, and zero, or near zero. interest rates were very common.

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 issuing bank 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 promises 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.

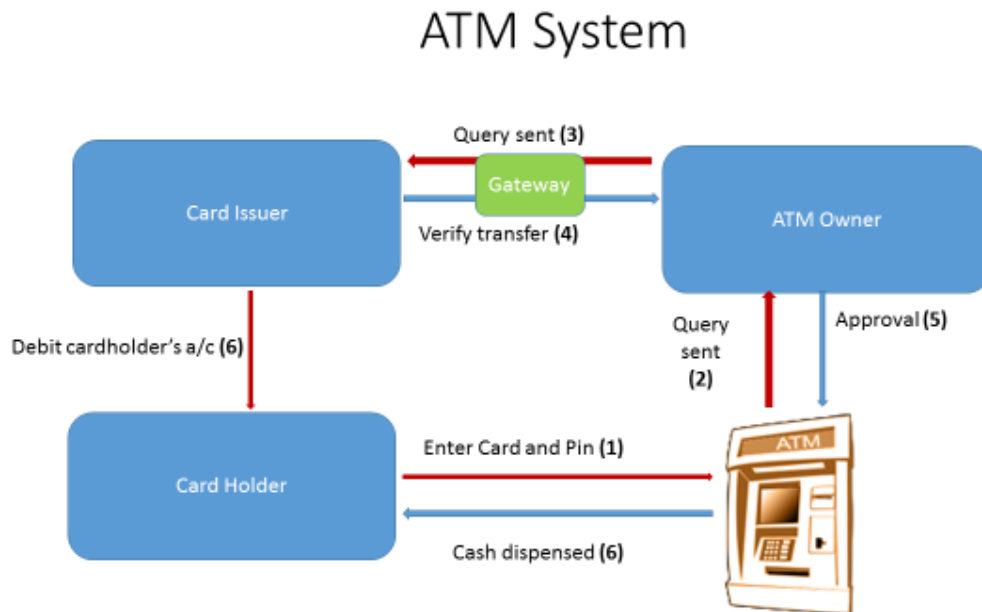


FIGURE 5: ATM INFORMATION FLOWS

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 are used by banks and 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 for ATM transactions.

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 was generally unable to access the funds until the transaction has been cleared and settled – which may involve a number of days. That creates risk of a “bad cheque” 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 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. Some countries, particularly the USA, have been slower to move away from use of cheques.

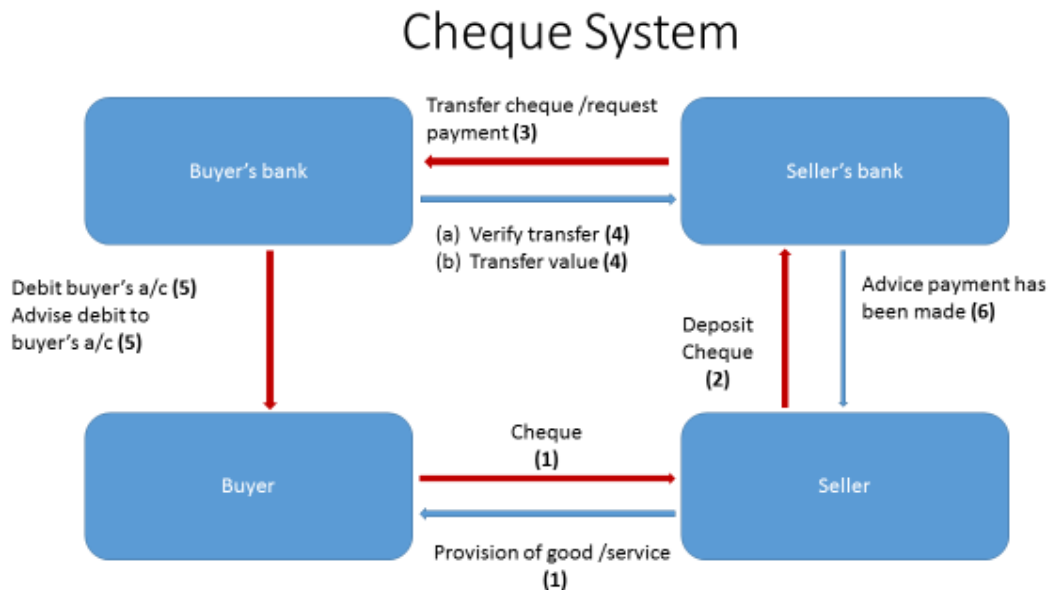


FIGURE 6: CHEQUE PAYMENTS SYSTEM

The cheque payments system is characterised by:

- (a) Time lags associated with the process.
- (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.

It is hardly surprising that with the advent of modern technology, which removes these problems (albeit involving other risks) the cheque system (and to a lesser extent cash) is in demise.

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 direct credit transactions, 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 with their bank for transfers such as 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 debit to their account, will also provide a file to their bank instructing it to arrange debits to customers' accounts and credit its account.¹¹

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 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.¹² While there may be lags in the payer initiating the transaction, once commenced the credit to the payee'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

¹¹ An [information sheet](#) on direct entry arrangements is available from APCA

¹² A merger with Eftpos and the NPP was approved by the ACCC in late 2021.

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).

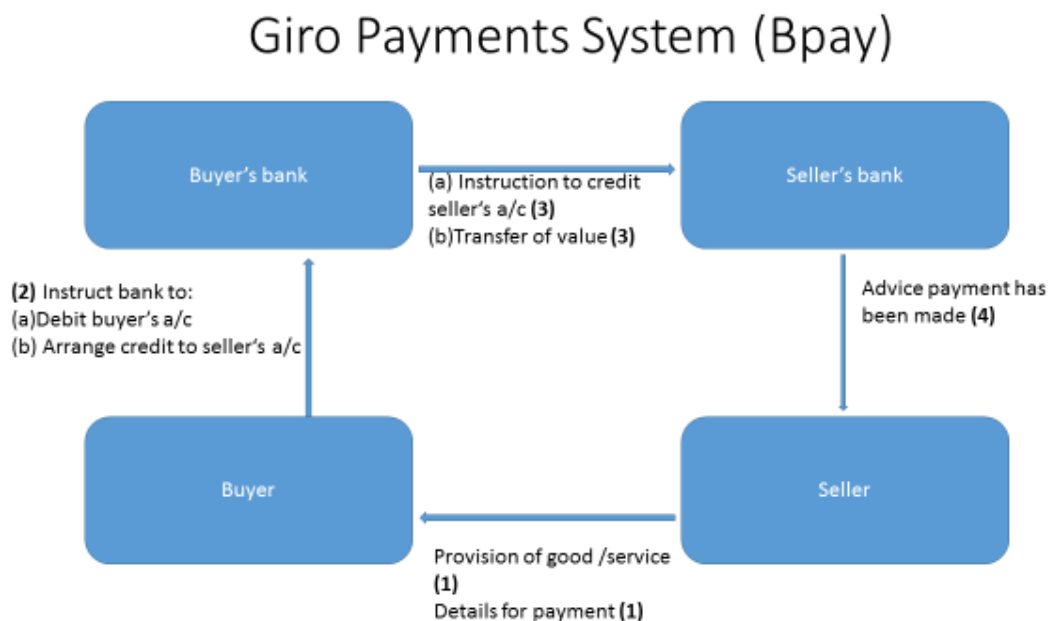


FIGURE 7: GIRO SYSTEM

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 that 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 particular card used by 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” buttons on a terminal, determine through which scheme the transaction is routed. Table 2 provides an overview of card systems and types found in Australia. With the advent of near field technology enabling a customer to simply tap their card on a terminal which links to all networks, the competitive issue of “default” routing arrangements has become an [issue of concern](#) for regulators. The potential problem is that the transaction may be routed over a network which is not least cost routing.

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 bank a/c deferred until customer pays outstanding card balance, 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 subsequent 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.¹³

Figure 8 provides an overview of the interrelationships between the various fees and benefits involved in a four party payments system.

¹³ Bedre-Defolie et al ([AEJMicro, 2013](#)) and Heidhues et al ([RIO, 2015](#)).

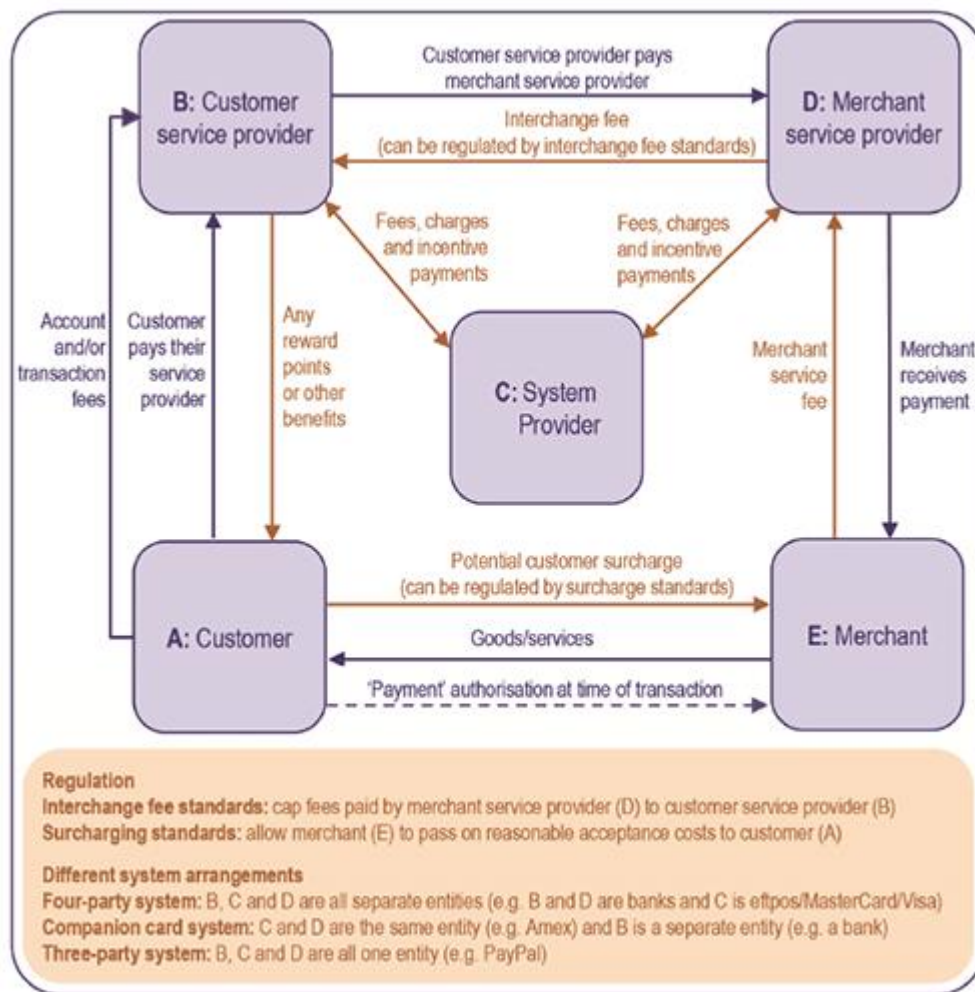


FIGURE 8: RETAIL PAYMENTS SYSTEM FEES AND CHARGES (SOURCE: FSI FINAL REPORT, FIGURE 11, P172)

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 (such as use of QR codes). Other electronic payments arrangements include PayPal which commenced operations in Australia in 2005.

EFTPOS was established by the major banks in 1984.¹⁴ 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.

Initially bilateral agreements between banks determined interchange fees. In 2009, a centralised operator (ePAL) was established 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).

¹⁴ The Australian banks introduced the BankCard credit card system in 1974. It was phased out in 2006.

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.

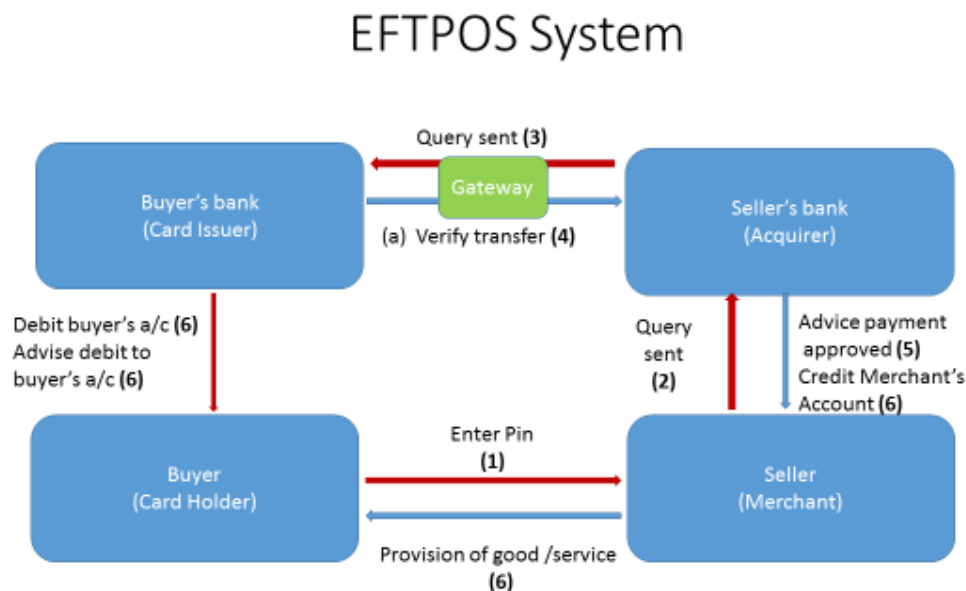


FIGURE 9: EFTPOS SYSTEM

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 communications 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.

Credit/Debit Card Systems

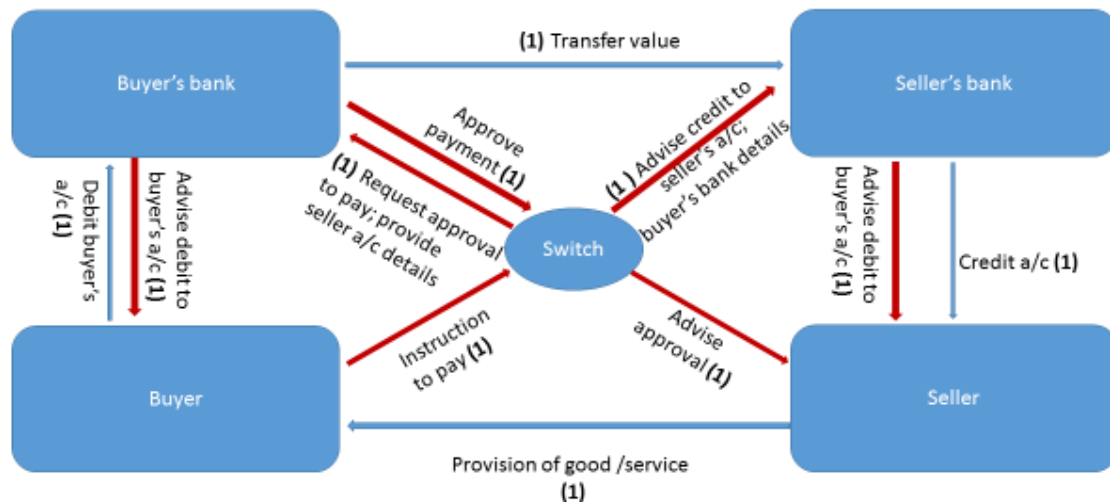


FIGURE 10: ELECTRONIC PAYMENTS SYSTEMS

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 against loss 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 or 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-authorized 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.

Three Party Card Systems

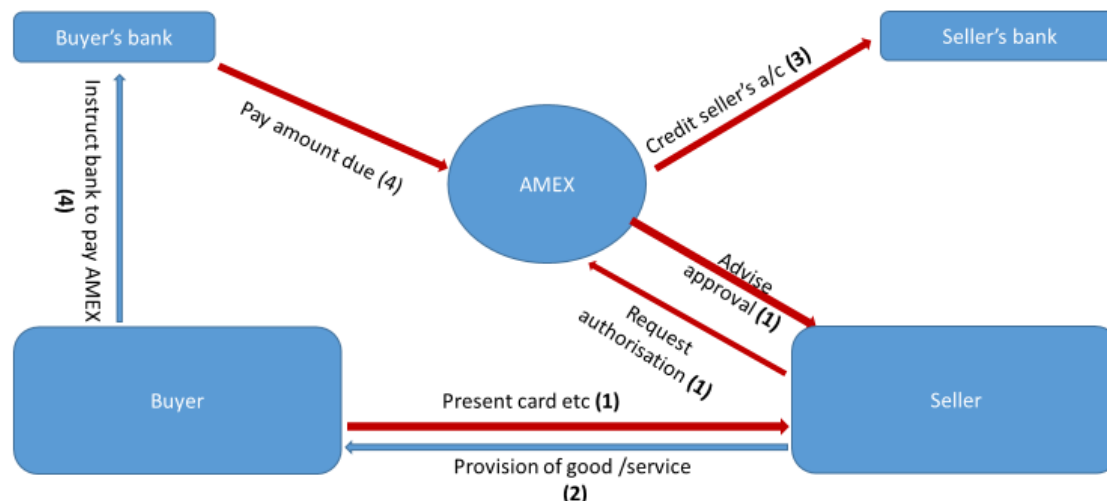


FIGURE 11: THREE PARTY PAYMENT SYSTEM

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 ISO2022, interoperability with other systems is enhanced. The new technology enables more information to be attached to a payment instruction.

Another benefit of the NPP is that participants are able to use alternative identifiers (mobile phone numbers, or email addresses, 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.

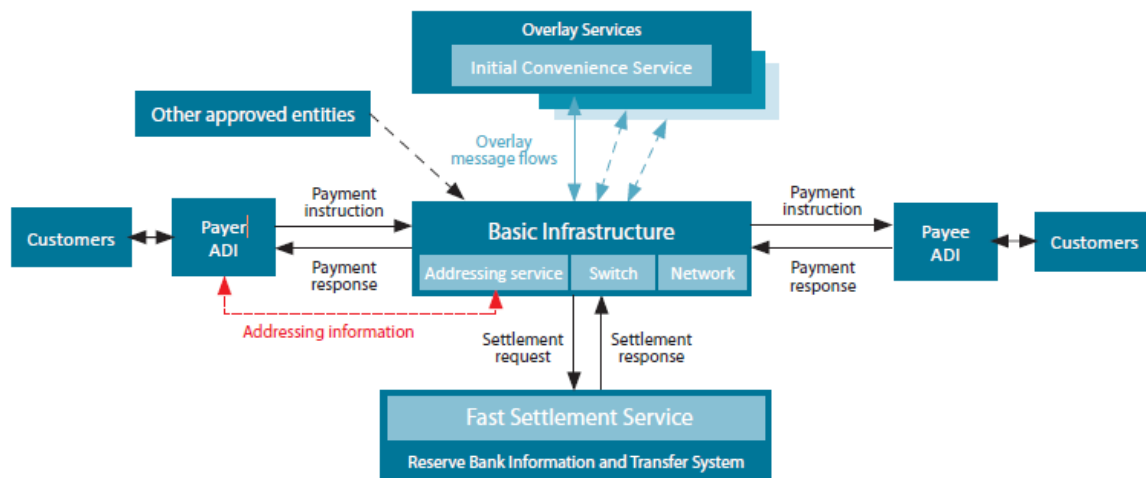


FIGURE 12: THE NEW PAYMENTS PLATFORM (SOURCE, [RBA](#))

Prior to ACCC [authorisation](#) in 2021 of a merger between NPP, Eftpos, and BPay, those entities were owned by different, overlapping, consortia of banks and others as shown in Figure 13. Apart from the rationalising the overall ownership structure, the ACCC was of the view that, subject to some undertakings regarding behaviour, there would be more scope for efficiency gains from better coordination of innovations. While it opined that there would be no adverse competitive effects, a merger would increase ability to compete with anticipated intrusions into the payments landscape by “bigtech” firms. Over time it might be expected that, for example, the Eftpos network might be subsumed within the NPP network (rather than having two sets of networks).

Since that merger, the three payments systems (NPP, eftpos, and BPay) are subsidiaries of [Australian Payments Plus](#). It also provides services via Beem (which enables bill-splitting and accessing customer rewards on mobile wallet transactions) and Connect ID aimed at enabling appropriate information sharing. It also operates Osko (a fast payments service under the NPP), PayID (enabling use of mobile numbers etc rather than bank account numbers) and Pay To (enabling merchants to initiate real time payments from customer’s bank accounts).



FIGURE 13: EFTPOS, BPAY AND NPP OWNERSHIP PRE-MERGER (SOURCE: [KALLMAN 2020](#))

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 Taobao, 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 Ethereum) 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 (it is believed) 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. Ethereum 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 attempted to develop 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. That project was terminated in early 2023.

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 was delayed due to the Covid Crisis and was completed in October 2021. Topics canvassed for consideration in the November Issues Paper included interchange and merchant service fees, least cost routing of

transactions, surcharging, electronic wallets. Among other matters are those 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 and the [final report](#) in October 2021.

The final report decisions included:

- Larger banks (eight of them) would be expected to issue dual network debit cards that enable a payment to be routed by the least cost network.
- The RBA’s interchange standards will set a lower cap (average of 8 cents per transaction) for single network debt cards which smaller banks might issue versus dual network cards.
- Least cost routing of payments functionality is to be expected for all methods of payment initiation.
- Consistent with the Bank’s view on the desirability of low interchange fees in a developed network a reduction in some maximum interchange fees will occur and greater transparency of overall fees required.
- Reflecting Bank concerns on how the structure of scheme fees could adversely affect payments system efficiency, scheme operators must provide information on fees to the RBA.
- Contrary to its original position, the PSB decided that BNPL operators would not be allowed to maintain a no-surcharge rule for merchants.
- The PSB will continue to monitor the costs of payments services experienced by smaller merchants.

The Government’s Strategic Plan agenda for the Payments System was released in late 2022, noting the importance of changing payments methods, new technologies, new providers and business models, and new risks. It posits a reform agenda involving:

- Developing a Strategic Plan for the payments system in collaboration with regulators, industry, consumer and business representatives;
- Updating the Payment Systems (Regulation) Act 1998 (PSRA) to capture the full suite of payment entities and systems, as well as provide the Treasurer with ministerial powers to address payment issues outside the scope of the Reserve Bank of Australia’s (RBA) public

interest powers;

- Implementing a tiered licencing framework for payment service providers;
- Reducing small business transaction costs, particularly through least cost routing, or a similar solution;
- Continuing development of international interoperability through cross-border initiatives; and
- Considering developments in the broader digital economy that are related to payments, such as digital wallets, buy-now-pay-later arrangements (BNPL)⁶, stablecoins, crypto-assets, central bank digital currencies (CBDCs), the consumer data right (CDR), and connecting with payment-related initiatives underway across the country (e.g. state-based initiatives).

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	Objective of reducing incentives to

	Visa, Mastercard and Bankcard	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. 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 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 14: RBA/PSB REGULATORY INTERVENTIONS