

The Australian High-Value Payments System¹

Payment and settlement systems are important components of a modern market economy. They provide the means for consumers to make non-cash payments to businesses, payments between individuals and between businesses, and for payments associated with financial and asset markets. A robust payments infrastructure is therefore important to the functioning of the economy. The linkages between participants through payment and settlement systems mean that they can be one channel through which weakness in one participant can be transmitted to others. Such ‘systemic risk’ in payment systems can be reduced by good payment and settlement system design.

This article describes the real-time gross settlement (RTGS) system for high-value payments in Australia and explains its role in promoting the stability of the financial system.²

1. Settlement of payments in Australia

Payment obligations between financial institutions are generated by transactions directly between them or made on behalf of their customers. On an average day, around \$140 billion in payment instructions are exchanged between financial institutions in Australia. These transactions include both retail payments and wholesale payments, such as securities transactions, large or time critical payments and the Australian dollar leg of foreign exchange transactions. While the number of retail payments is large – around 9½ million retail payments are made between financial institutions every day – the 20 000 payments passing through the high-value payments system account for around 90 per cent of the total value.

Prior to June 1998, most interbank payments were settled on a net basis at the start of the business day following the exchange of payment instructions. This meant that a lag existed between the time an interbank obligation was created and the time it was settled across accounts at the Reserve Bank (known as Exchange Settlement accounts) at 9.00 am the next day. This lag exposed banks to domestic interbank settlement risk. If a bank failed in the interim, it would be unable to settle its obligations. In the meantime, other banks would have made further payments themselves. If the payments they had expected to receive were not settled, they could be subject to liquidity pressures and, potentially, large losses.

In line with practice overseas, the Reserve Bank introduced RTGS in June 1998, targeted at high-value payments. In Australia, interbank settlement of payment obligations takes place through the Reserve Bank Information and Transfer System (RITS), which is the means by which banks and other institutions approved by the Reserve Bank access their Exchange Settlement accounts. (In the remainder of this article, the term ‘bank’ is used to refer to any holder of an Exchange Settlement account with the Reserve Bank.)

RTGS payments are settled immediately, on a final and irrevocable basis, when sufficient funds are available in the Exchange Settlement account of the paying bank. Provisions in the *Payment Systems and Netting Act 1998* (see Box 1) ensure that completed RTGS transactions cannot be later unwound if a paying institution were to be declared insolvent.

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2 More details can be found in *Payments Systems in Australia*, Bank for International Settlements, 1999; *Payments System Board Annual Report*, 1999, 2000, 2001, 2002, 2003; *Reserve Bank of Australia Annual Report*, 1998.

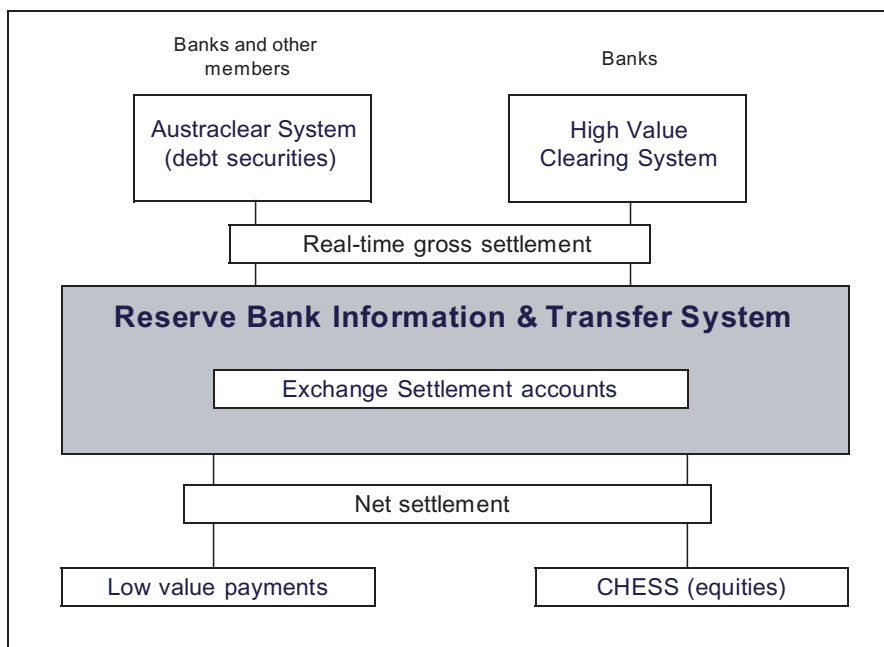
RITS is the hub of the Australian payments system, through which interbank payments are settled (Figure 1). There are two high-value payment systems that are linked to RITS and settle in real time. These are referred to as RTGS feeder systems and are:

- The *High Value Clearing System* – administered by the Australian Payments Clearing Association. This system uses the global SWIFT network to carry customer payments, correspondent banking flows and the Australian dollar leg of foreign exchange transactions. These transactions account for around 70 per cent of the value that passes through RITS.
- The *Austraclear System* – a depository and settlement system for transactions in Australian debt securities and other money market transactions, owned by SFE Corporation Limited. The payment leg of debt security transactions and cash flows connected to derivative products settle in real time through this system. Austraclear payments account for around 25 per cent of RTGS transactions.

More details on the feeder systems are given in Box 2.

The existing *Clearing House Electronic Subregister System (CHES)*, which settles equity transactions undertaken on the Australian Stock Exchange, has also been modified to provide CHES participants with the option of settling equity transactions on the Australian Stock Exchange on a real-time basis. However, the CHES-RTGS system has not yet been used.

Figure 1: Australian payments system infrastructure



In addition to payments generated by the feeder systems, some payments are made by directly entering transactions into RITS. Interbank lending and borrowing are generally settled as cash transfers between banks in this way. These transactions are a fairly small proportion – around 5 per cent – of total RITS transactions.

Finally, there are other payment systems that still settle on a net basis through RITS. These include the cheque, direct entry, debit card and ATM systems (which settle at 9.00 am on the day after payments are exchanged) as well as net settlement of equities transactions through CHESS.

2. Liquidity in the RTGS system

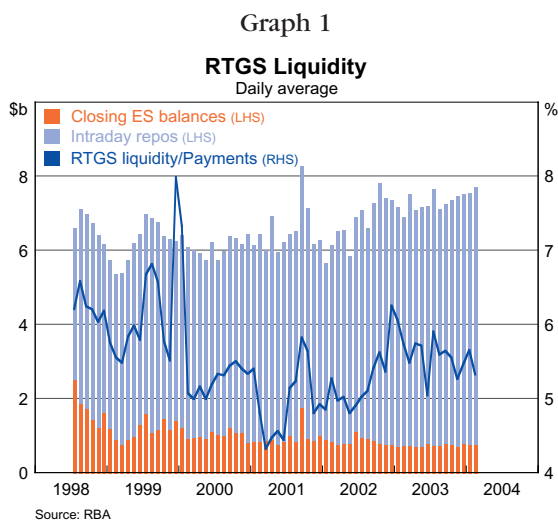
Although settlement of high-value payments through an RTGS system eliminates settlement risk for these transactions, it can potentially put liquidity pressure on financial institutions. A successful RTGS system therefore requires adequate liquidity for banks to make their payments.

For the system as a whole, liquidity available for RTGS each day comprises the total overnight balance in Exchange Settlement accounts and intra-day repurchase agreements with the Reserve Bank.

The aggregate level of overnight balances is determined by the Reserve Bank through its open market operations. These operations are designed to ensure that the aggregate supply of Exchange Settlement balances equals banks' aggregate demand at the target cash rate. The banks' demand for (end of day) balances is precautionary, in that it derives from each bank's need to be able to settle all payments with other banks and with the Reserve Bank.

At the start of the day, an individual bank's liquidity is made up of its opening Exchange Settlement account balance which includes any payments made by the Reserve Bank on behalf of its customers. Early in the day, banks estimate their liquidity needs and obtain additional liquidity by entering into intra-day repurchase agreements with the Reserve Bank and by bidding for inter-day funds in the Reserve Bank's open market operations. An intra-day repurchase agreement involves a bank selling eligible securities to the Reserve Bank in exchange for Exchange Settlement funds and agreeing to reverse this transaction by the end of the day. During the day, the payments of an individual bank will also be funded by incoming payments and loans from other banks. Overall, banks' RTGS payments are funded by liquidity of between 4 and 6 per cent of total payment values (Graph 1).

When the RTGS system was first established, liquidity demands were uncertain and banks held substantial overnight balances in their Exchange Settlement accounts as a precaution. As banks became more familiar with the system and more adept at managing their payment flows, these balances fell – quite sharply over the initial months of RTGS, and more gradually thereafter. In July 1998, immediately after the introduction of RTGS, aggregate overnight balances in Exchange Settlement accounts averaged \$2.5 billion. By 2003, these balances had fallen to an average of only \$750 million, although there are occasions on which significantly higher aggregate balances were held.



3. RITS liquidity conserving features

There is an opportunity cost to banks of holding balances in their Exchange Settlement accounts and other highly liquid assets that may be used for entering into intra-day repurchase agreements with the Reserve Bank. It is therefore important that a high-value payment system use liquidity efficiently.

In the Australian RTGS system, liquidity efficiency is achieved using two main features of the RITS system queue process – ‘next-down looping’ and ‘Auto-Offset’. Next-down looping is the process by which RITS traverses its queue of transactions awaiting settlement. Before it can be settled, a payment needs to meet a number of tests: it must be marked by the paying bank as ready for settlement; and there must be sufficient available unreserved funds in the paying bank’s Exchange Settlement account. If a payment passes these tests, it is settled with simultaneous entries to the Exchange Settlement accounts of the paying and receiving banks. If a payment does not pass the queue tests, including the Auto-Offset test described below, the queue processor leaves it on the queue and tests the next payment. It continues this process, settling or leaving each payment, until it reaches the end of the queue, after which it restarts testing from the start of the queue. This continual ‘settle or leave’ approach is generally more efficient than the ‘First In First Out’ algorithms often used in other countries.

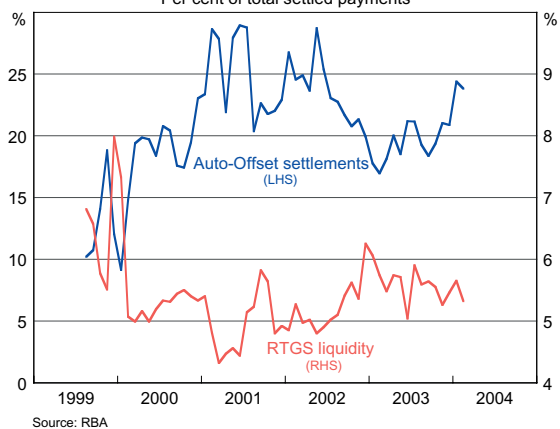
The last test of the queue processor is an Auto-Offset test. Auto-Offset is a facility that attempts to offset outstanding payments between two banks. If a payment remains unsettled on the system queue for longer than one minute, the queue processor searches for offsetting payments from the receiving bank. If there are sufficient unreserved funds available in each bank’s Exchange Settlement account to settle these transactions simultaneously, then the original and offsetting payments are settled immediately.

These queue features mean that while the queue processor tests transactions in the order received, transactions may not settle in the same order.

The Auto-Offset feature is very effective in using available liquidity efficiently. This shows up as a strong inverse relationship between the level of RTGS liquidity and the value of Auto-Offset settlements (Graph 2).

Graph 2

Auto-Offset Settlements and Liquidity
Per cent of total settled payments



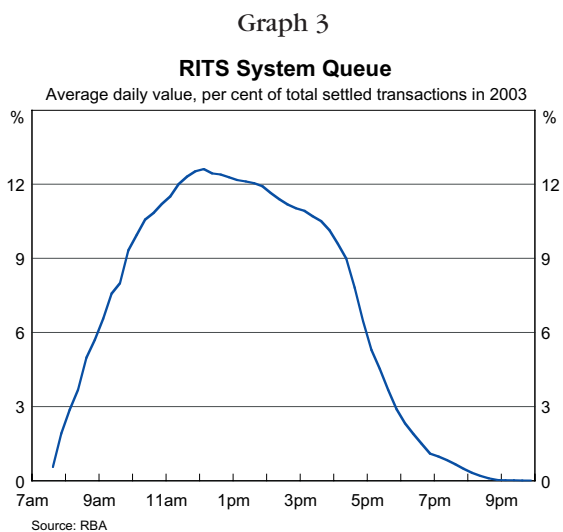
4. The RTGS day

A typical day in the Australian high-value payments system begins when RITS opens at 7.30 am. Prior to this time, the Reserve Bank posts any payments from itself (for example, government payments) to banks’ Exchange Settlement accounts so that these funds are immediately available. In the next 75 minutes, banks estimate their liquidity needs and, if required, undertake intra-day repurchase agreements with the Reserve Bank. RITS closes at 8.45 am ahead of settlement at 9.00 am of a batch which includes interbank obligations from the retail payment systems. The main RTGS settlement period then begins at 9.15 am when

all payments are eligible for settlement. The pattern of payments on the queue is fairly consistent day to day. It rises from opening as banks enter more high-value interbank payments for settlement, peaking around midday and remaining fairly steady through the early afternoon before declining quite sharply late in the day (Graph 3).

The main RTGS settlement period continues until 4.30 pm; Exchange Settlement account holders are typically active at this time settling their own and clients' transactions. By 5.15 pm, those banks that are not involved in global cross-currency settlements finalise their settlements

and unwind any intraday repurchase agreements with the Reserve Bank. An evening session allows simultaneous settlement of foreign exchange flows to take place with banks in other time zones through Continuous Linked Settlement Bank. The system closes at 7.00 pm in winter and 9.00 pm in summer.



Box 1: The Payment Systems and Netting Act

At the same time that RTGS was being developed to provide a payments system with greatly reduced settlement risk, the *Payment Systems and Netting Act 1998* was drawn up to address legal uncertainties including the finality of RTGS payments and the certainty of multilateral netting arrangements.

The so-called ‘zero hour rule’ avoids the difficulty of identifying the moment of insolvency by deeming that a court-ordered liquidation is effective from immediately after the previous midnight. Left unaddressed, this convention gave rise to the prospect that the finality of RTGS payments could be overturned by a court following the insolvency of a participant. To avoid this, the *Payment Systems and Netting Act* provides for the Reserve Bank to approve RTGS systems that meet specified criteria. Transactions settled in an approved system cannot be rendered void if the participant is placed in external administration.

A multilateral netting arrangement is one where obligations between three or more parties to financial transactions are netted. However, the law regarding ‘unfair preferences’ could have meant that if an institution failed, other parties could have challenged the validity of the arrangement. The *Payment Systems and Netting Act* enables the Reserve Bank to protect multilateral netting arrangements in the payments system from such a challenge.

Both of the above protections under the *Payment Systems and Netting Act* require the Reserve Bank to assess applications for approval of specific systems on their merit. To date, three systems have received approvals as RTGS systems – the Austraclear System operated by the Sydney Futures Exchange for real-time securities settlement; RITS operated by the Reserve Bank; and CHESS-RTGS, a system providing the option of real-time settlement of equities transactions. There have also been two multilateral netting systems approved – the Austraclear System under conditions where real-time settlement is not available; and the High Value Clearing System, operated by the Australian Payments Clearing Association, under the same conditions.

Box 2: RTGS Feeder Systems to RITS

Austraclear

Transactions in debt securities are settled through the Austraclear System, which is operated by Austraclear Limited, a wholly owned subsidiary of SFE Corporation (which also owns the Sydney Futures Exchange). Austraclear maintains electronic cash and securities records for its members; traditionally, many securities records were held in paper form.

On an average day, around \$35 billion in debt securities and other money market transactions are settled through Austraclear. Fixed-income securities, including Commonwealth Government securities, make up around two-thirds of this flow; the remainder is short-term debt issued by banks in the form of bank-accepted bills, negotiable certificates of deposit or promissory notes and other money market settlements. Securities settlements are effected on a 'delivery-versus-payment' basis. Where the buyer and seller of the securities have their accounts at different banks, settlement of the securities in Austraclear occurs immediately following the interbank settlement of the payment across Exchange Settlement accounts.

Austraclear has over 600 members, most of whom do not hold Exchange Settlement accounts. These members must have an arrangement in place with a bank which sponsors their participation in Austraclear and settles payments on their behalf.

Futures and options transactions on the Sydney Futures Exchange also result in payments such as margin obligations. These payments are made to and from the Sydney Futures Exchange's Exchange Settlement account and add a further \$40 million to the average daily value of settlements through the RTGS system. The settlement of these obligations between clearing participants and the Sydney Futures Exchange is effected by cash transfers in Austraclear, and any resulting interbank obligations are simultaneously settled across Exchange Settlement accounts.

High Value Clearing System

The High Value Clearing System is administered by the Australian Payments Clearing Association. This is also known as the SWIFT Payments Delivery System as it utilises the SWIFT FIN-copy service. Payments made through this system are predominantly payments for the Australian dollar leg of foreign exchange transactions and payments made on behalf of customers, including overseas banks for whom banks in Australia act as correspondent. Participating members of the system send payment instructions via SWIFT to RITS for the payment to be settled on a real-time basis. Members of the system therefore need to hold an Exchange Settlement account with the Reserve Bank. Currently, there are 48 members of the High Value Clearing System.