

Liquidity management in the New Zealand banking system

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This article provides an overview of how the Reserve Bank (the Bank) conducts liquidity management. It describes the two areas of liquidity management conducted by the Bank – what the Bank does to maintain a stable and sufficient supply of system liquidity and what it does to ensure individual banks have access to liquidity to meet daily transactional obligations through the payments and settlement system. It also explains how the Bank supports its monetary policy implementation by managing the level of liquidity in the banking system so as to avoid large fluctuations in short-term interest rates.

1 Introduction

The Reserve Bank, as New Zealand's central bank, has responsibility for the implementation of monetary policy, the operation of the inter-bank payments settlement system, and the promotion of a sound and efficient banking system. As part of its responsibilities in these areas, the Bank has an active role in managing the liquidity of the banking system by conducting open-market operations in the financial markets and by entering into transactions with individual banks to provide them with the liquidity they need to meet their settlement obligations.

The broad objectives of the Bank's liquidity management function are to ensure that the banking system has sufficient liquidity to enable the payment settlement system to function effectively and to avoid large swings in the volume of available cash that would undermine the implementation of monetary policy. The Bank also conducts securities tenders on behalf of the government, thereby providing the means by which market participants can secure intra-day or inter-day repurchase transactions with the Bank.¹ These transactions enable individual banks to meet daily obligations to make and receive cash transactions on behalf of their customers.

This article discusses the main features of the Bank's liquidity management functions and how they relate to the Bank's monetary policy and banking system responsibilities.

¹ The Bank conducts repurchase transactions with counterparties in which the Bank buys securities against cash with a commitment to sell the securities back to the counterparty at a pre-determined time and interest rate. When securities are bought by the Bank, the securities are lodged into the Bank's name.

2 What is liquidity management and why does it matter?

Liquidity is one of the essential requirements for the effective functioning of the banking system. Without adequate liquidity, banks are not able to perform some of their core functions, including the settlement of their inter-bank obligations (wholesale transactions occurring between banks). Excessive or insufficient liquidity in the financial market also has the potential to undermine the implementation of monetary policy by creating expectations of a firming or weakening of interest rates in ways that may contradict current and intended monetary policy settings. Too much liquidity in the banking system on a regular basis fosters an expectation of falling interest rates; too little liquidity increases the expectation of higher interest rates. Maintaining smooth cash flows and reducing short-term interest rate volatility produces a stable environment where businesses and individuals can make more informed decisions about savings, investment, and other expenditures.

Effective management of liquidity in the banking system is therefore an important element in maintaining a well-functioning banking system and in complementing monetary policy.

The Bank's liquidity management role has three broad elements. First, the Bank implements monetary policy through the Official Cash Rate (OCR),² a cash interest rate

² OCR reviews occur approximately six weeks apart, giving eight reviews during the year; four coinciding with *Monetary Policy Statement* releases. A schedule of these dates appears on our website. The Bank has the discretion to act outside these dates, but does so only in exceptional circumstances.

Box 1

Agency Agreement between New Zealand Debt Management Office (NZDMO) and the Bank

The Bank's responsibilities are to:

- Provide NZDMO with a Crown Settlement Account (CSA)³ facility.
- Conduct OMOs when necessary. The Bank reviews and verifies known cash flows between the government, the Bank, and banking system. When the net change in the CSA for all banks is determined the Bank either injects cash into or withdraws cash from the banking system to help maintain a broadly stable level of liquidity.
- When required, provide advice to NZDMO on the levels and structure of government domestic borrowings. The NZDMO take this advice into account when informing the Minister of Finance on the domestic borrowing programme.
- Conduct government securities tenders and provide administrative services connected to these tenders on behalf of NZDMO.
- Repurchase government bonds. These repurchase transactions normally occur within the six months prior to a bond maturing. The Bank will repurchase the bond and pay the cash to the bond holder. The Bank may then on sell the bond to NZDMO, instead of holding the bond on its balance sheet until maturity.
- Switch government bonds. Periodically, NZDMO may wish to switch out of one bond maturity and into another. The Bank conducts these transactions on behalf of NZDMO.
- Provide assistance in the setting of Kiwi bond interest rates.
- Provide market support by producing and publishing a variety of surveys and schedules: these include the weekly survey of the turnover of government bonds in the secondary market, the monthly survey of non-resident holdings of government bonds and treasury bills, and schedules of future issuances of government bonds and treasury bills.

system adopted by the Bank in March 1999. There is an interest rate corridor around the OCR of plus or minus 25 basis points. At 25 basis points above the OCR exchange settlement account system (ESAS) account holders (currently only registered banks) can obtain cash from the Reserve Bank, while at 25 basis points under the OCR, ESAS account holders⁴ can deposit funds with the Bank (ie those with credit balances in their settlement accounts overnight). By setting this corridor the Bank is able to exert a strong influence on short-term interest rates, which in turn affects economic activity and inflationary pressures through a number of channels.

Second, the Reserve Bank provides facilities to registered banks enabling them to maintain sufficient settlement cash

³ All flows between the government and the private sector and the government and the Bank end up flowing through this account. An example of this is when NZDMO funds the Ministry of Education's (MoE) Westpac Government Branch Account and then the MoE uses this money to pay fortnightly salaries to teachers.

⁴ The ESAS accounts must maintain a zero or positive balance.

at the Bank to meet their payment obligations to other banks through Austraclear.⁵ Whether banks settle their inter-bank obligations intra-day or at the end of the day with deferred settlement (intra-day and deferred settlement are via real time gross settlement⁶), they require sufficient credit balances in their settlement accounts at the Reserve Bank in order to make payments to other banks. The facilities the Reserve Bank provides enable banks to obtain cash from the Bank for the purpose of maintaining sufficient settlement cash to meet their obligations.

Third, the Reserve Bank manages the liquidity associated with government transactions; the Bank injects liquidity to compensate for net payments from the banking system to

⁵ Austraclear is a real-time gross settlement system that members access from their premises. All payments, whether security transactions or cash transfers, are irrevocable once they are accepted by the system.

⁶ Real time gross settlement is provided through the Exchange Settlement Account System (ESAS) allowing payments to be irrevocably settled, transaction by transaction, throughout the day. All transactions are completed in this manner, thus helping reduce the risk that the collapse of one bank may cause others to collapse.

the government (eg tax payments) on any given day, and it withdraws liquidity to compensate for net payments from the government to the banking system (eg pension payments) on any given day. These liquidity transactions are generally conducted via open market operations (OMOs).⁷ In performing this role, the Reserve Bank works closely with the New Zealand Debt Management Office (NZDMO), which is part of Treasury and has responsibility for managing the government's debt programme. The Bank has an agency arrangement with the NZDMO, which sets out the main elements of the Bank's liquidity management functions with respect to the neutralising of liquidity effects of government transactions, and sets out other reporting and analysis functions that the Bank performs for the NZDMO. The agency agreement is discussed in Box 1, previous page.

In addition to these functions, the Reserve Bank's liquidity management function plays an important role in keeping the Bank well apprised of developments in the financial markets and banking system, thereby better equipping the Bank to respond to emerging financial distress situations than would otherwise be the case. Participating in market transactions (eg, OMOs, processing securities tenders, and foreign exchange swaps) allows the Bank to gain knowledge about interest rate movements and the availability, or not, of various securities.

3 Implementation of monetary policy

Settlement Cash

Liquidity can be defined in many ways, but in the context of the banking system, it essentially comprises banks' holdings of monetary instruments that can be used for inter-bank settlement or can be converted quickly to such instruments. In practice, liquidity in this context is largely measured by banks' holdings of settlement cash – cash held at the Bank in Exchange Settlement Account System (ESAS) accounts. This cash is used to settle wholesale obligations between the banks and provides the basis for settling most of the retail banking transactions that occur every working day between corporates and individuals.

One of the ways the Bank maintains a stable liquidity environment is to provide a constant amount of settlement cash to the ESAS account holders. Settlement cash is the aggregate amount of surplus cash held by all ESAS account holders at the end of a given banking day.

Box 2 explains what banks use settlement cash for.

ESAS account holders' settlement cash balances constantly change during the day as transactions flow between other ESAS accounts, the government and the account holder, and the Bank and the account holder. For a description of

Box 2

Settlement Cash

Banks use settlement cash to:

- Settle obligations with the government. For example, a BNZ customer uses a cheque to make a tax payment to Inland Revenue Department (IRD). IRD then deposits the cheque to their account held at Westpac Government Branch. At the end of the business day, if the net balance of all government departments in the Westpac Government Branch is a credit balance, this cash is transferred to the Crown Settlement Account (CSA) at the Reserve Bank. If the net balance is an overdraft, then cash is transferred from the CSA to Westpac Government Branch.
- Settle obligations with the Reserve Bank (eg: purchasing currency from the Bank or settling liquidity management operations they have transacted).
- Settle obligations amongst themselves (eg: a Westpac customer pays for goods or services from a BNZ customer).

⁷ What OMOs are and how they are calculated is explained in box 6.

Box 3

Repurchase Agreements

There are two master repurchase agreements that counterparties can enter into with the Bank. The Reserve Bank Master Intra-day Securities Repurchase Agreement sets out the terms and conditions under which counterparties may obtain cash from the Bank. Specified securities are sold to the Bank and the same security is repurchased by the counterparty within a 24 hour period. Some of the core features covered by the agreement outline the legal nature of intra-day repurchase transactions, how to initiate and confirm a transaction, how cash and securities are exchanged, how to substitute securities, and what actions are taken in the event of a default.

The second agreement is the Reserve Bank Master Inter-day Securities Repurchase Agreement. This agreement sets

out the terms and conditions under which counterparties may obtain cash from the Bank for overnight periods or longer. Specified securities are sold to the Bank and the same security is repurchased by the counterparty at a specific date and interest rate. Some of the core features covered by the agreement outline the legal nature of repurchase transactions, how to initiate and confirm a transaction, how cash and securities are exchanged, how to substitute securities, and what actions are taken in the event of a default.

The Bank pays an overnight interest rate 25 basis points (a quarter of 1 per cent) less than OCR for any cash held in the ESAS accounts at the Bank. This rate forms the lower bound of the OCR corridor. Use of the ORRF is charged at 25 basis points above the OCR. This rate forms the upper bound of the OCR corridor.

how and why account holders obtain intra-day borrowings to ensure payments are made continuously throughout the day, please refer to section 4 of this article.

ESAS accounts are basic current accounts. They have no overdraft facility and therefore their balance cannot fall below zero. ESAS account holders have no right of access to cash from the Bank. If an ESAS account holder needs to make a payment and has insufficient cash in their account they are required to acquire the cash. They can obtain cash from other banks, or they may sell securities to the Bank for

cash using autorepo or the Overnight Reverse Repurchase facility (ORRF) (see Box 4 for more details on this facility), if they have signed the Intra- or Inter-day Master Repurchase Agreement (see Boxes 3 and 4 for more details). If an ESAS account holder does not have such an agreement in place with the Bank, then they will have to acquire cash from another source (eg: other banks).

A counterparty must sell government securities (government bonds, inflation-indexed bonds and treasury bills) in exchange for cash against a future repurchase date. There is no limit

Box 4

Overnight Reverse Repurchase Facility

There may be occasions when a registered bank is unable to acquire cash from another bank. When this happens, the counterparty is able to exchange securities for cash with the Bank for one working day. The only restriction on the amount the counterparty may request is the value of the acceptable securities held by the borrower.

The Bank enters into these overnight agreements with any counterparty that has signed the Inter-day Master Securities Repurchase Agreement through an on-demand facility known as the Overnight Reverse Repurchase Facility

(ORRF). Under this arrangement, the Bank credits a bank's settlement account with the required amount of cash and buys the eligible securities from the ESAS account holder. These securities are bought by the Bank on contractual terms that require the ESAS account holder to buy the securities back at a stipulated price the next banking day.

The facility is open from 09:00 to 12:00 and 13:00 to 14:30 to all registered counterparties who have signed a Reserve Bank Master Inter-day Securities Repurchase Agreement. In addition, ESAS account holders can approach the Bank between 14:30 to 16:00 and 07:30 to 08:00 the following business day to access the ORRF.

Box 5

Monetary policy implementation statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
ORRF	\$439m	\$0m	\$38m
ESAS account balance	\$1,077m	\$0.58m	\$62m

to the amount of cash the counterparty can ask for as long as they have sufficient securities to cover the transaction. This means that the Bank does not take a credit risk against the counterparty when providing them with overnight cash; the credit risk has been effectively eliminated by the purchase of government securities. The market risk for the Bank associated with these transactions (ie: the risk that the market value of the government securities may fall due to a rise in interest rates) is offset by applying a "haircut"⁸ to the security purchased in the transaction. The Bank calculates the face value of the security required using a haircut of 1 per cent for securities with less than 3 years to maturity, and 3 per cent for securities with 3 years or more to maturity.

Market convention ensures that ORRF transactions are repaid within the first hour of the following day's trading and the securities are sold back to the ESAS holder.

4. The Bank's liquidity management

Liquidity in the market is greatly affected by flows between the government and the banking system as previously outlined. This includes transactions between the government and banking system as well as between the Bank and the banking system.⁹ When the government makes disbursements to the private sector (eg in the form of social welfare payments, tax refunds, or salaries to public servants) and this exceeds the cash it receives from the private sector¹⁰ (eg: in the form of tax payments, fines or fees for government services) on any given day, this results in an increase in liquidity of the banking system. Conversely, liquidity is reduced when the government receives more cash from the private sector than

it distributes. These fluctuations in liquidity could have an impact on interest rates and monetary conditions unless neutralised by open market operations.

The Bank needs to know the value of the payments the government and the Bank expect to receive and pay out on any given day. The Bank does this by forecasting liquidity based on information provided to it by the NZDMO and the larger government departments (such as the Ministry of Social Development, the Ministry of Health, and the Ministry of Education). The flows between the government and the banking system, together with flows between the NZDMO and the Bank, are generally large, although flows between the NZDMO and the Reserve Bank do not affect the banking system. Total government revenue and expenditure on any given day averages around \$450 million. Other large periodic government flows include maturing government securities such as treasury bills (typically around \$650 million) and bonds (around \$2,500 million). While the value of transactions is large, there are regular patterns to the flows. For example, PAYE tax is due on the 5th and 20th of each month, and pension payments occur every second Tuesday. The regularity of these payment dates helps to provide greater certainty for liquidity forecasts, thereby facilitating effective liquidity management.

The NZDMO assists the Bank by ensuring that the government departments responsible for approximately 95 per cent of the government's receipts and payments provide the Bank with forecasts of their transactions in a timely manner. The Bank's responsibility is to review both the accuracy of the timing of these flows and then calculate the net impact on the banking system. Consequently, the Bank maintains a fairly close dialogue with some of the government departments in order to maintain a reasonably accurate and complete understanding of the magnitude and timing of cash flows. The NZDMO is also required to inform the Bank of transactions it has instigated that will impact on

⁸ If a 1 per cent haircut is taken, then an additional 1 per cent of security is obtained from the counterparty.

⁹ Transactions between the Government and the Bank do not impact on the level of settlement cash.

¹⁰ The Government receives revenue through tax receipts from IRD and excise and duties through the Customs Department.

Box 6

Open Market Operations

An Open Market Operation (OMO) is an operation whereby the Bank offers to inject cash into or withdraw cash from the banking system in an endeavour to maintain a stable level of cash in the ESAS accounts (currently \$20 million).

The Bank receives forecasts giving details of all receipts and payments from various government departments, NZDMO and the Bank itself. From this information, the Bank calculates whether to inject or withdraw cash from the banking system and the maturity date or dates it will offer. The Bank makes this offer daily to all institutions that are registered to participate. If the Bank injects cash, it also calculates a minimum rate at which it will accept bids from registered bidders. If the Bank withdraws cash it calculates a maximum rate at which it will accept bids. The minimum or maximum rate is calculated for each maturity date using the relevant market rates.

When the Bank announces an OMO, it provides the following information:

- settlement cash balance for the previous business day;
- forecast cash influence for today (the net amount of government and Reserve Bank cash flowing to or from the banking system on a given day);
- the size of the OMO and whether it is an injection or withdrawal;
- instrument (eg: reverse repurchase, repurchase, seasonal treasury bill);
- date (maturity date of the instruments offered);
- limit (maximum amount the Bank will inject or withdraw to the maturity date);
- minimum or maximum rate.

The table below gives an example of calculating the size of an OMO.¹¹

Example of cash flows between NZDMO and the banking system

NZDMO	Banking system	
	\$20m	Banking system balance at start of day
NZDMO transfers cash to Ministry of Education <i>(Non impact on banking system)</i> \$45m ↓		
Ministry of Education pays teacher's salaries <i>(Impact on banking system)</i>	→ +\$45m	
	← -\$100m	IRD collects GST revenue <i>(impact on banking system)</i>
Forecast cash influence (net government transactions)	-\$55m	
Size of OMO to inject cash into the banking system leaving \$20m settlement cash	→ +\$55m	
	\$20m	Forecast system balance at end of day

¹¹ These numbers are fictitious and are being used to demonstrate the calculation of the OMO's size only.

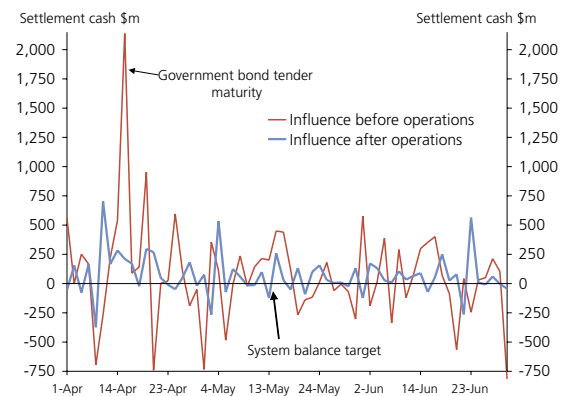
the banking system. Once the net position is calculated, the Bank conducts an OMO to counter the effect of the daily cash flows. Box 6 provides an OMO calculation.

While every endeavour is made to provide accurate forecasts, variations between what is forecast and what transpires can and do occur. These variations impact on ESAS account holders. If the banking system is left with surplus cash (ie more than \$20 million), this cash is held by ESAS account holders, which are remunerated at 25 basis points under the OCR. When the banking system does not have enough cash to enable banks to fulfil their daily obligations, they are forced to acquire additional cash from the Bank using the ORRF at 25 points above the OCR.

At the end of each banking day, the Bank reconciles the day's forecasts against the actual movements to highlight any variations that have occurred, including their source(s). Examples of this are when cash does not get transferred as forecast or if there have been settlement failures.

Figure 1 shows the government's net cash influences before and after liquidity management operations.

Figure 1
Settlement cash before and after liquidity management operations – target is \$20 m



the Bank does so using reverse repurchase transactions. The Bank also uses foreign exchange swaps to inject cash, although these transactions are done outside the OMO. Box 7 explains a foreign exchange swap. Repurchase transactions and seasonal treasury bills are used to withdraw surplus cash from the banking system. An explanation of how reverse repurchase agreements, repurchase agreements and seasonal treasury bills are used to inject or withdraw cash from the banking system can be found further on within this section.

OMOs are generally conducted at the same time each day (ie: 9.30am). If for some reason the Bank is unable to hold the OMO at that time, it advises the financial market of the delay. The OMO is open for 15 minutes and only

Open Market Operations (OMO)

The OMO is the Bank's primary operation for managing flows between the government and the banking system. Depending on a day's net cash influence, cash is either injected or withdrawn from the banking system using the instruments available to the Bank. When injecting cash,

Box 7

Foreign exchange swaps

Foreign exchange swaps are used in the same way as reverse repurchase transactions and repurchase transactions. They allow the Bank to inject or withdraw New Zealand dollars (NZD) on specified dates.

Foreign exchange swaps have two "legs" (or sides) to the transaction. When the Bank injects cash, the first leg will involve selling NZD for another currency (eg: usually USD) on a given day at a given exchange rate (eg: 0.6850). The second or maturing leg of the transaction is when the NZD is bought back at a future date at a predetermined

exchange rate (eg: 0.6800). In this instance, the 0.0050 difference in the exchange rates between the first and second legs is called the forward points. These reflect the differential between New Zealand and the United States interest rates. In this example, the Bank invests the US dollars received in the first leg for the same term as the foreign exchange swap. By performing a specific calculation using the US deposit interest rate and the 0.0050 interest rate differential, it is possible to calculate a New Zealand interest rate return for the Bank.

those counterparties who have registered with the Bank and signed an Inter-day Master Repurchase Agreement can place bids. The Bank's Operating Rules and Guidelines detailing the actual process are provided to counterparties and are also published on the Bank's website. Box 8 highlights the key features of the Operating Rules and Guidelines.

When setting OMO maturity dates, attention is paid to forecast cash flows, and maturity dates are selected in an endeavour to bring future daily flows to a manageable level.¹² The average duration of an OMO maturity, for the six months until 31 October 2004, was 4 days. If the size of the OMO is large, the Bank may offer more than one maturity date for the securities being transacted in the OMO, giving participants more choices. When offering multiple dates, it is likely that the Bank will have a preferred date based on its liquidity management requirements. For example, the Bank may want to inject cash today to be withdrawn from the banking system at a future date. One of the future dates selected may be forecasting net government flows of +\$300 million and another date may already have forecast net flows of -\$125 million. The preferred date in this situation will be the date indicating the system has surplus cash.

Over much of the 1980s and 1990s, OMOs were often used as a supplement to monetary policy implementation, being conducted in a manner that provided financial markets with a signal about the Bank's desired policy stance. OMOs are no longer used in this manner. The week before an OCR

announcement date, the Bank will offer an overnight date in the OMO as well as the usual maturity date(s). This allows market participants bidding in the OMO the option of not having to transact beyond the OCR date. If the consensus of opinion is that the Bank will lower the OCR rate at its next review, then bidders will not be keen to borrow money at a higher rate than they could once the OCR rate is reduced.

Bidders tend to have a preference for shorter-dated transactions, as they prefer not to have securities tied up for too long. However, OMO counterparties have the ability to switch securities already sold to the Bank with other securities, if they require securities back before the OMO transaction matures. This is done at a small cost to the counterparty.

The OMO is not conducted entirely as a commercial operation. However, when the Bank announces the OMO, it also sets a minimum or maximum acceptable rate for each maturity date on offer. Minimum rates are indicated when injecting cash and the Bank will not accept bids under this rate. Conversely, when withdrawing cash, the Bank sets a maximum rate and will not accept a bid above this rate. OMO participants can choose to bid at these levels or not. On average in the last year, OMO participants have bid at eleven basis points above the minimum rate for injections.

Box 8

Operating Rules and Guidelines

Rules are the non-negotiable aspects of any operation or tender with which counterparties must, without variation, comply. Guidelines are aspects of operations which are desirably adhered to in the interest of operational efficiency.

The key features of the Bank's operating rules and guidelines explain:

- how to bid in the Bank's government securities tenders and domestic market operations, either electronically or using the telephone;
- the minimum size of bids;
- the allotment of successful bids, including any pro rating that may need to be calculated in the event of multiple bidders at the cut-off interest rate.

¹² This level is dependant on the balance in NZDMO's Crown Settlement Account (CSA).

Box 9

Liquidity management statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
Reverse repurchases	\$3,275m	\$0m	\$720m
Repurchases	\$0m	\$0m	\$0m
Seasonal treasury bills	\$120m	\$0m	\$0m
FX swaps (transacted)	\$717m	\$0m	\$56m

Measuring the “success” of the operation

The main aim of the Bank in its OMOs is to smooth out daily government revenue and expenditure impacts, leaving the desired amount of settlement cash in the banking system. The first measure of a successful OMO, whether an injection or withdrawal, is for the full amount on offer to be transacted. A second measure is to have the majority of successful transactions going to our “preferred” maturity date, while the third element of success is to receive bids at a margin to either our maximum or minimum rate.

Repurchase agreements

Under a repurchase agreement the Bank withdraws cash from the banking system by selling government bonds from its investment portfolio in exchange for cash on a given day. On a pre-determined maturity date, the Bank repurchases the securities in exchange for cash and the interest earned during the period of the repurchase agreement.

A reverse repurchase agreement is used by the Bank to inject cash into the banking system by purchasing government securities. The Bank agrees to sell back those securities at a predetermined date, receiving cash and interest. There is no restriction on the period of the transactions, although, as noted earlier, OMO counterparties tend to have a preference for shorter dates.

Seasonal treasury bills

Seasonal treasury bills have the same characteristics as regular treasury bills (ie: they are a government security sold at a discount¹³ to par and carry no coupon¹⁴). Seasonal treasury bills are generally issued for terms of 1 to 3 months. Regular treasury bills are issued in weekly tenders with maturities of 3, 6, and 12 months as part of the government's borrowing programme.

The issuance of seasonal treasury bills is governed by the agency agreement with the NZDMO. The Bank sets the maximum rate at which it will accept bids, and then issues seasonal treasury bills to the successful bidder(s). This is different to when the Bank conducts treasury bill tenders on behalf of the NZDMO. On those occasions, the NZDMO makes the decision to accept or reject bids. While seasonal treasury bills are more commonly issued through an OMO, they can also be issued in the regular treasury bill tender.¹⁵ Seasonal treasury bills do not remain on the Bank's balance sheet, with the cash generated being passed directly to the government.

Foreign exchange swaps

Foreign exchange swaps can be used to inject or withdraw cash from the banking system. The Bank will enter into these transactions at commercial rates with approved counterparties. These transactions are entered into directly with market participants and not via an OMO operation. The amount of foreign exchange swaps the Bank can transact is limited by internal dealing limits with counterparties, which are set in order to limit the Bank's exposure to individual counterparties. If the swap does not provide a return equitable to or better than the OMO, then swaps will not normally be transacted.

See Box 7 for an explanation of a foreign exchange swap.

¹³ A 30-day treasury bill with a face value of \$1 million that is sold at a rate of 6 percent will cost \$995,092.69. When the treasury bill matures, the holder of the bill will receive the face value (ie: \$1 million).

¹⁴ Government bonds carry a coupon, which is the interest amount paid semi-annually in arrears. Inflation-indexed bond coupon interest is paid quarterly in arrears.

¹⁵ Treasury bill tenders are held weekly on a Tuesday. Settlement of these transactions occurs on the following banking day.

Bond repurchases

When the NZDMO organises the bond tender programme, it selects bond maturity dates along the yield curve. In most years there is one bond reaching its maturity date and the amount maturing will normally be around \$2.5 billion. It is the responsibility of the Bank to reduce as much as possible the impact this transaction will have on the banking system on the maturity day. One method of doing this is to repurchase these bonds before they mature.

Around six months prior to maturity the Bank will normally advise the market that it is prepared to receive offers from them for the repurchase of bonds. This “repurchase window” is open for two hours each business day. Any counterparty meeting our credit requirements can approach the Bank during the time the repurchase window is open with an offer to repurchase the bond. The Bank will set a rate at which it believes is a fair market rate. This rate will relate to its activities in other liquidity management operations (eg: OMO's, foreign exchange swaps). The Bank will nominate a settlement date which aids the management of government cash flows. If the counterparty agrees with the rate and date, the repurchase transaction will occur. These repurchases have the impact of bringing forward the effect of the maturing bond and thus reduces the effect on the maturity date. If the Bank repurchases bonds, it can either hold them on its balance sheet until maturity or alternatively, it can on sell the bonds to the NZDMO which then cancels the security. The Bank advises the market when it will stop receiving offers one day prior to the cessation.

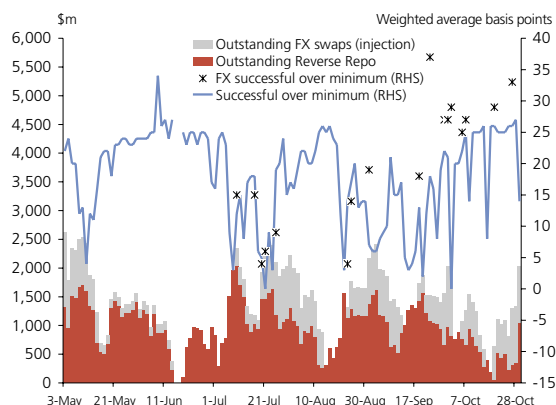
Graph 2 shows the volume of reverse repurchase transactions, foreign exchange swaps and treasury bills outstanding over the six months to 31 October 2004. No repurchase transactions have been transacted during this period.

5 Why banks need intra-day liquidity

An important part of the Bank's liquidity management function is the provision of liquidity to ESAS account holders to enable them to meet their intra-day inter-bank settlement requirements. As noted above, banks discharge payment system-related (and other inter-bank) obligations between each other through the transfer of settlement cash – the cash held in their ESAS accounts at the Bank. Prior to the introduction of real time gross settlement, these settlements occurred at the end of the banking day (ie prior to 9.00 am the following business day). Since the introduction of real time gross settlement, in 1998, inter-bank settlement for the bulk (by value) of payment system and other inter-bank transactions occurs throughout the business day. Under this system, transactions between banks “queue” until the paying bank has sufficient cash in its settlement account at the Bank to meet the payment required in relation to the transactions. Settlement typically occurs numerous times throughout the business day and cumulatively amounts to many billions of dollars on any given day.

The Bank provides the inter-bank settlement arrangements to facilitate real-time gross settlement. It debits banks' ESAS accounts for withdrawals from their accounts to meet inter-bank settlement obligations as well as other transactions (such as the acquisition by banks of notes and coin from the Bank), and it credits banks' ESAS accounts for payments received from other banks in the inter-bank settlement process and for other transactions (such as the sale by a bank of notes and coin to the Bank). The Bank also provides ESAS account holders with intra-day liquidity through an electronic autorepo facility to enable them to meet their settlement obligations throughout the day when they have insufficient credit balances in their ESAS accounts.

Figure 2
OMO results (May-October 2004)



Box 10

Autorepo agreement

The autorepo agreement is an automated facility between the Bank and ESAS account holders. ESAS account holders must have signed a Master Intra-day Securities Repurchase Agreement.¹⁶ If an intra-day transaction is not repaid at the end of the business day, it automatically becomes an inter-day transaction. As such, ESAS account holders must also have signed an Inter-day Master Securities Repurchase Agreement.

ESAS account holders obtain cash in order to enable the continuous flow of payments to other market participants. The cash is normally repaid on the same banking day to aid the continuing flow of existing system cash without permanently increasing the liquidity of the banking

system. Acceptable securities ESAS account holders can use are:

- treasury bills;
- government bonds;
- inflation-indexed bonds, and limited amounts of;
- registered, transferable and negotiable certificates of deposit with 365 days or less to maturity;
- bills of exchange with 365 days or less to maturity; and
- promissory notes and commercial paper of issuers approved¹⁷ by the Bank and with 365 days or less to maturity.

The autorepo facility is provided to ESAS account holders at no cost. Box 10 provides information on this facility. Therefore, when an account holder receives \$5 million in cash from the Bank, it will return the same amount before the close of the banking day.¹⁸ Automatic valuations of the securities being sold to the Bank for cash occur at the time the transaction is initiated. Interest rates covering the interest rate curve from overnight cash to the longest outstanding security, currently the 15 April 2015 bond¹⁹, are updated within the electronic system before the start of each working day. A haircut of 102 per cent is taken on all securities. This is different to inter-day repurchase agreements due to system constraints. For example, if on 29 September 2004 an ESAS account holder uses \$80 million of the 15 November 2011 bond in an autorepo transaction, and that bond is trading at 6.19%, they will receive approximately \$78.2 million. Without the haircut, the ESAS account holder would have received approximately \$79.8 million. The \$1.6 million difference is intended to protect the Bank from changes in the securities value (ie movement in interest rates).

Intra-day transactions are normally repaid to the Bank by the close of the banking day. An autorepo is automatically rolled over into an autorepo rollover (ARR), if a bank has insufficient cash in their ESAS account to complete (ie: buy back) any outstanding securities by the close of the banking day. However, if the ARR is rolled into a second day transaction, it is monitored manually by the Bank in its inter-day repurchase portfolio.

The charge for rolling an intra-day transaction into an inter-day transaction is 5 basis points above the ORRF facility (ie 30 basis points above OCR). This additional charge reflects a credit premium as ESAS account holders can sell a limited amount of non-government securities in autorepo. The same charge applies to the manually transacted second day rollovers.

Figure 3 highlights the volume of autorepos generated during the banking day for the last three months of the 2003/2004 financial year.

¹⁶ The agreement sets out all the terms and condition under which intra-day transactions with counterparties can occur. It also contains the terms and conditions for the transaction to roll into an inter-day transaction.

¹⁷ An issuer will normally be approved if its short term paper rating is at least A1 (Standard and Poor's) or P1 (Moody's).

¹⁸ The banking day starts at 9.00 am and continues through to 8.30 am the following working day.

¹⁹ The 15 February 2016 inflation-indexed bonds (IIBs) are manually transacted due to system constraints.

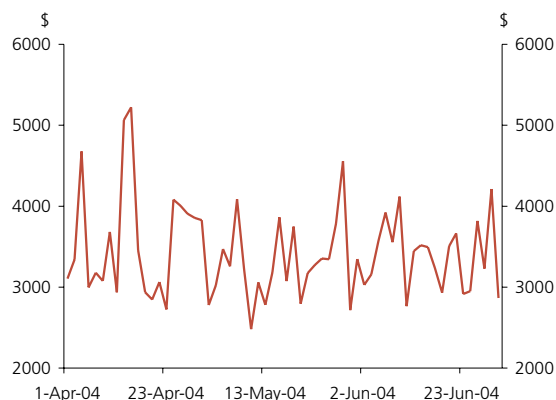
Box 11

Autorepo agreement statistics for the last financial year (to June 2004)

Facility	Maximum amount	Minimum amount	Daily average transacted
AAR	\$1.068b	\$0m	\$20m

Figure 3

Total autorepos generated during the day



6 Government securities tenders

The Bank conducts treasury bill and government bond tenders as part of the Bank's agency agreement with NZDMO. Box 12 gives details of the tender processes.

Treasury bills are issued as part of the government's short-term debt programme and tenders occur each Tuesday, or the next working day if Tuesday is a holiday. \$200 million of securities are offered each week in three tranches: \$75 million is offered in the first tranche with a maturity date of three months; \$75 million is offered in the second tranche with a six month maturity; and \$50 million is offered in the third tranche with a twelve month maturity date. Approximately \$5.5 billion of treasury bills are currently on issue.

Government bonds²⁰ are issued as part of the government's long-term debt programme with the tender timetable set by NZDMO, with advice from the Bank. NZDMO announce the tender programme for each financial year at the time of the government's budget (usually May). This includes total volume to be issued and tender dates. Currently, over \$24 billion in government bonds are on issue, of which more than \$19 billion are available for trading in the secondary market.

²⁰ The bonds have a fixed interest coupon paid semi-annually in arrears and are redeemable at face value on maturity.

Box 12

Treasury bill and government bond tender processes.

The tender processes for each security are similar.

Treasury bill tenders

On the day prior to a tender, the Bank releases details of the tender. This includes the amount being issued, the maturity profile, closing time and date for bids, settlement date, and when the results will be issued. On the day of the tender, the Bank processes the electronic bidding via Austraclear and provides results to the market. These results are issued via electronic media (such as Reuters and Bloomberg). A table (HD5) containing the historical tender results is available on the Reserve Bank's website. Settlement date for the tender is the first working day after the tender is processed.

Government bond tenders

One week prior to a tender, the Bank releases details of the tender. This includes the amount being issued, the bond(s) being issued, coupon rate, closing time and date for bids, settlement date, and when the results will be issued. On the day of the tender, the Bank processes the electronic bidding in Austraclear and provides results to the market. These results are issued via electronic media. A table (HD4) containing the historical tender results is available on the Reserve Bank's website. Settlement date for the tender is the third working day after the tender is processed.

7 Conclusion

The Reserve Bank, as New Zealand's central bank, has responsibility for the implementation of monetary policy, the operation of the inter-bank payments settlement system and the promotion of a sound and efficient banking system.

Monetary policy is implemented through the OCR rate setting and the use of the standing facilities. These standing facilities create the corridor around which the banking system operates. Deposits held at the Bank earn interest at 25 basis points below OCR, the lower bound of the corridor. Counterparties using the ORRF facility are charged at 25 basis points above the OCR, the upper bound of the corridor.

The broad objectives of the Bank's liquidity management function are to ensure that the banking system has sufficient liquidity to enable the payment settlement system to function effectively and to avoid large swings in the volume of available cash that would undermine the implementation of monetary policy. This is achieved through the Bank's liquidity management function of forecasting government cash flows and conducting operations (eg: OMOs and foreign

exchange swaps) to offset these flows. This interaction with the financial markets allows the Bank to collect data and information on market activity, which assists the Bank in its role of monitoring the stability of the banking sector.

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