
Monetary policy and the Reserve Bank balance sheet

Andrew Brookes, Financial Markets Department¹

Various aspects of monetary policy are the focus of much debate and research. This article aims to illuminate one of the less prominent aspects: the Reserve Bank's balance sheet and its role in monetary policy implementation. All central banks use their balance sheets to implement monetary policy. However, the focus of monetary policy implementation in New Zealand (and in most other countries) is on the price of money – the interest rate – not its quantity per se. The size of the Reserve Bank balance sheet can fluctuate without telling observers anything about the monetary policy stance or the outlook for inflation. We examine the different financial market operations undertaken by the Reserve Bank and their implications for the size and composition of the balance sheet.

1 Introduction: monetary policy framework and implementation

The Reserve Bank's assessment of inflation pressures determines the setting of the Official Cash Rate (OCR).² This assessment of the economy and the resulting OCR decision is the first and most important stage of monetary policy. The Reserve Bank then announces the stance of policy – the OCR decision and associated *Monetary Policy Statement* – and executes operations in the financial market which are consistent with this decision but contain no additional information about the stance of policy.³

What role does the Reserve Bank's balance sheet play in this?

Two key assertions have at times been made about the relationship of monetary policy and a central bank's balance sheet. First, that a central bank's balance sheet is key to successfully implementing monetary policy. This we firmly believe. Secondly, that expansion or contraction in the size

of the balance sheet is important information on the stance of monetary policy: an expanding balance sheet indicating looser monetary policy, and a contracting balance sheet tighter policy. This we do not believe.

Successful monetary policy in New Zealand depends on the Reserve Bank's influence over short-term interest rates, since it is interest rates – and through them other financial market indicators – which affect household and corporate spending decisions, and hence inflation. Under the current implementation regime, “standing facilities” are the primary tools used to achieve this. The Bank stands ready to provide overnight funds 25 basis points above the OCR,⁴ and pay interest on overnight deposits from banks⁵ with the Reserve Bank at 25 basis points below the OCR. The interest rates on these facilities serve to bound how far overnight rates in the financial market depart from the OCR, and in practice overnight rates stay close to the OCR.

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² The OCR was introduced as the cornerstone of monetary policy implementation in March 1999. The rationale for, and details of, the Reserve Bank's Official Cash Rate regime are explained in ‘Monetary policy implementation: changes to operating procedures’ and Archer et al (1999).

³ Monetary policy can be likened to steering the ship of the economy. Monetary policy deliberations and the resulting announcements come from the bridge. The subsequent operations to execute the chosen policy stance are strictly engine room; certainly important, but more a matter for financial market engineers than economic navigators.

⁴ Overnight funds are “collateralised” in the form of repurchase agreements, under which the Bank purchases securities from its counterparty while simultaneously agreeing to sell them back the following day. In market terminology, the Bank undertakes reverse repo in its normal operations, since it is receiving securities for the term of the repo. For simplicity, the term repo is used throughout the article, irrespective of the direction of the initial securities transfer.

⁵ For this article the word “banks” is shorthand for those institutions holding settlement accounts at the Reserve Bank. However: (i) not all registered banks hold settlement accounts; (ii) at present only banks hold settlement accounts; (iii) having a settlement account is not restricted to registered banks.

Use of these overnight lending and borrowing facilities creates Reserve Bank assets and liabilities – thus the balance sheet is used to control interest rates.⁶

What of the second assertion, that expansion or contraction of the balance sheet is a loosening or tightening of monetary policy? If this were the case, loss of control over the balance sheet would mean loss of control over monetary policy.

In fact, the size and composition of the Reserve Bank balance sheet can vary considerably, with no change in interest rates. The use of the overnight lending facility is at the discretion of the **banks**, not the Reserve Bank. The Reserve Bank balance sheet expands when these facilities are used. However, this apparent loss of control of the balance sheet does **not** compromise the Reserve Bank's ability to manage monetary policy. In a modern, low-inflation economy with deregulated financial markets, interest rates are the key to influencing activity and inflation. Changes in quantities reflect the activities of financial institutions and households; they do not drive them.

These standing facilities are typically small in size and are therefore not the prime driver of the Reserve Bank balance sheet. The major influence on the size and composition of the balance sheet is 'liquidity management' operations – the supply of central bank money to the private sector. For liquidity management, the Bank executes discretionary open market operations (OMOs), lending to, and borrowing from, the market for longer periods. Liquidity management operations are undertaken to smooth day-to-day fluctuations in the cash position of the banking system resulting from government cashflows, and to a lesser extent changes in the amount of currency in circulation.

Liquidity management operations result in large changes in the size of the Reserve Bank balance sheet – without compromising control over interest rates or inflation. The impact on the balance sheet of liquidity management varies

with the particular instrument chosen.

This article is designed to illuminate this interaction between our operations and the Reserve Bank balance sheet, illustrating that balance sheet size and composition vary significantly with no implications for the stance of monetary policy.

To set the framework, section 2 sets out a stylised central bank balance sheet. It highlights the similarities and differences in the structuring of central bank balance sheets and discusses what determines the composition of assets and liabilities. Section 3 lays out the Reserve Bank of New Zealand balance sheet.

Section 4 details the impact of a range of individual transactions on the Reserve Bank balance sheet, examining the consequences of changes in the amount of currency in circulation, and government taxation and expenditure payments. It demonstrates that different operations can be used to achieve the same result, that of managing private sector liquidity. These different approaches have different implications for the size and composition of the balance sheet. However, the choice of operational strategy does not compromise the Reserve Bank's control of short-term interest rates, nor does the size of the central bank balance sheet, per se, provide any useful information about the outlook for inflation.

Section 5 pulls together the impact of these different transactions, reviewing the recent evolution of the balance sheet. This demonstrates the substantial fluctuations of the past year.

2 What do central banks have on their balance sheets?

Table 1 sets out a stylised central bank balance sheet, listing the categories of assets and liabilities. While each central bank's balance sheet is different, reflecting both history and

⁶ This article deals with the impact of standing facilities on the balance sheet (see section 4). It does not address the more theoretical question of why financial markets so readily follow the lead given by central banks on interest rates. In short (and at the risk of tautology) financial markets require central bank assets and liabilities, particularly cash and central bank deposits. It is because central banks are the monopoly supplier of these domestic currency assets (central bank liabilities) that they are able to control their price. See Archer et al (1999).

Table 1
Stylised central bank balance sheet

Liabilities	Assets
Foreign currency liabilities	Foreign currency assets (including gold)
Cash (notes and coins)	Lending to government – government bonds
Government deposit	Lending to government – overdraft
Bank Deposits - settlement cash balances	Lending to private sector – repo/secured loans
Bank Deposits - required bank reserves	Other net assets
Central bank bills/paper	
Equity	

the particular operational structure in that economy, they can be usefully described using the categories below.⁷

Foreign currency assets and liabilities: Foreign currency assets give a central bank the capacity to intervene by purchasing its domestic currency in the foreign exchange market. At the Reserve Bank, these assets are matched one for one by **foreign currency liabilities**.⁸

Currency in circulation: Issuing currency is core to central banking and the Reserve Bank is the sole supplier of New Zealand dollar notes and coins. The amount of currency in circulation is demand determined. If New Zealanders wish to hold a higher or lower proportion of their wealth in the form of notes and coins, then the Reserve Bank increases or reduces the supply. The size of the currency liability on the Reserve Bank balance sheet alters accordingly.

Rather simplistically, currency is a liability in the sense that a note may be returned to the Reserve Bank at any time and exchanged for a different note. The origin of this redeemability of currency is the backing of paper currency by another asset, such as gold, for which the currency could be exchanged on demand. Currency issued without the right

of exchange for a different (tangible) asset is “fiat” money. However, fiat currency remains a liability in that the banks which deal directly with the Reserve Bank to buy currency, can return it to the Reserve Bank in exchange for a deposit in the bank’s account at the Reserve Bank. This is simply switching one central bank liability for another; both are means of payment.

The private sector must pay the Reserve Bank for currency it buys. Hence the Reserve Bank acquires an asset. The private sector’s holdings of currency (their asset, the Reserve Bank’s liability) are not interest-bearing. However, the assets acquired by the Reserve Bank with the proceeds from the sale of currency do pay interest. This interest is the Reserve Bank’s main source of income. The difference between this income and the Bank’s allowable expenditure is paid over to the government. Allowable expenditure is determined under a five year funding agreement between the Treasurer and the Reserve Bank.⁹

Government bonds: Central banks must decide how to invest the funds acquired from the sale of currency. While many choose the lowest risk local currency asset – government debt – others choose to hold some private sector liabilities as their offsetting assets. The Reserve Bank of New Zealand chooses to hold the lowest risk New Zealand dollar

⁷ See Borio (1997) for more details on the structure of different central banks’ balance sheets.

⁸ For an account of the structure of the foreign currency assets and liabilities see Law (1995). For more on the rationale for holding these assets, see Archer et al (1998). The Treasury borrows in international markets and on-lends the funds raised to the Reserve Bank, leaving the Treasury with matching assets (the Reserve Bank liability) and liabilities. Matching of assets and liabilities in this way removes any foreign exchange risk for both the Reserve Bank and the Treasury; if the New Zealand dollar falls (rises), the price of both foreign-denominated assets and liabilities rises (falls). Section 4 explains that liquidity injection via swaps increases total foreign currency assets on the balance sheet, giving an **apparent** foreign exchange risk. The additional asset is actually offset by the forward leg of the swap, which is an off-balance sheet liability. There is therefore no additional foreign exchange risk.

⁹ The net income from the note issue is sometimes known as seigniorage. This source of income in New Zealand currently generates around \$160million per annum. The extent of this income in an economy clearly depends on the amount of currency in circulation and the level of interest rates. Typically, more developed economies have less currency in circulation and, as electronic means of payment grow, this income falls. Conversely, the larger is the economy, the higher the proportion of activity that takes place in the black (cash) economy, and the more widespread the use of a currency overseas – for example, the US dollar is extensively used outside the USA – the greater is this income. (Seigniorage can also be defined as the inflation tax, the windfall benefit to government from the increased demand for currency, to which inflation has been a major contributor.)

denominated debt available – government bonds.¹⁰ Government bonds are also held as the counterpart to the Reserve Bank's equity. In practice, the matching of currency with bond holdings is not immediate; the Reserve Bank makes periodic purchases of bonds to reflect the average level of currency in circulation.

Government deposit/overdraft: Central banking has its origins in banking services provided to the Crown, and most central banks continue as bankers to their respective governments. If the balance in the government's "on-call" account is positive, the central bank balance sheet shows a liability. If the government is overdrawn, the loan is an asset of the central bank.

The extent of government cash management services varies between central banks. In the USA and Germany for example, the respective governments target a small positive balance for their accounts at the central bank. The government's own treasury function offsets predicted swings in the net of government inflows and outflows. As a result, only **unexpected** tax or expenditure flows – which the Treasury has not been able to offset in the market – impact on the central bank balance sheet.

The Reserve Bank operates the alternative model in which the government's balance at the central bank is allowed to fluctuate; and the central bank manages the impact of these cashflows. In the course of a year, the government balance may be markedly negative or positive. These fluctuations in the government's balance would, in the absence of offsetting liquidity management operations by the Reserve Bank, be matched by fluctuations in the banks' deposit at the central bank. Section 3 sets out the mechanics and consequences for the Reserve Bank balance sheet.

At present, the Reserve Bank pays the government the market overnight interest rate (the OCR) on its deposits, and charges the government the same rate on any borrowings.

For those central banks, such as the Reserve Bank, which allow the government to be overdrawn, there has traditionally been a distinction between intra-year and inter-year

lending. In the context of sound government finances, any loan by the Reserve Bank to the government is simply a short-term banking facility to deal with the volatility of government cashflow during the year. This presumes adherence to a "full-funding" rule, whereby the government funds all of its expected full year borrowing requirement by way of longer-term sales of debt instruments to the private sector.

The purpose of full-funding rules was to guard against money financing (or monetisation) by governments. The anatomy of money financing is as follows: suppose government spending results in its account at the Reserve Bank going overdrawn. The amount spent is transferred to the private sector's accounts at the central bank. Since these deposits are base (or high-powered) money, this narrow measure of the money supply has risen. Using the central bank balance sheet, government spending has been paid for by creating money.

In the late 1970s and early 1980s there was considerable emphasis on the quantity of base money, per se, as a leading indicator of future activity and inflation.¹¹ The consensus now, both in New Zealand and abroad, is that the quantity of base money normally only matters in so far as it impacts on interest rates. Financial prices, rather than quantities, are at the heart of the transmission mechanism. The Reserve Bank balance sheet, and the money base, can therefore fluctuate significantly without any implications for activity and inflation, as long as interest rates are unchanged. This understanding supported the move to the OCR, bringing the operating regime into line with the Reserve Bank's view of the transmission mechanism.¹² The standing facilities around the OCR prevent short-term interest rates altering much in response to fluctuations in settlement balances.

Private sector deposits:¹³ A number of banks hold accounts at the Reserve Bank and use these accounts to settle inter-

¹⁰ This approach is similar to that of the Federal Reserve, which holds a portfolio of government bonds nearly equal to the currency in circulation. By contrast, the European Central Bank holds foreign exchange reserves, including gold, broadly equivalent to the currency in circulation.

¹¹ In such a view of the world, monetisation of government debt results in banks being oversupplied with settlement balances. In response, they seek to transform them into other, longer-term assets – loans to companies for example – stimulating activity and inflation.

¹² See Archer et al (1999).

¹³ Many central banks have very substantial private bank deposits on their balance sheets, reflecting reserve requirements. These require private banks to hold a proportion of their eligible liabilities in the form of deposits at the central bank. Reserve requirements were abolished in New Zealand in 1985.

bank payments.

Where the quantity of money is the focus of monetary policy implementation, the aggregate holdings of central bank account holders (settlement cash balances) is particularly important. Together with the currency in circulation, these constitute the monetary base. This quantity view of the world was prevalent in the early 1980s. In managing monetary policy central banks, including the Reserve Bank, typically now concentrate on the price of money, rather than its quantity. In fact, under the OCR regime, the quantity of settlement cash balances is now demand-determined. If banks wish, in aggregate, to hold higher settlement balances, the Reserve Bank simply supplies these.

Whilst the level of settlement cash balances is of no policy significance, it matters for day-to-day liquidity management via open market operations. These operations are currently aimed at returning settlement balances to close to \$20 million for each day.¹⁴ Banks can, of course, use the standing facilities to borrow overnight from the Reserve Bank (via the Overnight Repo Facility, ORF), either to avoid overdrafts or to hold higher settlement balances.

In addition, the Reserve Bank provides very substantial, interest-free *intra-day* lending to banks. This *intra-day* lending, which lubricates the real-time gross settlement system, causes very significant (\$2.5 to 3 billion), demand-driven, expansion of the Reserve Bank's balance sheet during the day, reversed at the end of it.¹⁵ This expansion in the *intra-day* monetary base is not of concern from a monetary policy perspective, because (at the risk of labouring the point) neither under the current nor the previous regime could this expansion of the money base spill over to affect interest rates.

Lending to commercial banks: The Reserve Bank's operations to inject and withdraw liquidity are aimed at

maintaining a small, positive, settlement cash balance. To do so, it may be necessary to lend money to the private sector. These 'loans' can be a substantial proportion of a central bank's assets.¹⁶ For the Reserve Bank, this asset fluctuates mainly with the liability of the government deposit.

This loan is sometimes known as the 'stock of refinancing.' Central banks can choose the maturity of these loans, and hence the frequency with which the loans are renewed. At one extreme, the whole stock can be re-lent overnight; at the other, lending can be done for several months. (To inject liquidity for a longer period, the central bank can, as noted above, simply buy government debt or some other asset outright.) In deciding the maturity of these repos, the central bank may be influenced by its desire to control interest rates.¹⁷ This is not a factor in New Zealand where the control of the overnight interest rate is achieved by standing facilities 25 basis points above and below the OCR. Reflecting market preferences and operational efficiency, OMO repos usually have a maturity of around 10 days.

Use of the Overnight Repo Facility (ORF) by banks also boosts the stock of lending to the private sector. Where these funds result in the market being left long, the corollary is an increase in settlement cash balances – a private sector deposit and Reserve Bank liability.

Central bank bills/paper: Some central banks (eg the Bank of Japan) withdraw liquidity from their markets by selling

¹⁴ Settlement cash balances can be thought of as a buffer, absorbing some of the daily fluctuations in payment flows to and from the Reserve Bank. However, since the balance is normally small (\$20m) relative to the flows, OMOs are undertaken each day. An alternative would be to run with a "fully cashed up" system, in which the usual level of settlement cash balances was very large. This large buffer would be allowed to fluctuate removing the need for the Reserve Bank to undertake liquidity management operations every day. See Hampton (1999).

¹⁵ See Hampton (1999).

¹⁶ In the Reserve Bank accounts it is not the aggregate loan to the private sector that counts as the Reserve Bank asset, but the securities by which the counterparties collateralise that loan. These funds are provided to the market by way of securities repurchase agreements (repos). These transactions are very similar, in economic effect, to secured loans, hence the shorthand usage, but are not in fact loans and take a form that is designed to strengthen the legal position, in the event of a default, of the party providing the funds. Hence the "securities purchased under agreements to resell" in the asset side of the accounts. In March 1998, with the introduction of Real-Time Gross Settlement, the Reserve Bank ceased to take private bank assets as 'collateral' in inter-day open market operations. A limited (but falling) amount of commercial bank paper is accepted in RTGS. See Hampton (1999).

¹⁷ In the UK, for example, the Bank of England executes two week repos with a view to influencing interest rates at that maturity and out to the 3 month area.

central bank liabilities (bills), typically of a short maturity.¹⁸ The Reserve Bank issues seasonal **Treasury bills**, which play a similar role in withdrawing liquidity from the market. Because they are a **government** liability, withdrawals of liquidity using seasonal Treasury bills do not show on the Reserve Bank balance sheet (see section 4). The capacity of the Reserve Bank to issue a government liability at its own discretion (within a framework agreed with the Treasury) is unusual internationally.

Equity: Central banks' capital is usually held by the

government and is not particularly significant compared with other items on a balance sheet. Consistent with this, the Reserve Bank has \$400 million of retained earnings (equity). The Reserve Bank's equity is held entirely by the government and has been since 1936.¹⁹

3 The Reserve Bank balance sheet

Table 2 sets out the (stylised) balance sheet for the Reserve Bank. It demonstrates:

- the matching of foreign currency assets and liabilities,

Table 2
Reserve Bank balance sheet (stylised)
Figures for 30 June 1999¹ (\$ million)

ASSETS			LIABILITIES		
Description	Purpose	Amount \$NZ	Description	Purpose	Amount \$NZ
Foreign currency	Intervention capacity in forex market	5900	Foreign currency	Matching the foreign currency assets	5900
NZ Government Securities	Investment of the proceeds of currency issue and equity	2200	Currency in circulation		1900
			Equity		400
Securities purchased under agreements to resell	Money lent to banks is 'collateralised' via repo. The securities held under repo are the balance sheet asset	3100	Government deposit at Reserve Bank	Positive balance reflecting "overfunding" by Government	2900
			Settlement Bank deposits	Cash <i>target</i> ²	20
			Net other items		80
TOTAL		11200			11200

¹ Source: 1998/99 Annual Report.

² Bank deposits fluctuate, mainly in response to government tax and expenditure flows differing from forecast. The 'target' is shown in this stylised balance sheet for simplicity; actual settlement balances were only \$1million on 30 June as the balance of government revenue and tax payments came in lower than forecast on that day.

¹⁸ Until February 1999, the Reserve Bank issued 63 day Reserve Bank bills to provide a discount instrument to banks. The funds raised were on lent to the government. See section 4 and Archer et al (1999).

¹⁹ See Pringle et al (1999) for details on other central banks. The Reserve Bank's equity is not formal share capital, as the Reserve Bank is not an incorporated company.

²⁰ Source: 1998/99 Annual Report.

²¹ Bank deposits fluctuate, mainly in response to government tax and expenditure flows differing from forecast. The target is shown in this stylised balance sheet for simplicity; actual settlement balances were only \$1million on 30 June as the balance of government revenue and tax payments came in lower than forecast on that day.

the largest item on the balance sheet;

- the backing of currency in circulation and the Bank's equity with an equivalent holding of NZ government securities;
- the substantial (\$2.9 billion) Government deposit, matched by a similar sized loan to the private sector; and
- the settlement cash balance of \$20 million.

4 Impact of operations on the Reserve Bank balance sheet

This section details the consequences for balance sheet size and composition of changes to the currency in circulation, government tax and expenditure flows, and the associated operations undertaken by the Reserve Bank to offset the impact of these on financial markets. The Reserve Bank's choices of instrument for liquidity management are explored. 'T accounts' are used for illustration.

Currency issuance and open market operations

As explained above, currency in circulation is issued by the Reserve Bank, and appears on the balance sheet as a liability.

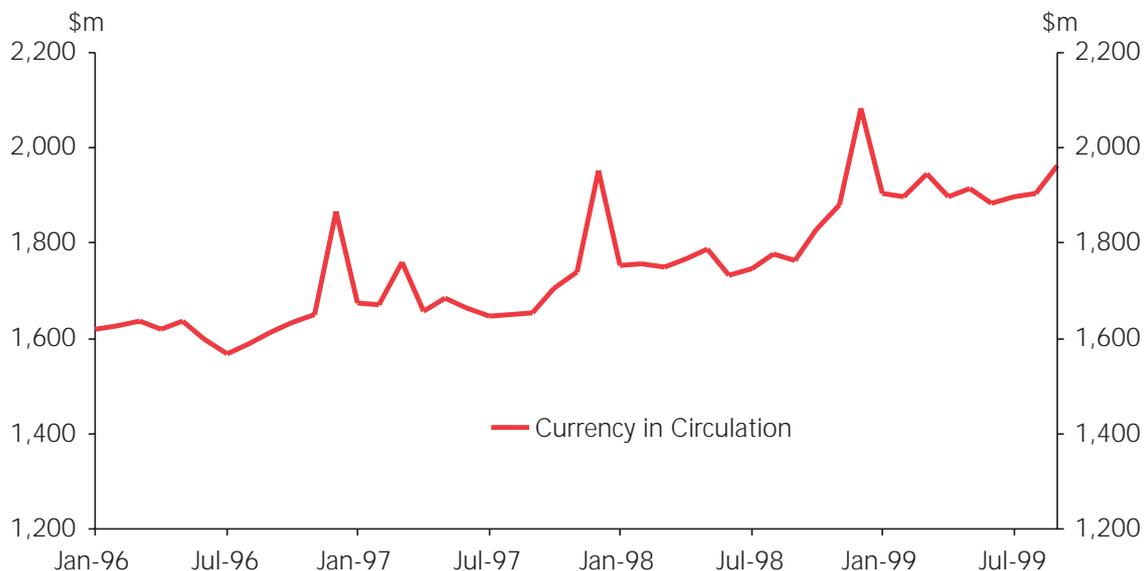
The amount of currency carried by New Zealanders is not constant through the year. There is both a weekly pattern – cash withdrawn on a Friday – and a seasonal pattern – a higher level of cash withdrawals to fund Christmas spending (see figure 1).

Increase in currency – liquidity injection via repo

Take the increase in currency in circulation over the Christmas period. The customers of New Zealand bank XYZ desire more notes; bank XYZ obtains these notes by purchasing them from the Reserve Bank. Payment is made to the Reserve Bank from bank XYZ's own account at the Reserve Bank.

This payment to the Reserve Bank reduces bank XYZ's balance, and thus the aggregate banks' deposit at the Reserve Bank. If nothing else took place, bank XYZ – and hence the banks and the private sector in aggregate – would be overdrawn at the Reserve Bank. In fact, accounts cannot go into overdraft, and to avoid this the Reserve Bank injects

Figure 1
Currency in circulation January 1996 – August 1999



liquidity, in effect lending money to the private sector.

These liquidity injections frequently take place via repo; the increased loan to the bank raises the asset side of the balance sheet. And bank cash – the aggregate private sector deposit (liability) at the Bank – is raised back to its target level.²²

Stage one: Currency in circulation rises. Banks' deposit falls.

Stage two: Lending to banks via repo increases.²³ Banks' deposit rises.

Overall impact: Reserve Bank balance sheet expands.

Increase in currency – liquidity injection via foreign exchange swaps

Foreign exchange swaps are an alternative means of injecting liquidity. Under a foreign exchange swap for injecting liquidity, the Reserve Bank buys US dollars in the first leg of the transaction, and pays NZ dollars to the counterparty in exchange.²⁴ The US dollars are invested by the Reserve Bank for the duration of the swap. The swap commits the Reserve Bank to reselling the US dollars, receiving NZ dollars, at an

agreed price on the maturity date. Since the exchange rate for both legs of the transaction are agreed at the start, any foreign exchange price risk is removed; the quantity of NZ dollars bought back by the Reserve Bank (and hence the impact of the second leg on liquidity) is known with certainty.

The New Zealand dollar liquidity impact of a swap is exactly equivalent to a repo: liquidity is injected when the deal is done, and withdrawn at maturity.

Reflecting standard accounting practice, the forward leg of the swap – the obligation to sell US dollars and buy NZ dollars – is an off-balance sheet item.²⁵ The US dollar holding appears as an asset on the balance sheet for the duration of the swap.²⁶

Stage one: Currency in circulation rises. Banks' deposit falls.

Stage two: The NZ dollars sold by the Reserve Bank in exchange for US dollars raise the banks' deposit back to target; the US dollars appear as a foreign currency asset.

Overall balance sheet impact: Balance sheet expands.

Chart 1
Increase in currency in circulation: injection via repo

Assets	Liabilities
Bond portfolio	Currency 
Advances to government	Reserve Bank Bills
Repos with banks 	Settlement banks deposit  
	Government deposit
Outcome: Balance sheet expands	
 Stage one – initial transaction  Stage two – Reserve Bank liquidity management operation	

²² This lending of cash via repo is not necessarily made to Bank XYZ. The objective of the operations is to square up the market as a whole. The banks are uncertain as to their individual balances, since they cannot exactly predict customer flows. However, the banks typically “square up” with each other at the end of the banking day, those with excess cash lending to those who are short.

²³ If the increase in note demand is permanent, in due course we will switch this additional repo into an increased holding of government bonds.

²⁴ For a more detailed description of a foreign exchange swap, see Hawkesby (1999)

²⁵ All swaps are off-balance sheet.

²⁶ See tables F2 and E1 (see “Reserve Bank reserves”) Financial Statistics, RBNZ. The recent increase in the use of foreign exchange swaps, which is discussed further in section 5, shows as an increase in “Foreign currency assets, current.” At first glance, this appears to result in foreign exchange risk. However, the additional asset is actually offset by the forward leg of the swap, which is an off-balance sheet liability. Foreign exchange risk is unchanged as a result.

Chart 2:
Increase in currency in circulation: injection via foreign exchange swap

Assets	Liabilities
Bond portfolio	Currency 
Advances to government	Reserve Bank Bills
US dollar assets 	Settlement banks deposit  
Repos with banks	Government deposit
Outcome: Balance sheet expands	
 Stage one – initial transaction  Stage two – Reserve Bank liquidity management operation	

Choosing between injecting via repo and injecting via a foreign exchange swap is primarily a commercial matter. The two options are compared by assessing the New Zealand dollar interest rates offered in each case. An additional consideration is the impact on the availability of collateral in the market. As section 5 illustrates in the context of the past year, overfunding by government results in offsetting liquidity injections by the Reserve Bank. Undertaking these via repo takes collateral from the market and, if done in sufficient quantities, may put pressure on the market for government collateral.

Government cashflow

The daily flows of tax and expenditure, debt sales, maturities and interest payments by government all impact on the

Reserve Bank balance sheet and liquidity management operations.

Tax payment – liquidity injection via repo

Suppose a customer of a bank pays a large tax bill. These funds increase the government's account at the Reserve Bank. Injecting via repo returns the banks' deposit to the target level.

Stage one: Government deposit at the Reserve Bank rises. Banks' deposit falls.

Stage two: Reserve Bank lending to banks increases. Banks' deposit rises.

Overall balance sheet impact: Balance sheet expands.

Chart 3
Liquidity injection via repo to offset tax payment

Assets	Liabilities
Bond portfolio	Currency
Advances to government	Reserve Bank Bills
Repos with banks 	Settlement banks deposit  
	Government deposit 
Outcome: Balance sheet expands	
 Stage one – Initial transaction  Stage two – Reserve bank liquidity management operation	

Chart 4
Liquidity injection via foreign exchange swap to offset tax payment

Assets	Liabilities
Bond portfolio	Currency
Advances to government	Reserve Bank Bills
USD assets 	Settlement banks deposit  
Repos with banks	Government deposit 
Balance sheet expands	
 Stage one – Initial transaction  Stage two – Reserve Bank liquidity management operation	

Tax payment – liquidity injection via foreign exchange swaps

The mechanics of the foreign exchange swap are identical to those undertaken to offset an increase in demand for currency.

Stage one: The tax payment raises the government deposit at the Reserve Bank. Banks' deposit falls.

Stage two: The NZ dollars sold by the Reserve Bank raise the banks' deposit back to target. The US dollars appear as a foreign currency asset.

Overall balance sheet impact: Balance sheet expands.

Withdrawing liquidity

Government expenditure payment – liquidity withdrawal via issuance of seasonal Treasury bills

Suppose the government makes a payment for goods or services. This payment is made to a bank, (which then credits its customer). Consequently, the bank's deposit at the Reserve Bank rises and that of the government falls. Because banks normally do not want additional cash – over and above the \$20 million Reserve Bank estimate of demand for settlement cash balances – the Reserve Bank acts to withdraw liquidity.

To prevent the settlement cash balance rising, the Reserve Bank sells seasonal Treasury bills, for which the private sector pays the Reserve Bank. Seasonal Treasury bill issuance does

Chart 5
Liquidity withdrawal via seasonal Treasury bills to offset government expenditure

Assets	Liabilities
Bond portfolio	Currency
Advances to government	Reserve Bank Bills
Repos with banks	Settlement banks deposit  
	Government deposit  
Balance sheet unchanged	
 Stage one – Initial transaction  Stage two – Reserve Bank liquidity management operation Treasury Bill issuance does not show on balance sheet	

Chart 6 Liquidity withdrawal via foreign exchange swap to offset government expenditure

Assets	Liabilities
Bond portfolio	Currency
USD Assets	Reserve Bank Bills
Advances to government	Settlement banks deposit
Repos with banks	Government deposit
Balance sheet reduced	
<p>① Stage one – Initial transaction</p> <p>② Stage two – Reserve Bank liquidity management operation</p>	

not show directly on our balance sheet, since Treasury bills are not a Reserve Bank liability. However, the proceeds of the sale are placed in the government's account at the Reserve Bank, returning it to its original level.

Stage one: The government deposit at the Reserve Bank falls. Banks' deposit rises.

Stage two: The issuance of seasonal Treasury bills increases the government's deposit at the Reserve Bank. Banks' deposit falls back to target.

Overall balance sheet impact: Zero

Government expenditure payment – liquidity withdrawal via foreign exchange swaps

The Reserve Bank sells US dollars via a foreign exchange swap. (These US dollars are obtained either from running down its deposits at the Federal Reserve, or borrowing from a commercial bank.) The NZ dollars received by the Reserve Bank in exchange are a withdrawal of liquidity from the domestic market.

Under the forward leg of the contract the US dollars are repurchased at the previously agreed price. Implicit in the purchase and resale of NZ dollars is a NZ dollar interest rate.

Stage one: The government's deposit at the Reserve Bank falls. Banks' deposit rises.

Stage two: Banks' deposit reduced back to target by NZ dollar withdrawal.

Overall balance sheet impact: Either US dollar liabilities rise (if US dollars are borrowed) – balance sheet unchanged. Or US dollar assets fall (if US dollar deposits are rundown) – balance sheet shrinks. (Balance sheet reduction is shown in the diagram.)

Foreign exchange swaps have only rarely been used to withdraw liquidity. This is a commercial decision – the costs of raising the US dollars have typically been too high, which has translated into a higher implied NZD interest rate. The alternative of withdrawing by issuing Treasury bills has typically had a lower implied interest rate for Reserve Bank borrowing from the domestic market. In addition, the use of swaps to withdraw liquidity reduces the capacity for intervention over the duration of the swap, since some of the Reserve Bank's holding of US dollars are tied up by the swap.

Government expenditure payment – liquidity withdrawal via repo of the Reserve Bank's portfolio

As explained above, repos are used by the Reserve Bank, and many other central banks, to inject liquidity to the market. Since the Reserve Bank owns a portfolio of government bonds (purchased with the proceeds of the note issue), this also gives us the opportunity to repo out bonds. The accompanying cash payment from the market would withdraw liquidity.

Chart 7
Liquidity withdrawal via repo to offset government expenditure

Assets	Liabilities
Bond portfolio	Currency
Advances to government 	Reserve Bank Bills
Repos with banks	Settlement banks deposit  
	Government deposit  
	Repo (obligation to repurchase) 
Balance sheet expands	
 Stage one – Initial transaction  Stage two – Reserve Bank liquidity management operation	

The Reserve Bank has not yet engaged in repos to withdraw liquidity, but such operations are under active consideration.

Stage one: The government's deposit at the Reserve Bank falls. Banks' deposit rises.

Stage two: The impact of the cash movement (payment for the Reserve Bank bonds) reduces the banks' deposit back to target. The cash is then lent by the Reserve Bank to the government (Reserve Bank asset), returning the government deposits (Reserve Bank liability) to its previous level. The second leg of the bond repo – the repurchase of the bonds from the market – shows as a liability in the Reserve Bank accounts.

Overall balance sheet impact: Balance sheet expands.

5 Putting it all together

The examples in Section 4 implicitly assume that separate operations are undertaken by the Reserve Bank to offset different influences on liquidity. In practice, these different influences take place concurrently. Daily operations by the Reserve Bank offset the **net** impact of changes in the demand for currency, government tax and expenditure flows, and maturing past operations. It is the net impact that changes the level of banks' deposits, and hence the Reserve Bank balance sheet.

Daily operations

The open market operations are undertaken each morning, reflecting forecasts of the different flows across the Reserve Bank accounts. The operations are announced via the electronic information providers (Reuters, Bloomberg and Bridge) to the financial markets.

The Reserve Bank sets out publicly the expected net impact of changes in currency in circulation, government flows, and maturing Reserve Bank operations. If the Reserve Bank estimate the net impact to be a withdrawal of liquidity from the private sector, operations are undertaken to inject a similar amount via repos and/or swaps. These operations currently aim to ensure that the aggregate balances of the banks are close to \$20m.

The operations each morning are based on the Reserve Bank **forecast** of liquidity required. However, government tax and expenditure flows cannot be predicted exactly, since both tax payments and expenditure may not take place as scheduled (the timing of cheque presentation is particularly problematic). The outturn may therefore be several million dollars above or below that forecasted.

If the Reserve Bank overestimate the liquidity required on a particular day, the end-of-day settlement balance will be greater than \$20m. One or more of the banks will hold this

money as a deposit, receiving an interest rate 25 basis points below the OCR. Where the forecast underestimates liquidity required, the settlement balance will be less than \$20m.

Since no bank can be overdrawn, an underestimate in the forecast will result in the overnight borrowing facilities being used. Banks can borrow via the ORF, at 25 basis points over the OCR. Alternatively, they can turn **intra-day** repos into **overnight** lending 30 basis points above the OCR.²⁷

The use of these facilities expands the Reserve Bank balance sheet in a very similar way to the injection of liquidity via repo in section 4. The facilities are 'on-demand' and may be used even when there is no forecast error. This underlines the extent to which the Reserve Bank balance sheet size may fluctuate for reasons outside its control, but with no consequences for monetary policy because the rates on these facilities themselves anchor short-term market rates. Effectively, the OCR regime makes the balance sheet endogenous – the balance sheet alters passively in response to liquidity management operations and the use of standing facilities.

Evolution of the Reserve Bank balance sheet

The cumulative impact of daily operations can significantly alter the size and composition of the Reserve Bank balance sheet over time. Figure 2 (overleaf) shows the changing size of the balance sheet between June 1998 and June 1999.

The composition of the balance sheet also changed over this period.

Figure 3 (overleaf) highlights two significant developments through the 1998/99 financial year.

- First, the ending of Reserve Bank bill issuance with the introduction of the OCR. The stock of issuance was \$1.2 billion. The funds raised had been on-lent to the government. Terminating the issuance of Reserve Bank bills had the effect of shrinking the total balance sheet.

²⁷ The higher borrowing rate reflects the acceptance of bank paper (lower quality security) in the Autorepo Rollover Facility. If an ESAS account holder would be in deficit at the end of the business day if the intra-day repos were repaid, the rollover facility is triggered automatically.

- Second, the increase in the government's cash deposit at the Reserve Bank. The growth in this liability from \$1 billion to almost \$3 billion represents over-funding by government; inflows from tax payments and debt issuance exceeded expenditure, debt redemption and interest payments by the difference, \$2 billion. The sale of Contact Energy late in the financial year, after debt sales were completed, was a significant contributor to this surplus. This over-funding required offsetting injections of liquidity to the market via repo – hence the increase in that asset to record levels.

One side effect was to put some pressure on the availability of collateral in the market, since the Reserve Bank was (via repo) holding a large proportion of the readily available stock of government debt. In response to this, the Reserve Bank became much more active in using foreign exchange swaps for liquidity injections. (See figure 7 below.) In switching at the margin from repo to swaps, the demand for New Zealand government collateral to support Reserve Bank operations was effectively replaced by demand for US dollars, of which there is a rather deeper pool.

Foreign exchange swaps have also been undertaken in the context of Y2K for similar reasons. Some banks plan to augment their holdings of government collateral over the year-end as a prudential measure. On top of this, any additional demand for currency has to be accompanied by Reserve Bank injections of liquidity. If these were done exclusively via repo, even more pressure would be put on the available supply of government securities. Hence, the increased use of swaps.²⁸ In addition, some longer-dated repos have been introduced as a substitute for shorter-dated repos.

Figures 4-7 explore the pattern of flows lying behind these developments in the balance sheet over the year. They illustrate the intra-year profile of government cashflows and the consequent Reserve Bank open market operations.

²⁸ Y2K has other implications for the balance sheet: settlement balances have been increased deliberately by the Reserve Bank; over and above that, the overnight lending facilities may be used by banks to fulfil any additional demand for settlement balances; bank bills will be taken as collateral in repos; and on demand unsecured lending may be made available to banks.

Figure 2
RBNZ total local and foreign currency
financial assets, June 1998 to June 1999

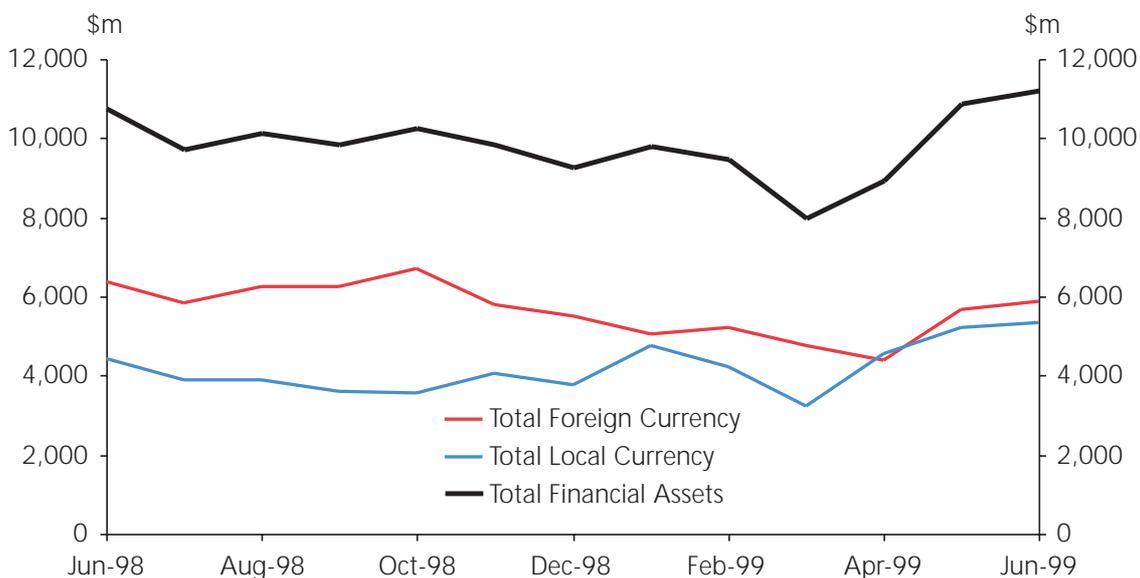
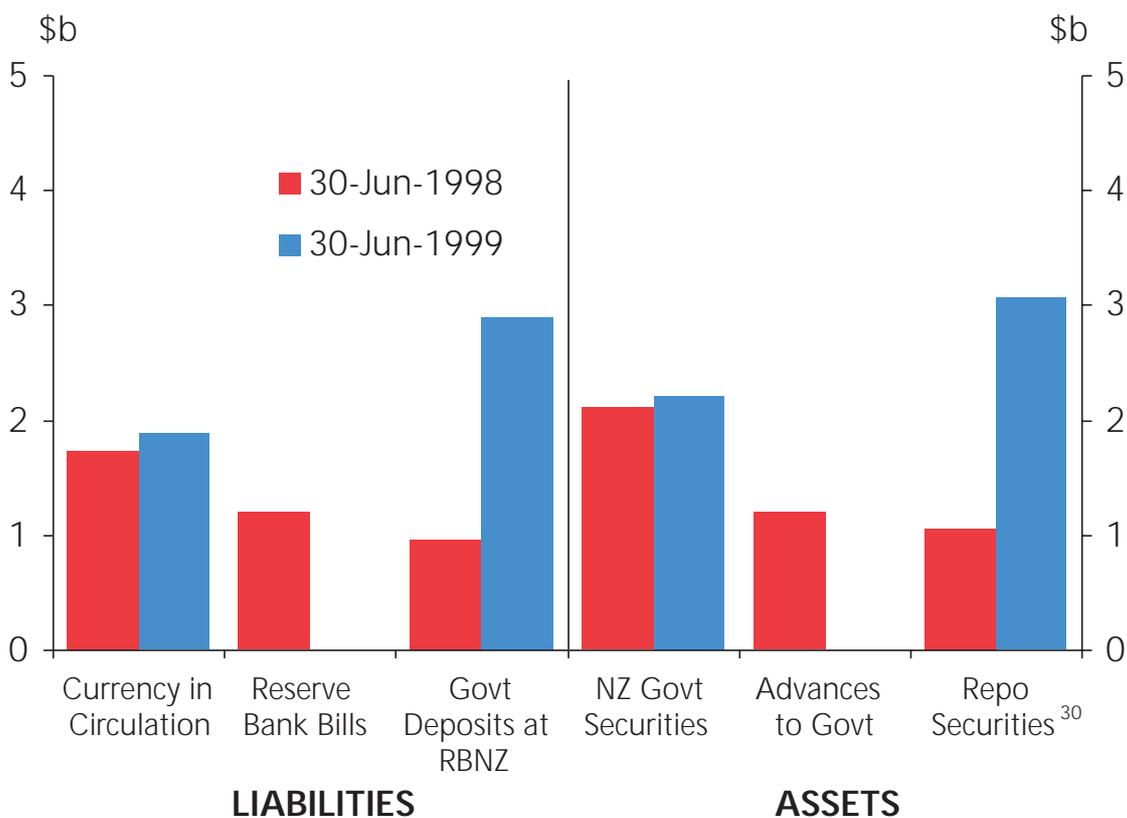


Figure 3
Reserve Bank Balance sheet: changes from 1998 to 1999²⁹



²⁹ Balance sheet as calculated on the 30 June 1998 and 1999 year end. Foreign currency assets and liabilities are ignored to focus on domestic operations

³⁰ Money 'lent' to the private banks by the Reserve Bank is 'collateralised.' This takes the form of repo, and the assets on the Reserve Bank balance sheet are the securities which have been repoed to the Reserve Bank.

Figure 7 highlights another aspect of government overfunding through 1998/99, the reduction (to zero) in the outstanding stock of seasonal Treasury bills. These were issued earlier in the year to the tune of \$2 billion in order to withdraw liquidity from the market (and restore the government deposit at the Reserve Bank; see section 4). As explained above, these do not show on the Reserve Bank balance sheet. Tax revenue, government expenditure, asset and debt sales through the year removed the need to issue seasonal Treasury bills.

6 Summary

This article explains the role of the Reserve Bank balance sheet in monetary policy implementation. The balance sheet remains key to the successful implementation of policy. However, the operational structure of the Official Cash Rate means that neither the size nor the composition of the balance sheet are significant for the stance of monetary policy. Both fluctuate as a consequence of fluctuations in government finances, the use of overnight standing facilities by banks, and the choice of liquidity management instruments. Independent of these balance sheet fluctuations, short-term interest rates remain anchored close to the OCR.

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Figure 4
Government expenditure less revenue
(daily flows)

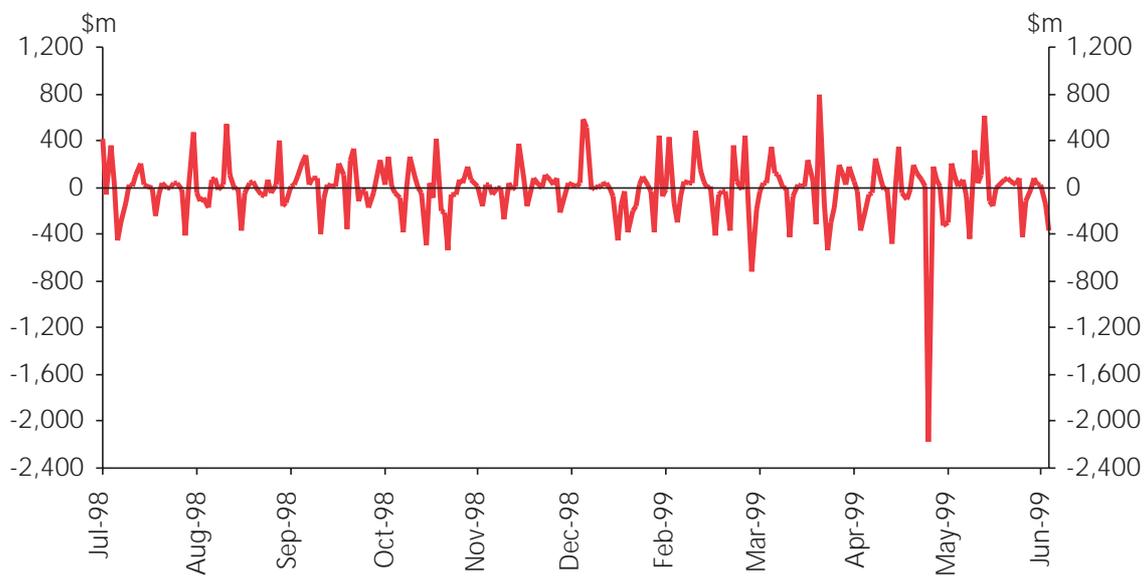


Figure 5
Government debt transactions: sales and maturities for Treasury bills and government bonds
(daily flows)

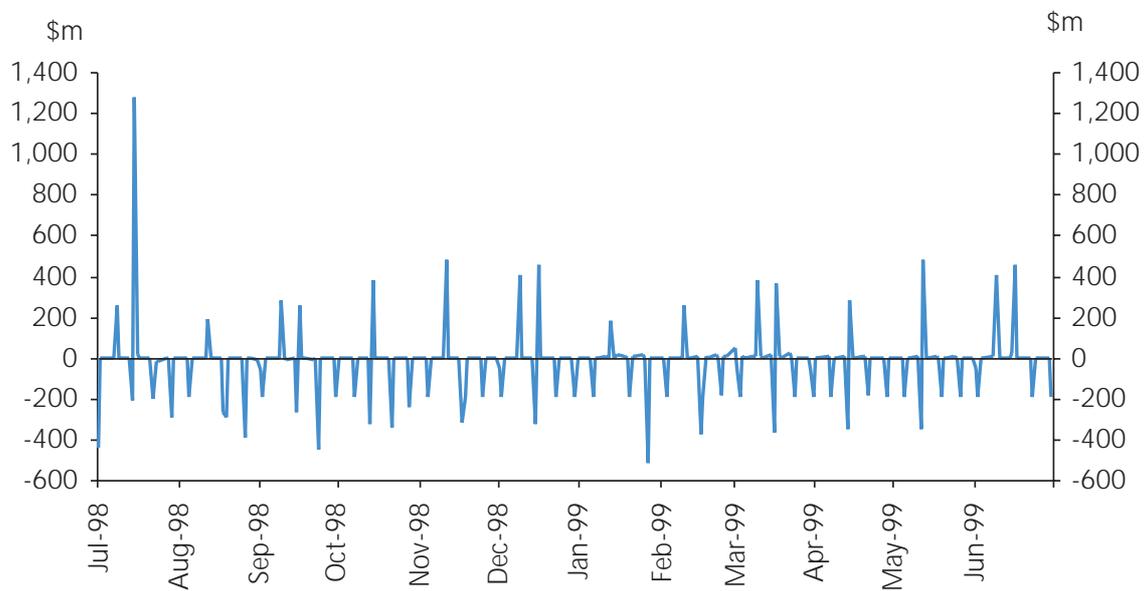


Figure 6
Impact of flows on liquidity and Reserve Bank open market operations

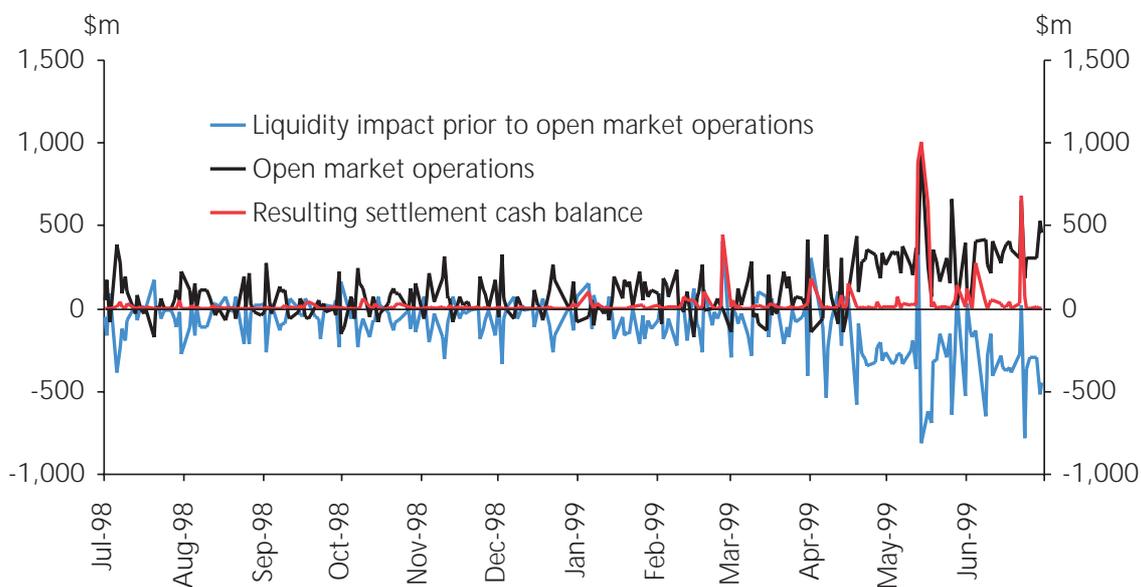
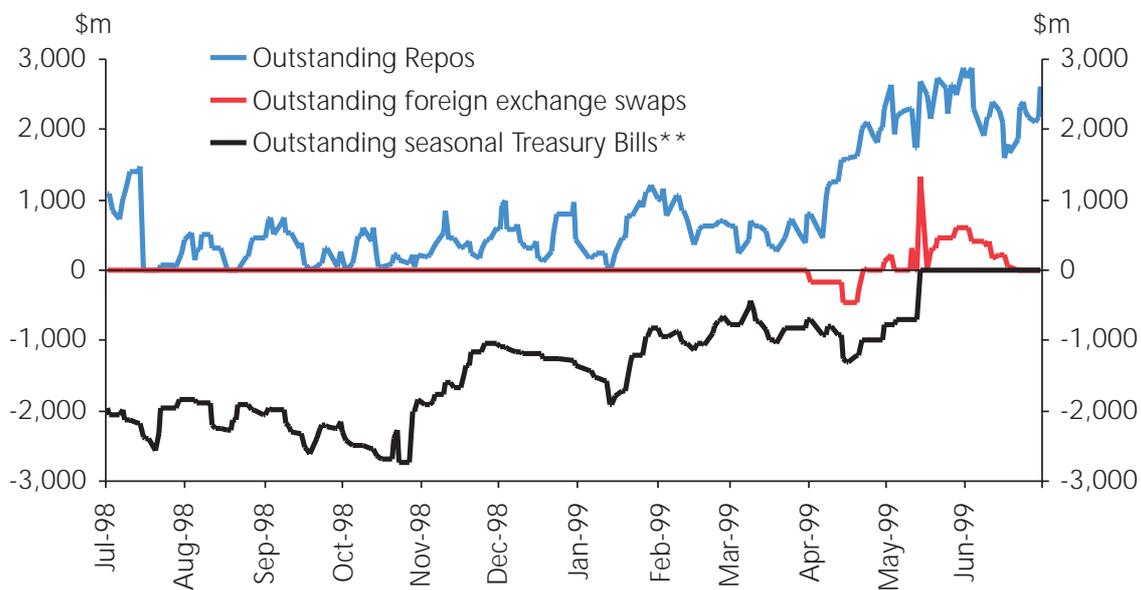


Figure 7
Gross stock of repos, seasonal Treasury bills and foreign exchange swaps



** Treasury bill issuance is given a negative sign, consistent with its impact on liquidity