

THE BASICS OF LIQUIDITY MANAGEMENT

This article, prepared in the Financial Markets Department of the Bank, explains the intentions of liquidity management policy, how it effects the behaviour of the financial system, and the various instruments and methods which are available to implement policy.

Introduction

In December 1984, the Reserve Bank announced details of new liquidity management arrangements. These involved the introduction of a tender system for the sale of Treasury bills; the payment of interest on settlement balances at the Reserve Bank; changes in the Bank's approach to open market operations and to the discounting of government securities; and the abolition of the compensatory deposit scheme after March 1985.

In December 1985, some modifications to the Bank's liquidity management arrangements were announced to be phased in between December 1985 and April 1986. These changes mainly affected the definition of the Bank's monetary base concept 'primary liquidity' and the interest rate paid on settlement balances held at the Reserve Bank. (Primary liquidity is comprised of the banks' holdings of settlement balances at the Reserve Bank — 'settlement cash' — and the amount of securities held by the private sector which the Reserve Bank will purchase on demand — 'discountable securities').

Since March 1986 the Bank has also been directly targetting the level of settlement cash in the system. There have been occasional changes to the level of the cash target as well as to the primary liquidity target.

This article explains why liquidity management operations are undertaken and where liquidity management fits into the medium-term focus of monetary policy. We consider the objectives of liquidity management policy, how liquidity management operations are conducted and what the influences on liquidity are. Readers are also referred to an article in the June 1987 *Bulletin* entitled 'A Laymans Guide to Monetary Policy in the New Zealand Context', and to be published in the December 1987 article issue of the *Bulletin*, 'Influences on Primary Liquidity'.

Objectives of Liquidity Management

Liquidity management is the aspect of monetary policy concerned with short-term conditions in the main wholesale money markets. These markets include the market for overnight deposits, commercial bills, government stock and foreign exchange. The essential role of liquidity management is to maintain market conditions such that short-term or seasonal factors do not obscure the stance of monetary policy.

A successful liquidity management policy (LMP) increases the probability that interest rates will be primarily influenced by fundamentals related to the stance of monetary policy rather than by factors such as short-term and seasonal movements in Government cash flows. The fundamental factors include inflationary expectations, overall demand for and supply of credit and the comparative level of domestic and foreign interest and inflation rates.

This is not to say, however, that LMP is principally concerned with interest rate levels as such. Price variables such as interest rates or the exchange rate are important indicators of the stance of LMP, but the target variables which LMP seeks to influence are quantities (of settlement cash and primary liquidity), not prices.

The major seasonal and daily influences of concern for liquidity management purposes are the large injections and withdrawals of funds arising from Government revenue and expenditure, maturing government securities, government stock sales, and bank notes (currency) sold to settlement banks. (Refer to factors 1-5 in figure 1). These flows have an important impact on financial markets because they involve the transfer of funds to and from the Reserve Bank, and hence reductions or increases in the level of settlement cash available to the financial system.

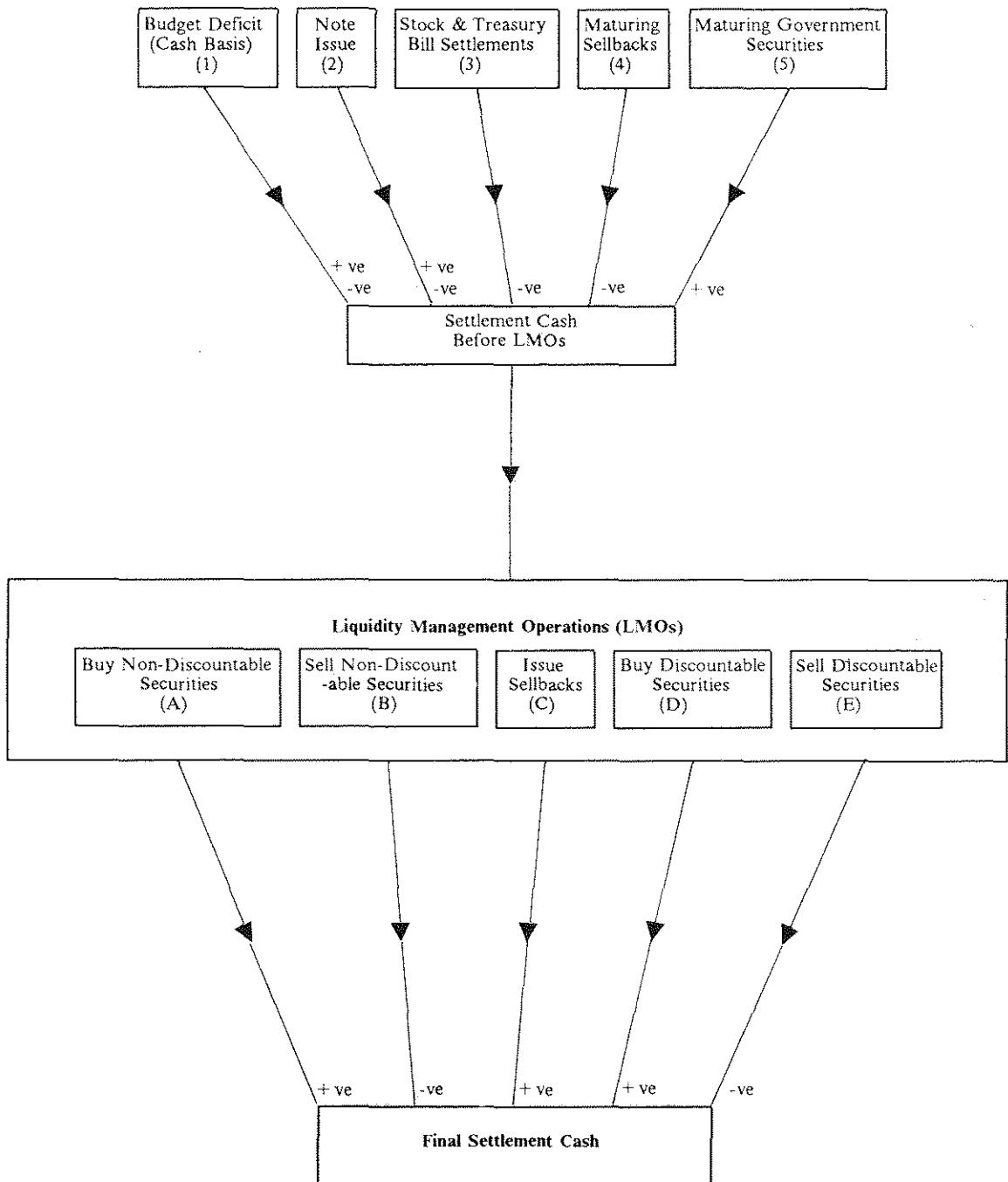
Many of these flows, particularly Government revenue and expen-

diture, exhibit daily fluctuations around seasonal trends. The major seasonal pattern in Government flows comes from terminal and provisional tax payments. In the past these payments have had a concentration in September and March although in future the bulk of this revenue will be spread more evenly over four periods in February, March, July and November. An illustration of this seasonality is given in Figure 2 which shows the cumulative deficit, measured on a cash basis, for 1986/87. The dips in September and March reflect the large amounts of revenue collected in these months.

The seasonal expansion in the budget deficit adds to the liquidity of financial institutions. Without liquidity management operations (LMOs) this seasonal growth in liquid assets could make financial institutions more able and willing to increase their lending. However when the seasonal growth in liquidity is reversed during the tax periods, institutions that did increase their lending would be left with unsatisfactory balance sheet structures which put considerable upward pressure on interest rates. Institutions would to some extent anticipate the tax period reversal of their liquid asset positions and this would lead to some caution in expanding lending. Nonetheless, optimism on the part of individual institutions that they could manage the tax drain pressures or, even more importantly, uncertainty as to which parts of the observed growth in liquid assets might be due to seasonal or permanent factors, could well generate undesirable cycles in credit growth and interest rates. Reducing the impact of such liquidity-driven cycles is one objective of liquidity management.

Liquidity management also aims to reduce short-term volatility in interest rates caused by daily fluctuations in cash flows to and from Government. Daily fluctuations in cash flows arising from the five factors mentioned above can be of significant size and create uncertainties for financial intermediaries looking to meet their funding requirements for any one day. Higher uncertainty increases the risk premium built into interest rates and

Figure 1
Influences on Settlement Cash



encourages financial institutions to hold larger precautionary asset holdings. Larger daily variations in cash flows also cause a greater allocation of resources to the forecasting of cash flows to prevent costly mistakes. Such factors raise the cost structure of financial intermediaries.

By supplying cash when Government flows are removing it, and removing cash when Government flows are supplying it, LMOs reduce this source of uncertainty with its associated costs and generate more stable conditions in financial markets.

Liquidity Management Operations

Figure 3 shows the effect LMOs have on cash injections into the financial system.

The line labelled NPSI represents net public sector injections of settlement cash after government stock tender payments. This shows the net amount of cash injected into (or withdrawn from) the system daily over the 1986-87 financial year, before liquidity management operations.

The second line, labelled NCI, denotes net cash injections after liquidity management operations. The effect of liquidity management operations is represented by the distance between the two lines which shows that net cash injections have been kept close to zero.

To help achieve the smoothing effect shown in figure 3 the Reserve Bank produces daily forecasts of cash injections and withdrawals up to 8 months in advance. Based on these forecasts the Reserve Bank operates in the market in two ways:

1. If there is a net flow of cash from the Government expected over the coming week, the Reserve Bank sells treasury bills by tender on the Tuesday to off-set the forecast flow.
2. Each day the Reserve Bank injects or withdraws cash by way of open market operations (OMOs) to achieve its settlement cash target, presently \$20 million.

Forecasts, however, are made with imperfect information about Govern-

Figure 2
Cumulative Fiscal Deficit

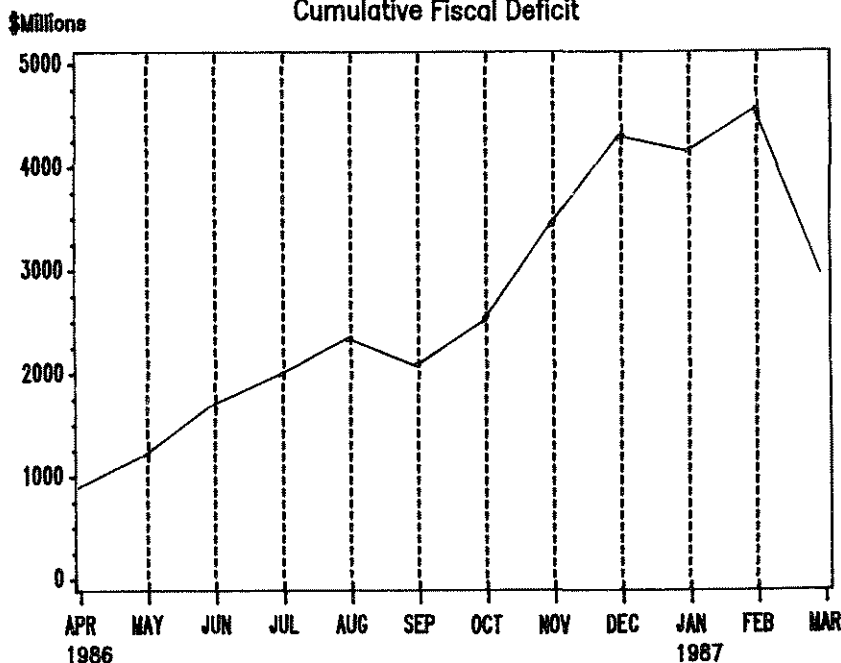
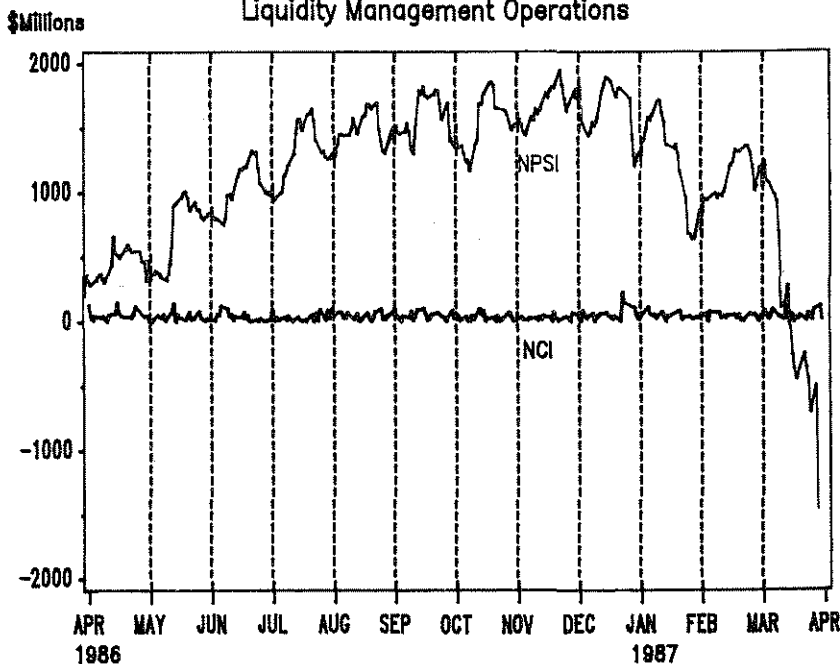


Figure 3
Liquidity Management Operations



ment expenditure and revenue flows so that for each day the cash target is not necessarily achieved. Occasionally forecast errors are sufficiently large to require settlement banks to discount government securities to obtain settlement cash. (The importance of this is explained below.)

In addition forecast error, the actual cash outcome on any one day will also be influenced by 'voluntary' discounting (discounting which occurs on days when the system still has cash), settlements on government stock or Treasury bill tenders not allowed for in the OMO calculation, and any difference between the OMO objective and the OMO outcome (reflecting insufficient bids in the OMO at rates acceptable to the Bank).

The Bank puts considerable resources of its own into liquidity forecasting and relies on the co-operation of personnel in Government departments and agencies to assist with information. The objective is not to eliminate what is referred to as 'forecast error' but to maintain more or less constant the degree of forecast error to help achieve a reasonably steady policy stance.

The exact size of open market operations is determined by the following equation (positive OMO means injecting cash and negative OMO means withdrawing cash):

$$\begin{aligned} \text{Amount of OMO} = & \\ & [\text{Yesterday's Settlement Cash Balance}^1 \\ & + \text{Net Cash Injections Forecast for today} \\ & - \text{Allowance for tender settlements for value today} \\ & - \text{Settlement Cash Target}] \end{aligned}$$

For example, if the Reserve Bank forecasts net cash injections of \$80 million for today (including an allowance for government security settlements), and yesterday's cash balance was \$10 million, then without liquidity management operations the cash balance for today would be \$90 million (i.e. \$80m + \$10m) if the

forecasts are correct. Given a \$20 million cash target, open market operations are used to sell \$70 million securities since this will withdraw \$70 million cash and leave \$20 million cash remaining in the system.

Methods of Conducting Liquidity Management Operations

Figure 1 shows some of the types of LMOs available to the Reserve Bank in its open market operations (see boxes A to E). Two main methods are used: government securities which are bought from or sold to the private sector; and sellback agreements, which are in effect loans to the private sector secured over government securities.

In weeks during which forecasts indicate a flow of cash from Government to the private sector the Reserve Bank will, as noted above, sell Treasury bills by tender to off-set this flow. The size of the tender is based on the forecast positive flow, while the maturities of bills offered are chosen to provide liquidity at the time of forecast cash flows to Government or to reduce the length of gaps in the maturity profile of Government securities.

On a daily basis, if it wants to remove cash the Reserve Bank sells Treasury bills from its portfolio. If an injection of cash is required the Reserve Bank can purchase government securities (an 'outright' purchase) or enter into sellback agreements, or do both. The Bank states the type of transaction it is willing to do and the quantity, and asks for offers from the market by a set time. Normally, the Bank is only prepared to conduct these transactions at market prices but may move outside the perceived market range of prices where there is a high priority attached to achieving the OMO objective such as in tax flow periods.

Although both outright purchase and sellbacks inject cash on a particular day, there are nevertheless differences between the effects each has on broader liquidity conditions. First, while sellbacks inject cash on one day, they automatically involve a withdrawal of cash some time in the

future. Secondly, in terms of conditions at the time of the transaction, outright purchases generally involve a somewhat firmer stance than sellbacks. This is mainly because with an outright purchase the Reserve Bank specifies the particular maturity of the security purchased, while securities of any maturity can be used as security for the loan under a sellback agreement.

Access to the cash the Bank is willing to supply through an outright purchase is thus limited initially to parties with access to these securities, who might be reluctant to sell them. This might be because the particular maturity fits in well with the owner's own liquidity flow needs, or because the owner would incur a loss if the security were sold at prevailing market rates. In short, these factors increase the risk that the injection of cash through an outright purchase will not actually take place. An additional point is that if the Bank chooses to purchase discountable securities in an outright transaction, the overall level of primary liquidity is not increased by the cash injection. In contrast, the fact that government securities of any maturity can be used in a sellback means that these are open to a greater number of market participants, who can each nominate the security which suits them best.

The choice between outrights or sellbacks depends on two factors: how the Reserve Bank reads conditions in the financial markets in relation to its monetary policy stance; and whether forecasts indicate future periods with a poor maturity structure of government securities, or maturities in excess of liquidity requirements. If the Bank is simply interested to buy securities for the latter reasons it will set a sufficiently high upper limit on the volume of sellbacks it is prepared to enter into such that, should it not receive enough acceptable offers on the securities, it is possible to supply the full amount of cash through sellbacks. On the other hand, if the Bank considers financial market conditions are soft relative to its monetary policy stance it can signal this by the way it sets the mix of outright

¹ Cash balance after discounting and tender settlements for value yesterday by settlement banks.

purchases and sellbacks.

Other Instruments Of Liquidity Management

While the use of liquidity management operations to smooth liquidity flows is a daily occurrence there are several other instruments of liquidity management policy which help to maintain short-term conditions in financial markets in keeping with the stance of monetary policy. These instruments are: the settlement cash target; the rate of interest paid on settlement cash balances; and discount policy and the maturity structure of PL.

The Settlement Cash Target

To understand the settlement cash target, a description of the banking system settlement process is useful. Each settlement bank holds an account at the Reserve Bank for the purpose of settling the daily transfers of funds that occur throughout the country and that impact on its funding position. These transfers can be between individuals in the private sector (e.g. a cheque drawn on one settlement bank is deposited to an account with a different bank) or between Government and the private sector (e.g. a cheque drawn on a settlement bank is given to Inland Revenue in payment of tax, and is deposited by IRD to an account at the Reserve Bank).

At the end of a typical banking day, (in practice, the following morning) some banks' settlement accounts at the Reserve Bank will be in debit and other banks accounts in credit. The Reserve Bank does not permit overdrafts on settlement accounts so settlement banks in debit must either borrow from those banks in credit or discount government securities to the Reserve Bank at a penalty in order to clear their debit balance.

If total debits are larger than total credits one or more settlement banks must sell government securities with 30 days or less to maturity (discountable securities) to the Reserve Bank to

eliminate the system debit balance. They may also need to discount securities at other times, usually when they are unable to obtain funds on the interbank market for settlement cash at an acceptable price.

By altering the size of the settlement cash target the Reserve Bank influences the probability that a settlement bank will be forced to discount government securities to fund its settlement account and so incur a higher funding cost. Increasing (decreasing) the probability of settlement banks incurring the cost of discounting encourages them to compete more (less) vigorously for funds in the various markets and so influences conditions in those markets.

In the past the Bank has altered the settlement cash target in response to perceptions that trends in the demand for settlement cash were running counter to monetary policy objectives, and also on occasions when extreme conditions (both loose and tight) on wholesale funds markets did not appear likely to self-correct in the short term.

The Bank does not normally adjust the target frequently in response to the many transitory fluctuations in market conditions. Frequent changes are not necessary to achieve policy goals, and would also serve to shift the attention of participants in financial markets away from the fundamental factors mentioned earlier and onto the intentions and views of the central bank. Such a shift in attention would make the formulation of liquidity management policy difficult as the prices and sentiment in various markets are used in forming policy views. If these prices and sentiment in turn reflect market participants' interpretation of central bank views more than they reflect fundamentals, the interaction between the markets and the Reserve Bank becomes almost completely circular.

Interest on Settlement Account Balances

Interest is paid on credit balances in settlement accounts at 65 per cent of the average seven day market rate.

Before December 1985 a fixed rate of 5 per cent was used. The rate paid by the Reserve Bank on settlement balances is not at present actively managed as a means of implementing liquidity management policy. It is worth noting, however, that lowering (raising) the rate would, in general, lead to downward (upward) pressure on interest rates. The further this rate is below market interest rates the more settlement banks will want to hold only small credit balances in their accounts. In attempting to avoid holding large settlement balances a settlement bank would lend funds more aggressively on wholesale markets, putting downward pressure on interest rates.

The risk a settlement bank faces in pursuing this course of action is that the probability of the bank not having sufficient settlement cash, and having to discount government securities to the Reserve Bank, increases.

Hence there is a trade-off between the opportunity cost of holding settlement cash at a less-than-market rate and the cost of discounting. The interest rate paid on settlement cash is intended to reduce the opportunity cost of holding settlement cash sufficiently that this cost does not provide an incentive to settlement banks to lend aggressively on wholesale markets.

The Discount Rate and Maturity Structure of PL

The Reserve Bank will purchase (discount) government securities with 30 days or less to maturity at a penalty yield one per cent above the market yield. For example, the Reserve Bank would purchase at 17 per cent a Treasury bill with a current market yield of 16 per cent. The higher the yield at which a bill is purchased, the lower the price. By changing the discount penalty, it is possible for the Reserve Bank to increase or decrease the cost of discounting. However, the discount penalty has not to date been used as an active instrument of policy since the adoption of the new liquidity management arrangements in late 1984.

The discount penalty of one per cent holds for discountable securities of all maturities within the 30 day period. However, while it is constant in yield-penalty terms it is not constant in price-penalty or funding cost terms. The price-penalty, or funding cost, rise with the length of maturity. For example on \$1m of Treasury bills with one day to maturity sold at 17 per cent when the market yield is 16 per cent, the penalty cost is about \$27, an annual funding cost penalty of 1 per cent. If instead the bill had 20 days to maturity the penalty cost would be \$538, an annual funding cost penalty of approximately 20 per cent. In general, the funding cost pen-

alty works out to around 1 per cent per annum for each additional day to maturity. The maturity structure of discountable securities thus affects the cost of clearing settlement accounts by discounting government securities to the Reserve Bank, and so can affect settlement bank behaviour.

Conclusion

Through liquidity management policy, the Reserve Bank attempts to manage financial market conditions, particularly conditions at the shorter end of the market, in such a way as to enable the financial system to function in an orderly manner consistent with monetary policy objectives. Liquidity

management is intended to ensure that the trends in monetary policy are clearly identifiable. By showing that short-term conditions are consistent with medium-term policy stance, the effectiveness and credibility of monetary policy is strengthened.

The current design of liquidity management arrangements has required consideration of a wide variety of objectives and techniques, which are complex and interrelated. In some cases, it has been necessary to strike a balance between competing objectives. As circumstances change, so some further revisions to the policy framework may suggest themselves in the future.