

# Implementing monetary policy in New Zealand

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*In this article Julie Huxford and Michael Reddell outline how monetary policy is implemented in New Zealand.*

## I Introduction

The Reserve Bank of New Zealand Act 1989 provides the mandate for the Reserve Bank to formulate and implement monetary policy directed to the broad economic objective of achieving and maintaining stability in the general level of prices. The Policy Targets Agreement (PTA) between the Governor and the Minister of Finance sets out the specific policy targets for monetary policy.

This article explains how monetary policy is actually implemented; that is, what sorts of things the Bank says and does to affect wholesale financial markets - the first and most direct of the channels through which monetary policy has its effects<sup>1</sup>. The article outlines how the banking settlement system helps provide the foundations for implementing monetary policy, and explains the Bank's regular market operations. The various ways the Bank can signal the need for a change in monetary conditions are outlined, against the background of how the structure has evolved over the last decade or so.

## II Laying the foundations

To achieve the sort of leverage over wholesale financial markets that it needs, the Reserve Bank must be able to affect the quantity and/or price of some financial assets for which there are no easy substitutes. In the past compulsory ratios on bank liquidity played a role in providing this leverage. These days, monetary policy derives its "bite" from the liquid balances banks hold in their accounts at the Reserve Bank. These balances are known as "settlement cash". By buying and selling securities, the Reserve Bank can alter the aggregate supply of settlement cash, and the Bank can also alter the effective cost of both acquiring and holding settlement cash balances. Because of this ability to make the supply of these balances scarce, we are able to affect the price; that is, real (adjusted for inflation) short-term interest rates. That, today, is the essence of implementing monetary policy.

To explain further, no institution is any longer compelled to bank at the Reserve Bank, or to hold any minimum

level of liquid assets. However, the Bank is still able to exert control because of its unique position as:

- the sole supplier of banknotes and coin;
- the banker to the government; and
- an institution with undoubted credit standing.

The government's bank balances are held at the Reserve Bank, and the government ultimately insists on being paid in Reserve Bank settlement cash. For example, to honour a customer's cheque drawn in favour of Inland Revenue, a bank must be holding settlement cash at the Reserve Bank. Similarly, any notes and coin bought from the Bank must be paid for with settlement cash.

Partly because of these customer-driven needs to hold funds with the Reserve Bank, and partly because of the Reserve Bank's own undoubted credit standing, the banks have also chosen to use their accounts at the Reserve Bank as the basis for bank-to-bank settlement of all other banking transactions.

Over the course of the banking day, huge volumes of financial transactions (by number and dollar amount) are undertaken, between banks themselves and between banks and their customers. At the retail level, these transactions include cheque, credit card and eft-pos payments, as well as cash transactions. A customer writing a cheque in favour of a retailer, for example, is issuing their bank a payment instruction. Once that cheque has been banked by the recipient, then the customer's bank must arrange for the transfer of funds (to the retailer's bank for the credit of the retailer's account) by the end of the banking day. Because banks choose to use their accounts at the Reserve Bank for settlement of banking transactions, making that transfer means the bank concerned must ensure that it has sufficient settlement cash in its account at the Reserve Bank.<sup>2</sup>

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1 Readers are also referred to Mayes and Riches (1996) for a more detailed review of some of the issues relating to the formulation of monetary policy in New Zealand.

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2 The whole day's interbank transactions are currently settled each morning on a net basis, (ie, one payment per bank) backdated to the previous banking day. Under the Real Time Gross Settlement (RTGS) system, which will commence in 1997, individual transactions across settlement accounts will be final as they occur throughout the banking day. For more information on RTGS, see Tait (1995).

Thus, banks want to hold settlement account balances to cover:

*Banknote and coin transactions -*

Total settlement account balances fall as banks pay for notes and coin that have been trucked from the Reserve Bank to their branches. Settlement account balances rise as surplus notes are returned to the Bank.

*Government revenue and expenditure flows -*

Payment of taxes, such as PAYE and GST, drain funds from the banking system and into the government accounts at the Reserve Bank, reducing total settlement account balances. Benefit payments and any other government expenditure (including government security maturities and coupon interest payments) have the opposite impact.

*Interbank settlements -*

Transactions settled between banks alter individual bank settlement account balances, but do not alter the total supply of settlement cash.

The Reserve Bank requires that settlement accounts maintain a credit balance - no overdrafts are allowed. As we shall see, the Bank is able to control the supply and cost of settlement cash. The volume of banking business, broadly linked to the level of economic activity, is one of the major influences on the demand for settlement cash. At a technical level at least, monetary policy works by managing the balance between the supply of and demand for settlement cash.

Given these structural characteristics of the settlement process there are numerous ways of exerting influence over the balance between supply conditions for settlement cash and the demand for that cash. In choosing a way that will provide an efficient system of monetary control we have several criteria in mind.

**(a) Neutrality**

Implementing monetary policy should not involve the Bank in directly controlling the activities of any institution(s). The arrangements should not artificially impinge on, or favour, any institution or group of institutions (unlike, for example, the old ratio systems).

**(b) Transparency**

The Bank's activities to influence monetary conditions should be as transparent as possible, in order to promote rapid and effective responses to policy actions by providing clarity about the Bank's intentions.

**(c) Stability**

The potency of monetary policy and instruments should be readily apparent, in order to promote stability in monetary conditions.

**(d) Self-stabilisation**

The system should have self-stabilising tendencies, again to promote stability but also to reduce reliance on discrete Reserve Bank policy actions.

**(e) Efficiency**

The system should be efficient, in the sense of imposing the minimum possible costs and distortions consistent with achieving the ultimate goals of monetary policy.

### III Building on the foundations

#### Regular operations

##### *Liquidity management*

Without active liquidity management (the term used for day-to-day operations designed to affect the supply of settlement cash) there would be very large swings in the stock of settlement cash, as hundreds of millions of dollars of tax revenue were banked one day, and large benefit payments were made a week or two later. Other things being equal, such large swings would engender short-term variability in interest rates and monetary conditions.

The first step in the implementation process is to smooth out the day-to-day flows across the settlement accounts. The Bank prepares and maintains forecasts<sup>3</sup> of the influences on settlement cash and uses these to determine how much cash to inject or withdraw through the daily Open Market Operation (OMO). Daily open market operations (OMOs) are conducted to offset net government revenue and expenditure flows and other transactions (including those involving the Reserve Bank's other customers) affecting settlement account balances.

If the cash flows **from** the banking system (ie, reductions in settlement account balances) are expected to be greater than the cash flows **to** the banking system on a given day

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3 These forecasts are prepared some months ahead, on the basis of the information contained in the government's budget for the year. The forecasts are then updated on an ongoing basis, as more information comes to hand.

(ie, a net reduction of settlement cash is forecast), then the Bank will provide additional settlement cash in that day's OMO. This is normally done via repurchase agreements ("repos"), in which financial institutions<sup>4</sup> sell some of their financial securities (such as government bonds) to the Reserve Bank in exchange for settlement cash, simultaneously agreeing to reverse the transaction at some fixed later date. The Bank may also offer to purchase short dated government bonds (in exchange for settlement cash) in the OMO.

On days when we need to withdraw cash from the banking system (ie, forecast injections of settlement cash exceed forecast withdrawals), we normally sell Treasury bills<sup>5</sup> in exchange for settlement cash.

OMOs are conducted mid-morning each banking day. The size of the intended injection or withdrawal of settlement cash, and details of the maturities to be offered, are announced to the financial markets via electronic news media such as Reuters and Telerate<sup>6</sup>. Financial institutions phone in their bids, indicating the yields and amounts that they are willing to transact. Bids are assessed by the Bank relative to prevailing market rates for comparable securities. As long as the bids are similar to or noticeably better than market yields, then the Bank will accept bids equal to the amounts we are aiming to inject or withdraw, and notify the aggregate results to the market, again via the electronic news media.

Occasionally, either insufficient bids are received, or the yields bid are not acceptable to the Bank on a commercial basis (ie, the yields are significantly worse than prevailing market rates for comparable securities). On these occasions the Bank may withdraw or inject less than the desired amount of funds, leaving the banking system with either more or less settlement cash (on that day) than would have been the case if the OMO had been fully successful. Nowadays, decisions on accepting or rejecting OMO bids are not taken with any monetary policy signalling intentions in mind; they are purely commercial judgements.

In November 1996 the Bank began to use foreign exchange "swap" transactions as another means of smoothing liquidity flows<sup>7</sup>. Like repurchase agreements, each swap has two legs. The first leg involves buying (selling) New Zealand dollars (generally against US dollars) in order to inject (withdraw) settlement cash on a given day. The second leg involves selling (buying) New Zealand dollars on a forward basis to withdraw (inject) settlement cash at a later date, in order to reverse the first leg of the original transaction. Using this additional instrument will enable liquidity management operations to be conducted at least cost - by increasing the range of markets we deal in. As a useful by-product, foreign exchange swaps will also provide the Bank with operational exposure to a wider range of markets.

### *Forecast error and discounting*

In conducting the OMOs we aim to leave the system with a pre-specified and announced level of aggregate settlement cash balances - the "cash target" (currently \$5 million). However, liquidity forecasts are not totally accurate; a factor which is taken into account when setting the target. Based on many years' experience, there is a fairly predictable degree of forecast error - less than \$20 million on four out of five days. The cash target is set so that on occasions banks need to obtain additional cash through channels other than the OMO. The main channel, discounting, is discussed below.

Although many government transactions are broadly predictable, and follow set patterns (such as regular benefit payments), the precise timing of some government and other relevant transactions can be less certain. For example, when government cheques have been issued (for tax refunds for example) no-one knows exactly when they will be banked. Appendix 2 illustrates how the actual cash flows for a given banking day may differ from those forecast, and the implications for settlement cash on the day.

Government expenditure flows are more stable and more predictable than government revenue flows. Indeed, to reduce the forecast error resulting from government revenue flows, the Bank also conducts a daily "float tender" at the end of each banking day - ie, first thing the following morning, when the total tax receipts for the day are

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4 There are no "authorised dealers" in New Zealand. The Reserve Bank deals with institutions subject only to creditworthiness considerations.

5 Treasury bills sold in the OMO are known as "seasonal Treasury bills". Seasonal Treasury bills are sold by the Bank, as agent for Treasury's New Zealand Debt Management Office (NZDMO). The Bank also administers the sale by tender of Government bonds and "regular issue" Treasury bills as part of the public debt programme, under an agency agreement with NZDMO.

6 More detailed information on the determination of OMO sizes and structure is provided in Appendix 1.

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7 These transactions do not form part of the OMO, but will be allowed for in setting the OMO size.

known<sup>8</sup>. In the float tender settlement cash is tendered to the banks in order to offset, for one business day only, the liquidity impact of government tax receipts. In effect the float tender delays the liquidity impact of tax receipts by one day, in the process changing the influence from an unpredictable one to a known one. Banks bid for the settlement cash that they wish to borrow, subject to a minimum interest rate each day set by the Bank (which reflects the actual wholesale call interest rate prevailing in the market).

When forecast error means settlement cash balances would otherwise be too small to cover banks' payment obligations, banks have to obtain additional settlement cash immediately to ensure that they are in credit at the end of the day. For the banking system as a whole, the only additional form of cash available is via selling ("discounting") Reserve Bank bills back to the Bank. The Bank undertakes to discount Reserve Bank bills on demand, so long as they have 28 or fewer days remaining to maturity.

Reserve Bank bills are, in essence, Treasury bills issued by the Reserve Bank. They are issued in twice-weekly tenders of \$70m each - making them the second quantity we control in our operating system - for terms of 63 days. Because Reserve Bank bills are the sole discountable instrument, they are usually issued at a lower yield than comparable, risk-free securities such as Treasury bills (this difference in yield is the value banks place on the option of encashing bills on demand).<sup>9</sup> The sum of discountable Reserve Bank bills and settlement cash is known as "primary liquidity" - the pool of liquidity immediately available to banks.

Although discounting adds settlement cash on demand, the forecast error that created the need for discounting continues to bite on monetary conditions. The bite comes because a penalty is charged for discounting Reserve Bank bills. This takes the form of a penal margin (currently 90

basis points<sup>10</sup>) above the market yield for other short-term securities (the discount rates are set, essentially mechanically, once a day). Because banks only need the additional funds overnight, but the penalty margin applies to the entire term of the bill discounted, discounting Reserve Bank bills with more than one day to maturity - necessary when large amounts of discounting occurs - is fairly expensive, when compared with the cost of a one day loan. For example, discounting a Reserve Bank bill with three days remaining to maturity involves paying the penalty margin for three days (ie, 270 basis points). This penalty structure thus encourages banks to run their businesses so as to minimise the volume of discounting they face.

When Reserve Bank bills totalling \$10 million or more with more than one day to maturity remaining have been discounted, then these bills will be offered for resale in the next day's OMO. This is done to maintain targeted primary liquidity volumes and, in principle at least, maintain neutral monetary policy settings. If necessary a "two-way" OMO will be conducted - in which we simultaneously sell Reserve Bank bills (which withdraw settlement cash) and engage in repos to inject settlement cash.

But what if the forecast errors are the other way around, and more cash is left in settlement accounts than we had intended? Here too, a penalty structure is at work. Banks are paid an interest rate substantially below market rates on the balances in their settlement accounts.<sup>11</sup> For each bank, and for the system as a whole, there are penalties cutting in whenever there is too little or too much cash in the system - the narrow path in between is intended to guide monetary conditions along the desired path.

## How the Bank adjusts conditions

The Bank's inflation projections relative to the inflation target range are the critical input in the quarter by quarter **formulation** of monetary policy. Unlike many other countries, in New Zealand the inflation projections are now published in some detail each quarter (in the *Economic Projections* and/or the *Monetary Policy Statement*). The projections, and the accompanying statements from the Bank, also play a direct role in policy **implementation**, influencing wholesale financial markets by providing information on which they can anticipate the Bank's policy actions.

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8 Government tax receipts are difficult to forecast with a great degree of accuracy, particularly during peak tax periods. If left unchecked, the resultant forecast errors would unnecessarily complicate the conduct of our current monetary policy operating structure, by introducing seasonal and intra-month patterns to forecast errors and, hence, potentially to monetary conditions themselves. Over time, the Bank has moved to integrate tax revenue more fully into its normal liquidity management arrangements. Since December 1995, 50 percent of the forecast tax receipts have been included in the open market operation, with the remainder offered in the float tender. In October 1996, this figure was increased to 60 percent. These changes have reduced the size of the float tenders, which has administrative advantages linked to the forthcoming introduction of RTGS.

9 Over the first 10 months of 1996, this "premium" for the ability to discount on demand has averaged around 20 basis points (see footnote 10).

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10 A basis point is one-hundredth of a percentage point.

11 The rate is calculated as 300 basis points below the seven day cash rate on individual settlement balances up to \$20 million, with zero interest paid on balances beyond that threshold.

Our inflation goal is very transparent. By publishing inflation projections and the key financial assumptions underpinning them the Bank provides market participants with a lot of information on which to base adjustments to financial market prices in anticipation of the monetary policy stance that will be required. The assumptions the Bank makes about two key components of monetary conditions, the exchange rate (the trade-weighted index measure, or TWI) and the 90-day bank bill rate are now published along with the projections. The numbers used in the projections do not represent policy targets in themselves. But they do provide reference points by indicating, by virtue of the inflation track projected, whether the appropriate set of monetary conditions is tighter, looser or about the same as those assumed. Thus, for convenience, policy signals or policy comment is often made by reference to the assumed levels.

In the period between the release of projections, the Bank continues to assess the implications for the inflation outlook of any new information to gauge the appropriateness of prevailing monetary conditions. This assessment is a near-continuous process – wholesale financial markets operate in real-time.

Ideally, there would be no need for any comments or actions from the Bank between the release of each set of published inflation projections. Financial institutions are able to anticipate the likelihood of a response from the Bank, both to new information about inflation pressures and to changes in monetary conditions. By anticipating our response they can react first, adjusting portfolio positions and moving interest or exchange rates (or both) in the desired direction, rather than wait for the Bank to adjust policy instruments and force such a move. This sort of automatic adjustment mechanism is common in many developed markets, but works particularly well by virtue of the degree of transparency and the operating credibility – the perceived willingness to act if markets don't adjust first – that the Bank has built up over the years.

However, things do not always work out so smoothly, and at times monetary conditions will evolve in a manner that is inconsistent with our intended policy stance. The automatic adjustment mechanism may not work because there are divergences between the Bank's view and the markets' collective view of what conditions are required to keep inflation within the desired range. As markets and the Bank work with much the same data, major differences should not be the norm. A second reason why conditions may not always evolve as we would like is that the market's natural tendency to anticipate changes in the Bank's policy stance can sometimes result in monetary conditions moving a little too far too soon.

In such circumstances, a range of responses is possible. A low level response would take the form of a comment from a senior Bank official or the Governor, broadcast to financial markets over the electronic wire services, or it may take the form of a formal news release or speech by the Governor. Comments can range from a simple clarification of the current stance to a warning that monetary conditions have moved to levels that threaten a future breach of the inflation target range. If the market fails to adjust monetary conditions in an appropriate manner, then the Bank may be forced to adjust one or more of the formal policy instruments.

Because such actions will expose financial institutions (and other investors) to potential gains or losses at the point at which the policy action is taken, there is a powerful financial incentive for market participants to anticipate our response. Our experience has been that this incentive has largely eliminated the need for formal actions by the Bank. As a result, changes in the settings of the **formal** policy instruments in New Zealand occur infrequently; on average, only about once a year in recent years. The last explicit action was in August 1995. Appendix 3 contains a summary of changes in policy settings that have occurred over the years.

The policy levers that that may be adjusted are integrally related to the operating system outlined earlier.

### Cash target

The level of the settlement cash target is regarded as the most important lever. Other things being equal, increasing the cash target will result in easier monetary conditions. This is because a higher target level of settlement balances typically leaves more money – at below market yields – in the system at the end of each day, and lowers the probability that the forecast error in liquidity management will be large enough to force banks into expensive discounting of Reserve Bank bills. Accordingly, with a higher cash target, banks tend not to compete as aggressively for the expected supply of settlement cash or Reserve Bank bills. Short-term interest rates generally fall as a result. In practice, market participants adjust the level of interest rates almost as soon as any change in the target is announced. In most monetary policy structures these days, the “announcement effect” associated with the central bank taking what is recognised to be a formal and major step is a dominant component of market reactions.

Conversely, a lower cash target, all else unchanged, will result in tighter monetary conditions. In practice, the cash target has only ever been lowered as far as zero, although the target could be set negative should conditions warrant it. Of course, actual cash balances could not be negative

- as noted above all accounts must be in credit. Setting a negative target simply means that less of the settlement cash that banks require each day is provided at market rates, and more is obtained at above-market penal rates (in other words, the frequency and thus the cost of expensive discounting is increased as Reserve Bank bills with more days remaining to maturity are discounted).

### Discount margin

An increase in the cost of discounting - the penal discount margin - can also be used to tighten monetary conditions. The higher penalty cost of obtaining additional settlement cash via the discounting process will encourage banks to compete more aggressively in the market for settlement cash, thereby raising short-term interest rates. Each bank aims to attract additional customer deposits to reduce the risk that it will have to discount. The reverse applies with a lower discount margin. This lever has been used on a couple of occasions (in earlier years) to achieve large movements in market interest rates.

### Supply of Reserve Bank bills

An increase in the supply of Reserve Bank bills will, all else unchanged, result in easier monetary conditions. Because Reserve Bank bills are a potential substitute for settlement cash, via the discounting process, the potential

supply of settlement cash is increased.<sup>12</sup> Increasing the supply will generally lower short-term interest rates. The reverse applies for a decrease in the supply of Reserve Bank bills.

### Interest rate paid on settlement account balances

Increasing the margin below market interest rates paid on settlement account balances discourages banks from holding excess settlement cash, and can consequently contribute to easier monetary conditions. Banks are more resistant to holding surplus cash and hence less keen to compete for funds. Conversely, a smaller margin (implying a higher nominal interest rate) provides less of a disincentive for banks to hold settlement cash, tightening conditions.

Table 1 below summarises the general effects of changes in the various policy instruments.

Neither the interest rate on settlement balances nor the supply of Reserve Bank bills are normally adjusted as policy levers. Changes made since the introduction of the system have been purely technical in nature, offsetting some other technical change.

The choice between the range of levers available is more a matter of convention than of economic substance. Our choice of the cash target as the major policy lever in part

**Table 1**

Policy instrument	Impact of an increase	Impact of a decrease
Cash target	Decreased probability of discounting, resulting in decreased demand for settlement cash and Reserve Bank bills	Increased probability of discounting, resulting in increased demand for settlement cash and Reserve Bank bills
Discount margin	Increased cost of discounting, resulting in increased demand for settlement cash and Reserve Bank bills	Decreased cost of discounting, resulting in decreased demand for settlement cash and Reserve Bank bills
Supply of Reserve Bank bills	Decreased cost or probability of discounting, resulting in decreased demand for settlement cash and Reserve Bank bills	Increased cost or probability of discounting, resulting in increased demand for settlement cash and Reserve Bank bills
Margin below market interest rates paid on settlement cash balances	Increased cost of holding settlement cash balances, resulting in greater disincentives for holding settlement cash. Not necessarily lower demand for settlement cash/Reserve Bank bills however, as the costs and probability of discounting are unchanged	Decreased cost of holding settlement cash balances, resulting in lower disincentives for holding settlement cash

12 Increasing the supply of Reserve Bank bills without simultaneously reducing the level of settlement cash requires an offsetting reduction in the sale of Treasury bills. Treasury bills are not discountable and provide no reserve access to cash.

reflects the historical quantity-based vision of the system. The whole operating structure appears to place considerable emphasis on a series of quantity targets. In fact, however, for a number of years the absolute levels of these quantities have not been regarded as being of any particular intrinsic significance and, in any case, the actual penalties imposed by the structure are also small in an absolute sense and relative to the scale of banks' business. Rather, it is the well-recognised ability and willingness of the Bank to adjust these levers, significantly if necessary, that provides leverage over monetary conditions. It is the same recognition that means that actual changes to the levers are needed only rarely. If necessary the levers would be adjusted by whatever amount was necessary to deliver financial market prices that are consistent with the Bank's policy goals.

### **Setting monetary conditions without explicit targeting of financial market variables**

It is conventional amongst students of the implementation of monetary policy to look for "the price" or "the quantity" that the central bank either sets or targets closely. That price or quantity is then taken as the first step in the transmission mechanism from central bank actions, through changes in financial market prices and quantities, to the activities of firms and individuals in the wider economy.

Such students of monetary policy implementation often find themselves at a loss when observing New Zealand arrangements. As explained above (and further below), the levels of the various quantities in the system - the cash target, settlement cash balances, the volume of discountable Reserve Bank bills - are not regarded as having intrinsic significance. They are adjusted if necessary in order to obtain monetary conditions that are judged to be consistent with maintenance of price stability. This approach suggests that students should look for "the price" that the Bank sets or targets. In fact, the two key prices in the system - the discount rate and the interest rate paid on settlement balances - are set as margins relative to financial market interest rates. As market interest rates rise, so too does the discount rate and the return on settlement cash balances (thereby reinforcing the tightening in monetary conditions).

Nor is the Bank very explicit about the level of short-term interest rates that it regards as consistent with "appropriate monetary conditions". Unlike most countries, the Bank does not target a specific rate. In large part, this reflects the joint attention paid to the exchange rate and an array of interest rates (as well as credit growth and other financial market indicators) in assessments of the

state of monetary conditions.<sup>13</sup> Thus, if the exchange rate were to appreciate, interest rates could fall and leave monetary conditions broadly unchanged - at least in the aggregate.<sup>14</sup> As the Reserve Bank cannot control the mix of monetary conditions, but only the aggregate level (or degree of tightness), it has thus far chosen not to tie down too closely either interest rates or the exchange rate. In most instances, any comments on the one are made conditional on the other.

To fill the gap apparently left by the absence of either a single financial market price or a single quantity acting as a unique point of reference for policy implementation, the New Zealand system relies on links established within quarterly inflation projections. As explained above, the projections contain assumptions about monetary conditions and, given all other influences, the consequent future inflation outcomes. This allows the assumed conditions to act as reference points for targeted monetary conditions, at least for the period until the next projections.

One important consequence of this approach is that interest rates can adjust rapidly as the market's view of circumstances alters. If new information points clearly to a change in inflation pressures, for example, interest rates can adjust without any need for Reserve Bank action.

## **IV How the system evolved**

Until 1984, monetary policy in New Zealand was characterised by a high and only gradually decreasing degree of regulation, including a number of direct controls on the operations on financial institutions.

Since 1984 things have changed markedly; most dramatically in 1984/85, and incrementally since. The abolition of interest rate controls and the reserve asset ratio, and the later float of the New Zealand dollar, left the Bank in a better position to control independently the liquidity of the banking system, and thereby ultimately the inflation rate, than had previously been the case.

In the early years the Bank focused primarily on limiting growth in Primary Liquidity (PL). Using Government debt policy, the aim was to restrict the ability of financial institutions to expand credit. Sufficient government bonds were issued to offset, broadly on a monthly basis, the li-

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13 See "Summary indicators of monetary conditions" *Reserve Bank Bulletin* September 1996, for a more complete discussion.

14 Such changes in the "mix" of monetary conditions will have implications for sectoral activity, however.

quidity injections resulting from the Government's deficits, public debt maturities and Reserve Bank transactions with the private sector in what was described as a "full funding" approach. Exact full funding implies that PL would remain unchanged through time. It was expected that a reasonably stable relationship between PL and nominal GDP would exist, implying that a stable level of PL would also produce – at a first approximation – a stable level of nominal GDP. Growth in nominal GDP would be allowed for by a deliberate and controlled degree of under-funding. Under these arrangements, the major financial prices, interest rates and exchange rates, were thought more of as incidental, rather than key, indicators of how monetary conditions were evolving.

In 1986 the Bank moved to complement the monthly full funding by beginning the daily open market operations (OMOs). As discussed above, these were (and still are) geared towards offsetting projected daily liquidity influences.

Throughout the mid-1980s interest rates and the exchange rate were quite volatile. Such volatility was tolerated for a number of reasons, including concerns that attempts to reduce financial price volatility would increase volatility in monetary quantities (which were thought to be the more important); a reaction to past control-oriented regimes and the resulting desire to let markets locate the equilibrium; and considerable uncertainty in the immediate post-liberalisation period about what interest and exchange rates were consistent with the desired stance of policy.

Increasingly, however, the Bank came to judge the degree of volatility in interest and exchange rates as costly and unnecessary, both in terms of its impact on the economy and its impact on the wider public support for the monetary policy framework and the ultimate goals of policy. It was also recognised that the threat of central bank action could reduce variability in prices, without the need to alter the volume of settlement cash and primary liquidity. The hoped-for stable relationship between the quantities and nominal income failed to emerge, at least with the necessary degree of stability. Moreover, as consciousness of interest and exchange rates as direct influences on spending and prices heightened, it was recognised that considerable short-term volatility made it difficult for investors firms and households to respond reliably to the intended stance of monetary policy - the "noise" was often swamping the intended "signal".

The Bank therefore increasingly shifted its focus away from using quantity movements as either the key indicator, or even as the main instrument of policy. Greater emphasis began to be placed on financial price movements and on statements and published comments. In this respect, interest rates and the exchange rate have assumed a

role of greater prominence in assessing monetary conditions and determining monetary policy settings. Also changing over the years has been the technique used to make small scale adjustments to monetary conditions (either to keep them in line with desired monetary conditions or for technical reasons). At one time, "low-key" monetary policy signals were sent to the market via the details of how the OMOs were structured or conducted. For example, if the Bank judged that monetary conditions had become somewhat easier than desired it might have chosen not to resell discounted Reserve Bank bills to the market or to inject funds only by purchasing a security outright, rather than through repurchase arrangements. Typically, it was not the direct financial impact of the decision concerned that mattered, but rather the implied signal of central bank disquiet. The conventions associated with these sorts of structures were generally understood by those closely associated with the market. Nonetheless, at times, these sort of signals gave rise to a degree of confusion, being difficult to distinguish from similar actions not motivated by concerns about monetary conditions.

Over a period of years, the Bank moved away from using OMOs to give signals on desired monetary conditions. OMOs are now strictly liquidity management operations, with commercial criteria driving the associated decision process.

Another signalling tool used in years past was for senior Bank staff to make comments to some or all financial institutions, indicating the Bank's concerns and/or views about the way in which conditions should adjust. This "jaw boning" or "moral suasion" process was gradually transformed into the more transparent and neutral system known as "Dealers' notes", which consisted of short comments or phrases regarding the Bank's current views or stance. The notes were used by the Bank's staff in their regular conversations with market participants and were sometimes altered to guide a change in conditions. The system became increasingly formalised and artificial, without fully resolving the neutrality concerns, and was abandoned in October 1995. Nowadays, if the Bank wishes to make some comment in order to influence monetary conditions, such comments are made transparently and neutrally, normally via the electronic news media.

In parallel with moves away from low-key or behind-the-scenes signalling, the Bank began to put increasing emphasis on the quarterly inflation projections, the key financial assumptions published in them, and the policy comments associated with the projections. Together these have progressively come to provide considerably more structured routine guidance to markets than had been available earlier.

## V Assessing the approach

The New Zealand implementation system is somewhat different from most others used in countries with well-developed wholesale financial markets. The Reserve Bank does not intervene in the foreign exchange market in order to influence monetary conditions. More significantly, we also do not set any "official" interest rate - recall that our discount rates are reset each day as a fixed margin to market rates and so follow the markets rather than lead them. Our emphasis has been to balance the need to have the ability to guide conditions broadly, while still leaving sufficient scope and incentives for the market itself to adjust overall conditions as much as possible.

To some extent the transparency of our ultimate target and of the projections makes this approach more feasible for New Zealand. However, this distinction should not be overstated as an increasing number of countries have adopted some form of inflation target and are more open, in general terms, about the sorts of considerations which will guide the policy reaction rule.

Returning to the criteria identified earlier in this article, how does the current New Zealand system perform on its own terms?

### Neutrality

The framework itself does not favour particular institution(s), or force transactions on specific institutions or groups. The Bank deals with any institution, subject only to creditworthiness and commercial considerations, and all transactions are conducted on a voluntary basis. New Zealand was the first - and is still one of the few - OECD countries to scrap reserves ratios completely and to have no preferred dealer arrangements. All policy information communicated by the Bank is released in a neutral manner, and is simultaneously available to all interested parties.

### Transparency

All policy communications from the Bank are in writing and widely and transparently available to all in the markets and in the media. Our inflation projections and the key monetary policy assumptions made in formulating them are published and closely scrutinised. At an operational level, key operations are conducted using commercial criteria and results are published promptly. Sometimes the transparency of the content of policy signals has been less than markets would have liked, reflecting our reluctance to specify particular levels for interest and exchange rates.

## Stability

When policy signals are needed they can be made in a graduated fashion, via a statement from a senior Bank official or the Governor, or by stronger means, such as an explicit change to a policy instrument. More often the market will itself adjust conditions in anticipation of a change in the Bank's stance. Underlying that behaviour is clear recognition of the potential power of monetary policy instruments, and the Bank's willingness to use those instruments. These mechanisms allow monetary conditions to alter in a stable and consistent manner, in line with the Bank's policy objectives.

### Self-stabilising tendencies

The framework provides the financial markets with the opportunity and sufficient incentives to adjust conditions in response to changes in the economic and inflation outlook, without requiring sanctioning by the Bank. A clear example of this was the movement seen in 90-day interest rates over 1994. Emerging inflation pressures over this period, which became increasingly obvious to investors and commentators, required a very substantial movement in monetary conditions. Ninety-day rates rose from around 4.50 percent in February 1994 to almost 10.00 percent by the end of 1994, without any explicit policy adjustment by the Bank. By contrast, in a cash rate system, like those used in Australia and the United States, the authorities themselves had to take and announce concrete policy decisions to achieve the needed changes in short-term interest rates and monetary conditions. The distinction between the two is important but should not be overplayed. In a system with full inflation forecasts published every quarter the critical issue of assessing and reacting to the inflation outlook relative to the target range remains the same under any system of monetary policy implementation. One drawback of the current operating system is the lack of a reliable connection between the target quantities (settlement cash and primary liquidity) and ultimate variables of interest (inflation).

### Efficiency

Monetary policy is an intervention involving a government agency attempting to change private behaviour. Hence some efficiency costs can be expected, even if they are substantially outweighed by the wider benefits to society of central bank stabilisation of the price level. However, efficiency costs associated with the New Zealand system of policy implementation are relatively small. Banks receive 300 basis points below market rates for overnight settlement balances. However, the cash target has not exceeded \$30 million in recent years, against a

total deposit base in the banking system of around \$100 billion. Banks generally earn a lower yield on Reserve Bank bills than on other alternative assets, and discounting itself imposes a cost, but, again the magnitudes are small relative to the volume of business banks are able to conduct on this base of assets. One area in which the Bank has come in for criticism on occasions has been the efficiency with which policy intentions are communicated. The Bank has for example never given a precise indication of how much adjustment in conditions is required in response to a statement. As a result, overshoots or misunderstandings sometimes occur, triggering a second statement in relatively quick succession (although these occasions have been relatively infrequent).

Taking a medium to long-term horizon, the New Zealand system has worked relatively well. The control framework has evolved as our understanding of how monetary policy and financial markets work has changed and grown. The system has proved capable of ensuring an effective degree of monetary control without relying on direct restrictions on the market activities of individual institutions or groups of institutions or requiring the Bank to specify directly any particular interest or exchange rate. The big moves in interest and exchange rates have occurred in a manner appropriate to our policy objectives, although from a short-term perspective desired "fine-tuning" is sometimes difficult to achieve smoothly. The system has proved very good at signalling the direction of movement in conditions the Bank believes is necessary, although rather less good at signalling the appropriate magnitudes of movements in conditions. Against this must be set one of the key advantages of the current system; that the Bank does not have to take concrete decisions to initiate all major changes in short-term interest rates.

## Appendix 1

### OMO size and structure

Table 2 provides several examples of daily OMO calculations (to determine the amount of funds to be injected/withdrawn by the OMO). In each case a settlement cash target of \$5 million is assumed.

In Scenarios 1 and 2, the Bank needs to withdraw cash in the OMO. As discussed earlier, this will normally be achieved by the sale of Treasury bills. In determining the maturity of the Treasury bills to offer in the OMO, the Bank consults its cash flow forecasts to determine future dates where net cash withdrawals from the banking system are forecast to occur (ie, future days where a cash injection will be required). By selling Treasury bills to mature on these days - when they will provide an injection of funds to the banking system, the Bank is able fully or partly to offset the future liquidity withdrawal that is forecast.

The required OMO in Scenario 3 is a cash injection of \$150 million. This will normally be achieved by Repurchase Agreements, where the banks sell securities to the Reserve Bank in exchange for cash, with a later obligation to repurchase those securities. The maturity dates of the Repurchase Agreements are chosen to coincide with future dates where the banking system is forecast to have a surplus of cash (because the maturities will result in a withdrawal of cash from the banking system on a future date).

Under Scenario 4, Reserve Bank bills had been discounted at the end of the previous banking day. If these bills matured on any other day than the one for which the OMO is being conducted, then the Bank would normally offer to resell the bills (subject to a minimum volume of \$10 million of bills with more than one day remaining to maturity) to the banks, in order to restore the supply of primary liquidity and thus maintain a neutral stance with respect to monetary policy. However, to sell the bills will result in a withdrawal of cash from the banking system, on a day when, in this case, an \$85 million injection of cash is required. Hence, in order to maintain a neutral policy stance, a "two-way OMO" will be conducted. The Bank will offer to inject **net** \$85 million, withdrawing \$25 million via the sale of the previously discounted Reserve Bank bills and injecting \$110 million via Repurchase Agreements and/or the purchase of short-dated government bonds.

**Table 2**

	Example of OMO sizes, given:	Scenario 1 (\$m)	Scenario 2 (\$m)	Scenario 3 (\$m)	Scenario 4 (\$m)
1	Previous day's settlement cash balance, before discounting	5	0	30	-25
2	Discounting	0	0	0	25
1+2=3	Previous day's final settlement cash balance, after discounting	5	0	30	0
4	Forecast banking system receipts				
	- Govt expenditure (ie. DSW benefits)	150	75	25	0
	- Payments by Reserve Bank	15	5	0	10
5	Forecast banking system payments				
	- Maturing float tender loan	-125	-50	-200	-80
	- Misc. Govt revenue	-5	-15	0	-10
4+5=6	Net cash influence	+35	+15	-175	-80
3+6=7	Forecast settlement cash prior to OMO	40	15	-145	-80
8	OMO	-35	-10	+150	+85 (net)
7+8=9	Forecast settlement cash at end-of-day (after OMO)	5	5	5	5

## Appendix 2

Table 3 illustrates how the actual cash flows can differ from those forecast, and the implications for settlement cash on the day.

The net forecast error was + \$50 million in this illustration. This has resulted in an end-of-day aggregate settlement cash balance of \$55 million.<sup>15</sup>

If, by contrast, the forecast error for the day had been - \$50 million for example, then the aggregate settlement cash balance for the banking day would have been -\$45 million (the \$5 million cash target less the \$50 million error). Consequently, \$45 million of discounting would have been required.

**Table 3**

Example of settlement cash outcome, Scenario 4 (from Appendix 1)	Forecast (\$m)	Actual (\$m)	Error (\$m)
Settlement cash balance, previous day, after discounting	0	0	
Forecast banking system receipts			
- Govt expenditure (ie, DSW benefits)	0	45	45
- Payments by Reserve Bank	10	10	0
Forecast banking system payments			
- Maturing float tender loan	-80	-80	0
- Misc. Govt revenue	-10	-5	5
Net cash influence	-80	-30	50
Settlement cash (prior to OMO)	-80	-30	50
OMO	+85 (net)	+85 (net)	
Settlement cash at end-of-day (after OMO)	5	55	50

15 Depending on the size of the float tender, the banks may be able to offset some or all of this error by underbidding in the float tender.

## Appendix 3

Table 4 - Changes in monetary policy instrument settings since 1986

Date of change	Cash target (S million)	Discount margin (Basis points)	Reserve Bank bills - tender issue volumes (\$ million)	Interest rate paid on settlement account balances
24 Mar 1986	50			
24 Sep 1986	40			
3 Nov 1986	30			
2 Apr 1987	45			
8 Apr 1987	30			
27 Apr 1987	40			
12 May 1987	30			
2 Sep 1987	20			
7 Oct 1987		150 <sup>1</sup>		
7 Nov 1987	30			
29 Feb 1988	40			
23 Mar 1988	30			
2 Sep 1988			50 <sup>2</sup>	
12 Jun 1989	50			
13 Jun 1989	30			
1 Dec 1989	45			
5 Dec 1989	30			
22 Feb 1991 <sup>3</sup>	15	90 <sup>4</sup>	70 <sup>5</sup>	
21 Aug 1991	30			
22 Aug 1991	15			
25 Sep 1991	20			
18 Dec 1991				300 bpts below the 7 day cash rate <sup>6</sup>
6 Jan 1993		150		
7 Jan 1993	0			
11 Jan 1993	5			
18 Jan 1993	10			
27 Jan 1993	15	120		
3 Feb 1993	20	90		
11 Aug 1995	15			
25 Aug 1995	5			

<sup>1</sup> Prior to this, the discount margin had been 100 basis points for a number of years.

<sup>2</sup> Reserve Bank bills were introduced as the sole discountable instrument replacing short-dated government securities. Bills were initially issued in the tenders for a term of 91 days.

<sup>3</sup> These adjustments were part of an overall set of measures designed to improve the functioning of the interbank settlement market, and were 'technical' in the sense that they were not intended to have any impact on the stance of monetary policy, or on the level or structure of wholesale interest rates.

<sup>4</sup> At this time, it was noted that the discount margin was lowered from an 'effective' 120 basis points (bpts) to 90 bpts above comparable market rates. The difference between the previously announced 150 bpt margin and the 'effective' 120 bpt margin was due to the approximate 30 bpt difference between short maturity private sector and government security issues.

<sup>5</sup> The term of the bills was also reduced to 63 days.

<sup>6</sup> This rate had been calculated as 65 percent of the 7 day cash rate since late 1985. However, the effective penalty had been progressively reduced as interest rates fell. The change in calculation methodology largely restored the earlier intended penalty margin.

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