
Managing New Zealand's foreign reserves

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New Zealand holds foreign exchange reserves primarily to enable the Reserve Bank to intervene in the New Zealand currency market if serious liquidity problems were to develop. Holding reserves involves balancing a number of factors. We need to have assets that we can readily convert into cash in a crisis. But holding reserves costs money. We want to minimise that cost wherever possible, but we want to do so without exposing the Bank to undue financial risks. Much of this article is about how we balance these considerations and about the framework used to manage the risks associated with our foreign reserves operation. It also discusses our active management approach, undertaken with the objectives of reducing the risk-adjusted cost of holding reserves and enhancing our understanding of financial markets, and the relevant statutory provisions governing foreign exchange intervention and reserves.

1 Introduction

This article discusses the Reserve Bank's management of foreign exchange reserves. Section 2 briefly reviews the rationale for holding reserves in New Zealand. Section 3 explains how we structure our portfolio and describes our formal risk management framework.

2 Rationale for holding foreign reserves

Almost all countries hold foreign reserves, typically managed by the central bank. Many countries hold reserves to enable intervention to support their currency, or to limit currency volatility.¹

New Zealand differs from countries that have used foreign currency reserves to influence exchange rates. Since the New Zealand currency was floated in 1985, we have not intervened in the foreign exchange market despite having maintained the capacity to do so.

A previous *Bulletin* article² discussed the rationale for New Zealand holding reserves. That article concluded that, even for a country with a free floating currency, such as with the

New Zealand dollar, foreign reserves are necessary for three main reasons:

- The most important reason is that reserves provide an important policy option if New Zealand were ever to experience serious liquidity problems in its foreign exchange market. By helping to provide liquidity and restore order, foreign exchange intervention might help to limit the damage to the economy. The cost of holding foreign reserves is akin to the premium homeowners pay to insure their houses against fire. In both cases, the main financial benefit is realised only in rare and adverse circumstances (indeed, hopefully not at all).
- Investors may use a country's holding of reserves, at a reasonable level, as a crude proxy for financial health. Certainly, no country has chosen to hold none. Reserves may improve the perceived creditworthiness of New Zealand and thereby lower borrowing costs for its borrowers and increase foreign investor confidence in New Zealand.
- By managing reserves the Bank benefits from practical market experience and an enhanced understanding of financial markets, which is beneficial both in conducting monetary policy and in fulfilling the Bank's financial stability responsibilities.

The legislative authority relating to the Bank's reserves and foreign exchange intervention is covered in the box overleaf. That box also discusses the role of the Minister of Finance and shows the level of reserves that have been held over the last ten years.

¹ Other motivations may include: acting as a liquidity buffer in the event of a national emergency, improving resilience to meet crises arising from domestic or external shocks, meeting government foreign currency obligations, and acting as an investment fund to enhance national wealth.

² 'The rationale for holding foreign currency reserves,' Reserve Bank of New Zealand Bulletin, David Archer and Jerse Halliday, Vol 61 No 4.

Legislative authority, the role of the Minister and the level of reserves

Part II of the Reserve Bank of New Zealand Act 1989 (the Act) sets out some of the Bank's functions and powers. Some key sections relevant to foreign reserves and intervention are:

- *Section 16* gives the Bank authority to deal in foreign exchange. This section provides the Bank with broad powers to deal, as it thinks fit, in order to perform its functions and fulfil its obligations under the Act.
- *Section 17* gives the Minister of Finance (the Minister) power to direct the Bank to deal in foreign exchange, for the purpose of influencing the exchange rate or exchange rate trends. When such a direction remains in force, all foreign exchange dealing by the Bank must comply with this direction, notwithstanding the Bank's powers under Section 16.

The Minister has given the Bank a direction to cover the possibility that a crisis could appear in the market suddenly and the Minister could not be contacted. Under these circumstances, the Bank is directed to intervene if urgent action is required. In all circumstances the Minister would be briefed as soon as possible.

- *Section 18* gives the Minister power to fix exchange rates for foreign exchange dealing by the Bank.³
- *Section 21* makes the Crown (New Zealand Government) incur any foreign exchange gains or losses arising from directions by the Minister under section 17 or section 18.
- *Section 24* contains provisions relating to the level of foreign reserves. This section gives the Minister the

³ Section 19 deals with circumstances in which the Governor of the Bank may consider the Minister's directions under section 17 or section 18 to be inconsistent with the Policy Targets Agreement set under section 9 of the Act. The Governor is given the power to request new monetary policy targets to be fixed.

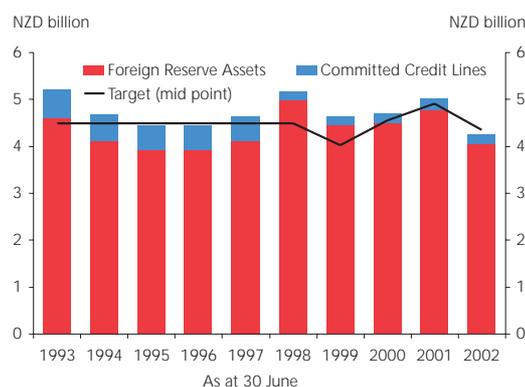
power, in consultation with the Bank, to determine the foreign reserves level or range.

In accordance with Section 24 of the Act, the Minister has specified a target range for the Bank's foreign reserves. This target range is specified in terms of an intervention capacity, which includes a modest committed credit line with the Bank for International Settlements.

The current range is specified in terms of a notional foreign currency, known as a Special Drawing Right (SDR), which is calculated in reference to a composite basket of major foreign currencies.

The target range has been set at SDR 1.45 billion to SDR 1.75 billion (which at current exchange rates equates to around NZ\$3.9 billion to NZ\$4.8 billion). Over recent years, the intervention capacity has generally been close to the mid-point of SDR 1.6 billion (NZ\$4.4 billion at current exchange rates). The graph below illustrates the intervention capability expressed in New Zealand dollars over the last 10 years versus the prevailing target midpoint.⁴

Figure 1
Level of foreign reserves



The level of reserves has remained largely unchanged since the late 1980s. The Bank has recently initiated a review of the suitability of the current level of reserves.

⁴ The level of reserves in this graph is less than those shown in the International Financial Statistics of the International Monetary Fund, as the IMF statistics include assets held (not for intervention purposes) by the New Zealand Treasury.

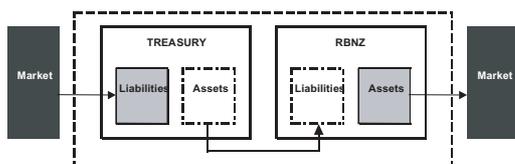
3 Structuring our portfolio

Given the policy decision to hold reserves, there are a number of important choices the Bank needs to make. Broadly, these reduce to balancing a desire for liquidity with a wish to keep the cost of holding reserves to a minimum, all without exposing the Bank to undue risk.

3.1 Borrowing to fund foreign reserves

The Bank funds foreign reserves by borrowing in foreign currencies from the Treasury, which borrows the funds it lends to the Bank (see figure 2). This approach helps to facilitate the Crown's management of its consolidated asset and liability exposures.

Figure 2
Funding the Bank's foreign reserves



The Bank's approach of borrowing in foreign currencies to fund reserves differs from that of most other central banks⁵, and has an important bearing on how we structure the composition of reserves we hold. We greatly reduce our exposure to market risk by matching up the interest rate and currency exposures of our reserve assets and funding liabilities. This approach virtually eliminates our exposure to currency movements and changes in the level of interest rates, but leaves us exposed to the spread between investing and borrowing rates.

Holding liquid reserves typically costs money. The cost of holding reserves becomes transparent when reserves are funded by foreign currency borrowing. The analogy of a householder having a mortgage and a credit balance in a cheque account illustrates the point. For the Reserve Bank, the interest rates paid on financing reserves will typically be greater than the interest rates we can earn by investing in highly liquid low risk assets in the world's major markets.

Funding reserves from foreign currency borrowing does have a potential downside. To maintain continuity of reserve holdings, maturing loans must be refinanced. The risk that a market disruption could impair the Bank's refinancing ability is managed by ensuring that loan maturities are adequately spread out over time.

3.2 Need for liquidity

The rationale for holding foreign reserves influences the type and nature of the reserves held.

The need to be able to restore order in the event of a crisis is a key determinant. Financial crises, by their nature, can occur with little or no warning. For example, a surprise event such as a major earthquake in New Zealand could adversely affect the liquidity of the New Zealand currency market. An outbreak of foot and mouth disease could be another potential cause, given the importance of agricultural exports to the New Zealand economy.

Since the float of the New Zealand currency, intervention has been conceived as occurring primarily in cases of "extreme disorder" in the currency market. This means that we cannot count on international markets functioning smoothly when we need to liquefy reserves.

For these reasons all our reserves are held in secure and highly liquid assets – assets that can be sold or lent out quickly at minimum cost, even in troubled times abroad.

If a financial crisis were to emanate from overseas, say from a terrorist attack or a technology outage, the effects might be concentrated in a particular country or exchange market. The Bank therefore requires adequate diversification of its

⁵ Reserves must be funded in some manner, as a central bank's assets must equal liabilities. As alternatives to borrowing in foreign currencies, reserves may be funded from domestic currency issuance or banks' holdings of settlement account balances at the central bank.

asset holdings across countries and types of security issuer, so that at least some reserves could be liquefied in a range of possible scenarios.⁶

3.3 Managing foreign reserves

In managing foreign reserves, the Bank aims to be able to meet the liquidity needs for any intervention in the New Zealand currency market. Subject to this over-riding objective, the Bank seeks to lower the net cost of holding reserves.

The Bank is also concerned about the year-to-year variability in this cost, which represents a risk – the greater the year-to-year variability in costs, the greater the potential for an adverse result in any given year.

There may be trade-offs between lowering the net cost of holding reserves and lowering the variability in this net cost. The Bank has therefore adopted an objective which combines risk and return into a single measure – reserves are actively managed in order to minimise the risk-adjusted net cost of holding reserves. This objective is equivalent to maximising the risk-adjusted net return.

The bulk of the Bank's reserves are held in the United States or Germany in a range of different financial instruments issued by public and private sector entities. We used to hold a portion of reserves in Japanese government bonds. This portion has been reallocated into the United States and German markets over the last couple of years due to growing concerns about Japan's economic difficulties.

We do not hold reserves in Australia or Asia given the possibility that a financial crisis affecting the New Zealand currency may arise as a result of a shock affecting the region. When deciding which reserve assets to hold, we, like other central banks, aim to hold assets whose value and liquidity will be affected as little as possible by shocks affecting the local market.

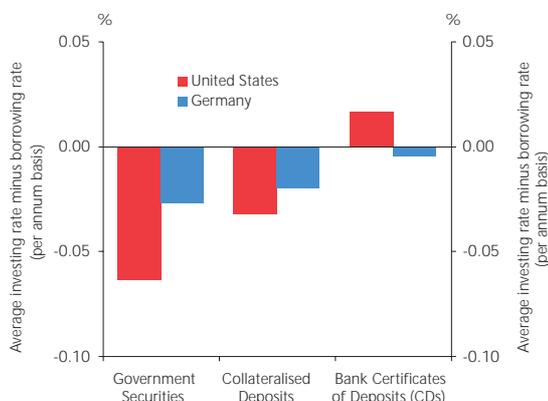
Most of our reserves are held in the following:

- United States or German government securities, such as bonds or Treasury Bills.
- Deposits with banks, denominated in US dollars or euro, where United States or German government securities are provided as collateral.⁷ This collateral provides protection in the event of default. Although bank deposits are generally not broken before maturity, we can readily raise cash in the interim by using the collateral held.
- Certificates of Deposit (CDs), issued by banks, denominated in US dollars or euro. These are marketable securities that can be on-sold before maturity. The small size of the Bank's holdings, relative to the size of the CD market, provides comfort that these securities offer adequate liquidity. Nevertheless, we consider CDs to be our least liquid "tier" of reserves and hold these on top of specified minimum holdings of government securities and collateralised deposits.

If liquidity were the only consideration, we would only hold government securities. If cost were the only consideration, we would only hold higher yielding assets, such as CDs. In practice, we strike a balance between these considerations by holding a mix of assets.

The following graph shows indicative borrowing costs over the year to 30 June 2002, for investments with a period to

Figure 3
Indicative borrowing costs



⁶ By holding reserves in a form that can be used in the event of a serious liquidity crisis we do not compromise our ability to implement any other approach to intervention the Minister of Finance may direct. For example, in normally functioning markets intervention may be financed in the foreign exchange swaps market - as the Reserve Bank of Australia typically does - without liquidating assets at all.

⁷ Although these are referred to as collateralised deposits in this article, technically they are reverse repurchase agreements. Under this arrangement the Bank has clear title to the securities and can use them freely before the maturity of the arrangement.

maturity of 3 months. The costs represent the average difference between the interest rate received from each type of investment, and the corresponding interest rate paid by the Bank on its funding. The more negative this difference, the greater the cost.

As this graph shows, government securities generally cost more to hold than collateralised deposits, and collateralised deposits cost more to hold than CDs. This reflects the lower rate of return generally obtained on government securities than on some other financial instruments, due to the lower credit risk associated with government securities.

The Bank imposes limits in order to strike a balance between minimising costs and maintaining adequate liquidity, security and diversification. These limits specify minimum holdings, but provide some discretion to respond to pricing considerations. Discretion applies to different types of investments in one currency and also to the choice between investing in the United States or Germany. For example, US Treasury Bills normally cost the Bank more to hold than collateralised US dollar loans. When this has not been the case we have responded by increasing our holding of Treasury Bills and reducing our holdings of collateralised deposits.

Over the years, we have sought opportunities to use different types of investments with a view to lowering risk-adjusted costs. For example, we hold a portion of euro denominated assets in medium-term investments issued by the Bank for International Settlements.

Earlier this year, the Bank shifted from holding longer-term US government bonds to holding short-dated US Treasury Bills. The corresponding loans were converted from a fixed rate to a floating rate basis at that time. We expect that over time, this change will help lower the average cost of holding US government securities. This change will also significantly reduce the year-to-year variability in our cost of holding reserves. This variability arises because the Bank has an accounting policy of revaluing assets to their current market value. The reason this variability has been reduced is that valuation changes diminish when interest rate exposures apply to a shorter period.⁸

⁸ The Bank views the expected reduction in average costs as the most important consideration. This is because the Bank typically holds reserve assets to maturity, in

3.4 Avoiding undue risk

To ensure that the Bank is not exposed to undue financial risk as a result of holding reserves we make three strategic choices:

- we finance the reserves by foreign currency borrowing;
- we match up the currency mix of our assets and liabilities (therefore reducing the risk of exchange rate loss); and
- we limit how much exposure we have to any issuer or counterparty (therefore reducing the risk of loss associated with the default of an issuer or counterparty).

Foreign exchange risk can be all but completely eliminated. Interest rate risk can be substantially reduced (the residual impact is discussed in the following section), so that our largest single risk is the probability of default by an issuer (ie credit risk).

3.5 Costs of holding foreign reserves

The costs of managing foreign reserves are shown in the Bank's Annual Financial Statements.

Some of the costs arise because the Bank must provide a range of services in order to provide this function. These include:

- operating costs directly associated with the management of reserves; and
- operating costs for other services that can be attributed to supporting the management of reserves, such as:
 - risk management;
 - settlements;
 - governance and oversight; and
 - accounting.

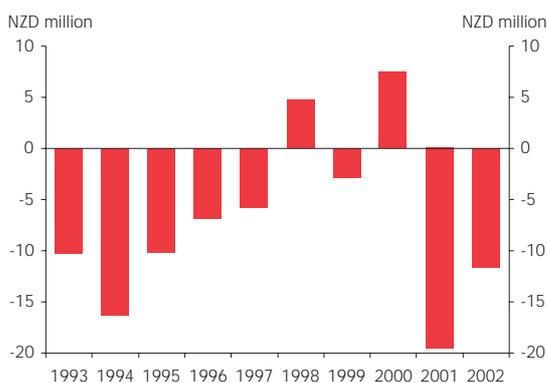
In total, the operating costs required to maintain the foreign reserves function have averaged \$1.8 million a year over the ten years to June 2002. This cost represents around 0.04 per cent of the average value of the foreign reserves held over this period.

which case the average cost of holding long-term bonds is "locked in" at the time of purchase, regardless of subsequent valuation changes.

Additional to these operating costs are the holding costs that arise because reserves usually cost more to fund than the earnings they generate. These holding costs have not been constant from year to year, mainly due to revaluation changes. These revaluation changes reflect incomplete matching of asset and liability exposures – in particular, changes in the spread between borrowing and lending rates.

The following graph shows the net returns from holding foreign reserves over the last ten years, excluding the impact of active management decisions, operating costs and risk charges. In this graph a negative net return equates to a cost of holding reserves.

Figure 4
Net returns from holding reserves



The average annual cost of holding foreign reserves shown in the above graph is \$7.2 million per year. This equates to around 0.15 per cent of the average value of the foreign reserves held over the period. The cost over the second half of this ten year period (0.09 per cent) was lower than over the first half (0.21 per cent).

3.6 Active management

The Bank undertakes a modest amount of trading in markets, based on expectations about future movements in interest rates and currencies.⁹

⁹ We have firm rules in place to limit trading in New Zealand markets and especially around Official Cash Rate (OCR) release dates.

For example, we seek to add value in exercising discretion relating to the timing of borrowing, and the period to maturity. These decisions are made in consultation with the Treasury. Another example is our recent use of a derivative security known as a bond index swap. Under this arrangement, we hold a portion of reserves in longer-term German government bonds, but receive returns linked to a floating rate benchmark. We expect this arrangement to cost less than the alternative of holding short-dated German government bonds.

To ensure accountability, we monitor and report the success or otherwise of active management decisions to the Governor, senior management and the Bank's Board of Directors. To identify the impact of active management decisions, we maintain a notional portfolio established using pre-defined rules. This notional portfolio represents a benchmark against which performance can be measured. To allow for the incremental risk arising from active management, risk charges are applied to the returns attributable to active management.

Much of the Bank's active management represents short-horizon or "trading" positions. To ensure the resulting profit and loss impact of these trades can be monitored, they are accounted for within a separate "portfolio". The activities within this trading portfolio generate interest rate and currency exposures limited by various constraints imposed by the Bank's overall risk management framework (which will be discussed in more detail in a subsequent section). In engaging in this activity, we seek to reduce the risk of losses by diversifying across the:

- types of exposures taken;
- time horizon over which positions are taken; and
- approaches used to generate positions.

One example of this diversity in approach is the use both of decisions made by individuals and also quantitative trading systems.

The Bank's active approach to management distinguishes it from some central banks, which for various reasons avoid taking active management decisions.

While our experience suggests we can add value through

active management, the Bank does not take this for granted and keeps its approach to the management of foreign reserves under review.

Over the ten years to June 2002, the value added from active management has averaged \$0.85 million per annum, net of all costs and risk charges attributable to active management.¹⁰ However, the value added over this period has not been even and the performance was generally worse over the latter half of this period. The Bank's experience may reflect a change in the environment for active interest rate and currency management. Investment surveys indicate that, as a group, global bond managers had a similar deterioration in performance over the latter half of this ten-year period.

Some central banks use external managers to manage a portion of their external reserves. Although not opposed to this idea in principle, we have not used external managers to date because we have not judged that doing so is likely to be cost effective.

The Bank does use an external party to run a securities lending programme. This programme allows the Bank to earn additional income by lending out securities that are in particular demand and investing the proceeds at higher yields, subject to specified exposure limits, without compromising the liquidity we need for intervention purposes.

3.7 The formal risk management framework

Holding and managing foreign reserves exposes the Bank to a range of risks, which are managed by a combination of:

- suitable governance arrangements;
- a framework which defines key risks, sets limits to control them, and monitors compliance; and
- transparent reporting of results and processes.

¹⁰ The operating costs attributable to active management were \$1.9 million per annum over the period. These costs are additional to the operating costs identified under Section 3.4. The Bank's Financial Statements show the combined operating costs in the Consolidated Statement of Cost of Services.

3.7.1 Governance

The Bank's powers, authorities and accountabilities are prescribed in the Reserve Bank of New Zealand Act 1989. The Bank's powers and authorities are vested in the Governor, who delegates appropriate authorities to relevant staff. The Bank conducts foreign reserves operations in accordance with a mandate from the Governor. This mandate, which has been in place since September 2000, specifies:

- the purpose of reserves management;
- objectives;
- the level of reserves;
- performance expectations;
- risk management policies; and
- key management responsibilities and delegations.

The Head of Financial Markets is accountable to the Governor for the performance of the Foreign Reserves Group (responsible for the management of the reserves) and Risk Unit (responsible for advice on the risk framework used for foreign reserves). The Chief Financial Officer heads the Financial Services Group, which is responsible for "back office" operations such as settlements, financial accounting, and also for risk and exposure reporting.

Other departments and committees also play an important role:

- The Risk Assessment and Assurance Department (RAA) participates in high level strategic reserves management issues, acting as the Governor's adviser on risk frameworks across the Bank's activities. This department also contains an internal audit function.
- The Reserves Oversight Committee (ROC), which is made up of the Governor, Deputy Governor and senior managers, reviews the appropriateness of the reserves portfolio structure, approves the use of new types of investments, and monitors investment performance.
- The Risk Management Committee (RMC), which is made up of Governors and senior managers, reviews the risk management arrangements in respect of all the Bank's operations, including reserves management.

The Bank's Board of Directors (largely non-executive) advises the Governor with respect to matters relating to the Bank's functions and the exercise of its powers. Management reports to the Board monthly on the financial results of reserves management. The Board's audit committee, which is chaired by a non-executive director, also meets regularly and monitors audit and accounting matters relating to reserves management.

3.7.2 *The Bank's risk management framework*

A summary of the key risks, and how the Bank manages these risks is as follows:

- *Political risk* represents the risk of damaging the Bank's reputation by making losses from investing in shares, complex investments, or in less developed markets. To manage this risk, investments are restricted to "plain-vanilla" interest rate investments, and some derivatives. At present, we restrict derivative exposures to interest rate futures, and currency and interest rate swaps. No investments are permitted outside developed countries and markets.
- *Liquidity risk* represents the risk that reserves could not be liquefied as rapidly as needed for intervention purposes. To manage this risk, we hold only liquid assets and we apply limits specifying minimum exposures by country and security type. These limits require not less than one third of the reserves to be held in government securities, and not less than two thirds in a combination of government securities, collateralised deposits and investments with the Bank for International Settlements (with Certificates of Deposit issued by banks confined to the balance).
- *Credit risk* represents exposure to default, bankruptcy, and marked-to-market losses associated with any perceived deterioration in creditworthiness. This risk applies to entities we invest with (for example CD issuers) and also the entities used to facilitate investment transactions.

Credit risk is managed within a ratings-based limit framework. This approach forces diversification and ensures an automatic response to changes in

creditworthiness. Exposure limits specify maximum exposures to individual entities, based on long-term credit ratings. These limits are calibrated so the exposure to any non-government entity is limited to the Bank's capital. The maximum limit permitted for non-government entities with the highest credit rating is \$350 million, but limits are scaled down for entities with lower credit ratings. Exposures are not permitted to entities with a rating below A-. Limits also apply to groups of exposures, such as entities within the same country.

- *Market risk* represents exposure to changes in the market value of investments. The market value of investments can vary, due to changes in interest rates and foreign currency values. The Governor has specified a tolerance for loss from market risk of not more than \$50 million from active management and \$50 million from underlying (benchmark) exposures in any financial year.¹¹ These "worst case" tolerances include times of extreme global financial market crises.

To keep maximum losses within the Governor's tolerance range, the Bank imposes limits based on a statistical measure of exposure to market risk. These limits are based on a widely used measure known as Value at Risk (VaR). Separate limits apply to the total portfolio and also to relevant sub-components.

The Bank recognises that, in extreme events, losses can be many times the losses generated in more normal conditions. The Bank has therefore built a significant "safety factor" into the levels chosen for its VaR-based limits. The safety factor has been chosen after consideration of extreme financial market stress scenarios.

"Stop loss" limits close down trading positions if aggregate losses from these activities exceed \$9 million in any rolling 20-day trading period. It is then up to the Governor to decide whether positions are to be re-established.

¹¹ **The Bank is less concerned about valuation changes that represent an increase in costs now, but imply lower costs in the future if assets are held until maturity. This does not apply to losses from active management where there is no expectation that losses will be recouped in the future.**

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- *Operational Risk* represents the risk of losses due to a failure to maintain continuous intervention capacity, or losses due to fraud, error or oversight. In order to maintain continuous intervention capacity, the Bank maintains processes relating to data integrity, disaster recovery planning (including offsite capacity), and key person risk.

The Bank has in place a number of operational controls to minimise the financial and reputational damage from fraud. These include:

- separation of front and back office functions;
 - logged dealer phones;
 - tracking of deal tickets;
 - transaction and position reconciliation across profit and loss, and risk reporting; and
 - confirmation and settlement instruction matching with counterparties.
- *Refinancing risk* is the risk of the Bank experiencing disruption when rolling over maturing loans. To mitigate this risk, the Bank limits the concentration of funding requirements in any twelve month period.

The Bank's risk management framework is subject to regular review, including by the Bank's RAA department. External audit also provides a further layer of review, as does the regular monitoring by the Bank's non-executive directors.

4 Conclusion

Although the Bank has not intervened in the New Zealand currency market since the New Zealand dollar was floated in 1985, it has maintained the capacity to do so. In managing foreign reserves, the Bank must meet its overriding objective of being able to meet the liquidity needs for any intervention.

There are good public policy reasons for holding reserves and the management of reserves is an important function for the Bank. To support this function, the Bank provides a range of services. These cover the spectrum, from governance and oversight through to settlements and accounting.

In managing its reserves, the Bank strikes a balance between maintaining liquidity and minimising costs. The Bank has been successful in finding ways to reduce holding costs by restructuring assets and utilising new instruments.

Holding and managing foreign reserves exposes the Bank to a number of significant risks. The Bank has implemented a sound structure to manage and control these risks.