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# Foreign currency reserves: why we hold them influences how we fund them<sup>1</sup>

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This article reviews New Zealand's approach to funding foreign currency reserves: a mix of holding foreign currency assets funded by outright purchases of foreign exchange, borrowing foreign currency long term to fund foreign currency assets, and swapping local currency assets for foreign currency assets for a long term. The use of borrowed and hedged reserves is unusual, but not unique, among floating exchange rate countries with liberalised financial markets. We consider the reasons for holding reserves, and the connection between these reasons and the costs and benefits of each of the funding options that New Zealand has chosen.

## Introduction

Almost all countries hold foreign currency reserves. Doing so provides options – a self-insurance of sorts – that would not exist so readily in the absence of reserves. What options a country wishes to provide for will in turn depend on a number of other choices.

For a country with a fixed exchange rate and free cross-border capital flows, a large stock of reserves may be required to maintain the desired exchange rate. In that case, reserves help limit foreign exchange rate risk as well as ensuring the availability of foreign currency to facilitate cross-border transactions.

For an advanced country with a floating exchange rate, a much smaller stock of reserves is typically required. Intervention in the exchange markets is infrequent in these economies, and the primary reasons for holding reserves may relate to the risk that extreme market disorder could compromise the functioning of the foreign exchange markets in ways that create difficulties for the real economy of the financial system. Not all advanced floating exchange rate economies have a modest level of reserves, but most do. New Zealand is one of those countries.

The intended uses of foreign currency reserves, in turn, have influenced the approach New Zealand has taken to funding those resources. Different funding approaches have different characteristics, particularly in

terms of rollover risk, influence on the foreign exchange market, and cost.

This article outlines the statutory framework for holding reserves in New Zealand, and how that has translated into the relatively unusual approach taken in New Zealand to financing the foreign reserves held as foreign exchange intervention capacity.

## 1 Foreign currency reserves: insurance against what?

*The monetary policy framework and exchange rate regime: a brief history*

The so-called monetary policy “trilemma” (figure 1, overleaf) is one lens through which we can understand the role of foreign currency reserves. The monetary policy trilemma<sup>2</sup> states that it is impossible to have all three of the following at the same time:

- a fixed nominal exchange rate;
- an independent monetary policy; and
- free capital movement.

For decades prior to 1985, New Zealand's economy was quite highly regulated and the New Zealand dollar exchange rate was fixed (but adjustable from time to time). Foreign reserves were held by the Reserve Bank and the Treasury, and were used routinely to maintain and manage the fixed exchange rate. For most of the period,

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<sup>1</sup> A broader paper related to this one was presented at the conference *Financial Regulations on Capital Flows and Exchange Rates*, organised by the East West Center and the Korea Development Institute, 19-20 July 2012, and will be published in a conference volume.

<sup>2</sup> The idea, also known as the “impossible trinity”, goes back to at least the work of Mundell in the 1960s. Obstfeld, Shambaugh and Taylor 2005 find the constraints implied by the trilemma to be largely borne out by history in the sense that floating rate countries have greater short term interest rate independence.

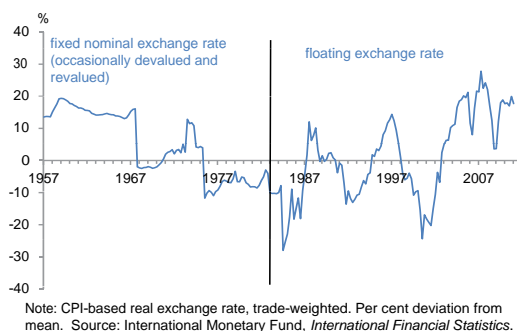
Figure 1  
The trilemma



and until just three months prior to the float, private capital flows were tightly restricted, and short-term private capital inflows were largely prohibited.

In principle, this combination of capital controls and a fixed nominal exchange rate implied a good degree of control over both inflation and the exchange rate. In practice, that control was exercised in a way that meant that inflation was high throughout the 1970s and early 1980s, and even during the fixed exchange rate period, the real exchange rate tended to be quite variable (Figure 2) as a result of devaluations, occasional revaluations and differences between domestic and foreign inflation.

Figure 2  
Real trade-weighted New Zealand dollar exchange rate



New Zealand's current approach to foreign reserves was formed in the late 1980s, in the context of far-reaching public sector management and financial reforms, including the 1985 move to a freely floating exchange rate. The move to a floating exchange rate was an integral part of securing domestic monetary control and ending New Zealand's protracted period of high inflation. By the late 1980s, the choices New Zealand had made in terms of

the trilemma were fairly clear: the nominal exchange rate had been freed to float; capital flows had been liberalised; the 1989 Reserve Bank of New Zealand Act established domestic price stability as the objective of monetary policy (figure 1).

*The primary role for reserves: extreme disorder in foreign exchange markets*

Among New Zealand policymakers in the late 1980s, there was a strong predisposition to be sceptical of the ability of the authorities to reach a better judgement than the market about appropriate financial market prices (interest rates<sup>3</sup> or the exchange rate), and a sense that most swings in the real exchange rate reflected changing real economic factors, so played a valuable buffering role. Accordingly, little weight was put on the possibility of intervening in the foreign exchange market to influence the level of the exchange rate.

Against that background, the possibility of foreign exchange intervention was envisaged only in cases of "extreme disorder", when effective liquidity in the New Zealand dollar foreign exchange market had (all but) disappeared. Such a situation might arise because of a severe imbalance between supply and demand for New Zealand dollars (a common hypothetical scenario was an announcement of foot and mouth disease), or a market shutdown due to technical factors or severe counterparty credit risk. The focus of intervention for extreme disorder, if it had been required, was always envisaged as assisting to restore trading in the market, and ensuring that essential transactions could be conducted. The aim was not envisaged as being to defend a particular rate, nor to slow an orderly decline in the value of the currency.<sup>4</sup>

Foreign exchange business in the New Zealand dollar markets reflects a wide variety of factors. Foreign trade

<sup>3</sup> It was not until 1999 that the Reserve Bank adopted a short-term interest rate (rather than quantitative tools) as its principal monetary policy tool.

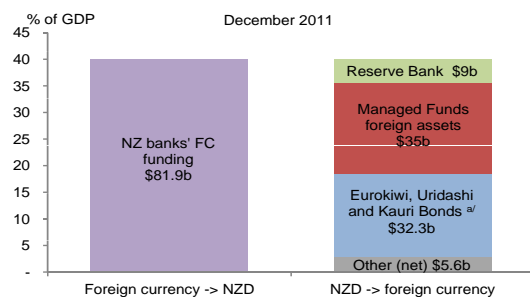
<sup>4</sup> The Reserve Bank of New Zealand Act 1989 provides power for the Minister of Finance to direct the Reserve Bank to intervene in the foreign exchange market, and provides the Minister with the power to (transparently) direct the Bank to fix the exchange rate. No such request has been made. It has, however, always been planned that foreign exchange market intervention to counter extreme disorder would be done under a ministerial direction (and associated delegations) because of the fiscal implications of any gains or losses from such intervention.

transactions have to be paid for, generating business on both sides of the spot and forward markets. Capital flows dominate foreign exchange trading volumes and can take a variety of forms. There are many shorter-term speculative positions, affecting both the spot and foreign exchange swap markets (the largest chunk of turnover is through the short term foreign exchange swap market). And there are significant longer-term balance sheet positions to be funded and/or hedged.

In respect of balance sheets, the main parties with natural long-term positions wanting to swap foreign currency into New Zealand dollars are resident banks. The banks raise foreign currency funding (totalling about 40 percent of GDP) that is then swapped into New Zealand dollars to on-lend to households and firms in New Zealand dollars.

On the other side of the swap market, the main sources of New Zealand dollar funding are (i) non-resident entities who issue New Zealand dollar denominated bonds (often referred to as Eurokiwi, Kauri and Uridashi bonds) when it is cheap relative to funding from other currencies (net of the cost of swapping the proceeds into foreign currency to meet their end-uses); (ii) the managed funds industry that holds foreign assets, but hedges some of the associated currency risk to match their New Zealand dollar liabilities; (iii) and the Reserve Bank which obtains foreign currency liquidity by swapping New Zealand dollars for US dollars to obtain foreign currency liquidity (discussed in the next section). Each of those parties relies, to a greater or lesser extent, on the continued functioning of those markets

**Figure 3**  
Major participants with natural long-term positions in New Zealand dollar swap market

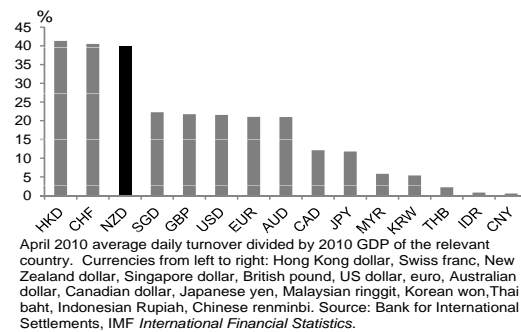


a/ Outstanding Eurokiwi, Euridashi and Kauri bonds reached \$60.8b in 2007. Source: Bloomberg, Reuters, Reserve Bank of New Zealand.

The health of the institutions that make markets in foreign exchange products also matters to the resilience of the market. Heightened perceptions of risk, or large realised losses, can lead market makers to reduce their risk limits, and the ability of the markets to function in an orderly way. The New Zealand dollar markets benefit from a diverse set of market makers in terms of time zones, jurisdictions and ownership, although diversity probably also exposes the New Zealand dollar foreign exchange markets to a wider set of shocks.

All else equal, a more “liquid” market might be expected to be more robust in the face of shocks than a less liquid market. Turnover in the New Zealand dollar market is high relative to the (small) size of our economy. The New Zealand dollar was the 10th most traded currency in the 2010 BIS Triennial Survey, despite New Zealand’s small size. Average daily New Zealand dollar turnover in global foreign exchange markets in April 2010 was almost 45 percent of New Zealand’s annual 2010 GDP (figure 4).

**Figure 4**  
Average daily domestic currency turnover (% of annual GDP)



April 2010 average daily turnover divided by 2010 GDP of the relevant country. Currencies from left to right: Hong Kong dollar, Swiss franc, New Zealand dollar, Singapore dollar, British pound, US dollar, euro, Australian dollar, Canadian dollar, Japanese yen, Malaysian ringgit, Korean won, Thai baht, Indonesian Rupiah, Chinese renminbi. Source: Bank for International Settlements, IMF International Financial Statistics.

The absolute size of the New Zealand dollar market is, however, small relative to major currencies; New Zealand dollar short term volatility is typically relatively high; and a large share of the turnover arises from non-resident participants with no natural reasons to be holding New Zealand dollar positions. Turnover and effective liquidity can fall sharply during crises, and markets that had previously appeared robust became stressed during the Global Financial Crisis.

Through some testing periods over almost three decades, there has been no intervention to counter

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extreme disorder in foreign exchange markets in the post-float period. The foreign currency market has continued to function adequately despite periods of very high short-term volatility, sometimes thin markets, big cyclical swings in the exchange rate, New Zealand's high external financing requirement, and external crises during the late 1990s and late 2000s.

The 2008 (global) US dollar shortage provides a useful example of the effects of severe one-sided pressures on the New Zealand dollar market (see Fender and Von Peter 2009). After the Lehman bankruptcy, there was a general rise in uncertainty and fall in risk appetite, a flight to quality (USD assets in particular), and rising concern about the creditworthiness of many global banks. New Zealand dollar turnover in the domestic market declined by about 25 percent from its pre-crisis level. Over the fourth quarter of 2008, the value of the New Zealand dollar fell by 25 percent against the USD and 22 percent on a trade-weighted basis. The well-hedged nature of New Zealand's financial liabilities meant there were no material adverse economic or financial effects from that large depreciation.

Hedging markets also continued to function effectively during the crisis. Like many borrowers, New Zealand banks found it relatively more difficult and costly to raise foreign currency funding, but initially relatively cheap to swap (into New Zealand dollars) the USD funding that they did raise. In addition, the sharp depreciation of the New Zealand dollar reduced banks' refinancing requirements in USD terms (New Zealand bank loan books are almost entirely in New Zealand dollar terms).<sup>5</sup> For parties on the other side of the market it quickly became very expensive to swap into US dollars. The Reserve Bank established a precautionary swap facility with the US Federal Reserve, but this was not activated during the crisis period.

The historical robustness of the foreign exchange markets may suggest little need for reserves, but each crisis is different and, at times, even markets that were assumed always to be robust have become dysfunctional. Over the floating exchange rate period, there has not been a crisis centred on New Zealand specifically, but it

would not be prudent to assume that New Zealand will never face such a situation and the associated potential for dysfunctional markets.

#### *A secondary role: exchange rate overshooting*

From the floating of the exchange rate in March 1985 to March 2004, the Reserve Bank's intervention mandate was limited to restoring functioning in foreign exchange markets. Faced with the experience of large real exchange rate fluctuations - probably larger than most had expected when the exchange rate was floated - there has been some shift in views over the floating exchange rate period regarding the role of foreign exchange market intervention.

In 2004, the Reserve Bank's foreign exchange intervention mandate was broadened to include the potential to lean against (on a modest scale) extreme cyclical peaks and troughs in the exchange rate that are judged inconsistent with underlying economic fundamentals (see Eckhold and Hunt 2005). The 2004 policy recognises that, even when markets are liquid, market dynamics can result in deviations between the exchange rate and medium-term fundamentals.<sup>6</sup>

In some instances when the exchange rate is both exceptional and not well explained by macroeconomic fundamentals, there may be scope for intervention within bounds agreed with the Minister of Finance. All else equal, limiting intervention to periods when the exchange rate appears to be well away from long-run average levels and not well explained by fundamentals, probably increases the chances of subsequent adjustment back towards a longer-term average.

The Reserve Bank first intervened in the foreign exchange market on the basis of the 2004 policy, in 2007.<sup>7</sup> Figure 5 shows the monthly net New Zealand dollars purchased or sold by the Reserve Bank. The foreign currency purchases in 2007-8 occurred at a time when the New Zealand dollar was unusually strong and there

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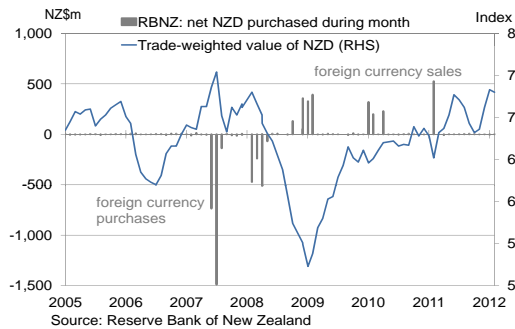
<sup>5</sup> Funding pressures were also eased by sovereign retail and wholesale funding guarantees and by local currency liquidity provision by the Reserve Bank.

<sup>6</sup> See <http://www.rbnz.govt.nz/finmarkets/foreignreserves/intervention/0147012.html>.

<sup>7</sup> Interventions are typically not announced at the time (an exception was made for the first time in 2007), although monthly data on the Bank's foreign currency position are published at the end of the month following the intervention.

was concern about speculative exuberance despite signs of a slowing economy and growing uncertainty in financial markets.

**Figure 5**  
Net foreign currency sales



Foreign currency purchases over the 2007-8 period also served a second objective. It had been decided that the Reserve Bank would shift some of its foreign currency reserves to an open (unhedged) position (more on this in section 4). So the foreign currency purchases contributed to that shift in composition. Although subsequent repurchases of New Zealand dollars in 2009-2010 occurred at an opportune time in terms of pricing, they were not intended to influence the market.

## 2 Official reserves and foreign currency liquidity

The potential need to counter extreme disorder in foreign exchange markets, probably with quite short-term intervention positions, remains the dominant factor in the Reserve Bank's demand for foreign reserves. The capacity for intervention under the 2004 policy is modest, especially by comparison with the level of turnover in the market. Only intervention to address a shortage of foreign currency in the market requires us first to have secured foreign currency liquidity. Interventions to provide domestic currency to the market (purchasing foreign currency) can be done by a central bank at will.

New Zealand's total official reserves, as reported (for example) on the Reserve Bank's website, are typically much larger than the effective amount of intervention capacity the Bank has. Following the crises of the 1990s, the IMF revised its data collection on foreign currency

resources to make a distinction between official reserves and "foreign currency liquidity". "Official reserve assets" is a gross balance sheet concept. that does not necessarily account for all foreign currency resources that may be available, and does not account for predetermined and contingent drains on reserve assets. Since 2005, the reporting under the IMF template on international reserves and foreign currency liquidity accounts for those factors. Our own focus internally, and in discussions with the Minister of Finance, has been primarily on a target level of effective intervention capability, not on gross reserves per se.

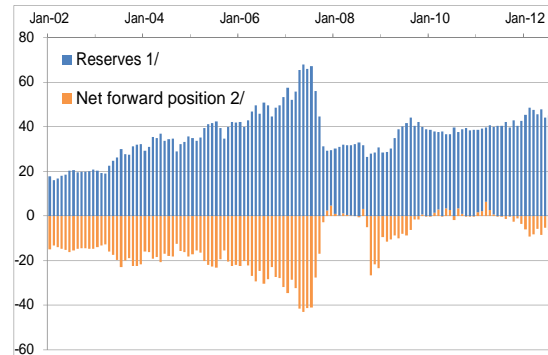
Figure 6, overleaf, shows official reserve assets (ex gold) plus the predetermined 12-month net forward position for several countries.

In New Zealand's case, the difference between total reserves and intervention capacity (and hence New Zealand's relatively large net short forward position) reflects two factors. One is the use of short-term foreign currency swaps in Reserve Bank domestic short-term liquidity management operations. During the late 1990s and early 2000s, the New Zealand government ran surpluses that reduced gross sovereign issued debt to about 15 percent of GDP. In response to the scarcity of government paper available for normal domestic liquidity operations, the Reserve Bank began accepting foreign currency collateral on which it could achieve better pricing. As a result, foreign currency assets on the Reserve Bank's balance sheet rose. This increased "official reserve assets" but those foreign currency assets are not thought of nor reported as intervention capacity – the swaps were typically quite short-term in nature, and the foreign exchange collateral had to be able to be returned at maturity to the institution that had borrowed New Zealand dollars from the Reserve Bank. The predetermined drain associated with the foreign exchange swap liquidity operations is reflected in the IMF template as a net short position. The foreign exchange swaps, driven solely by day-to-day domestic liquidity management considerations, account for the bulk of New Zealand's net short forward position, including most of the variation.

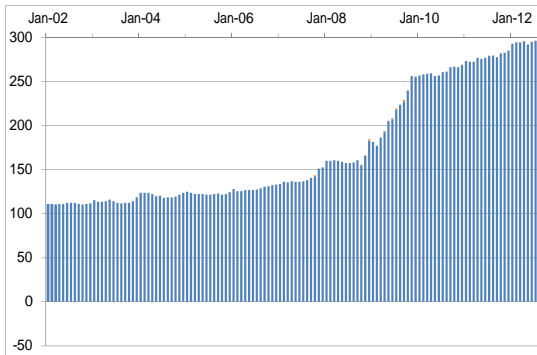
The second factor that contributes to a net short

Figure 6  
 Foreign currency reserves and net forward  
 positions  
 (billions of US dollars)

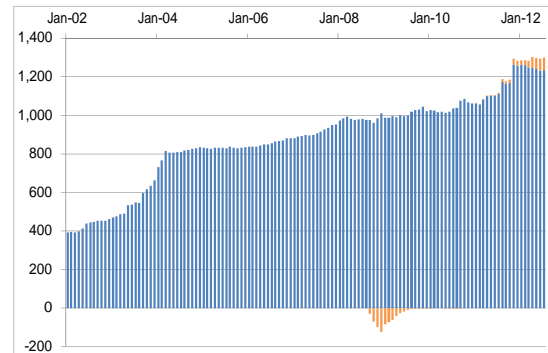
Australia



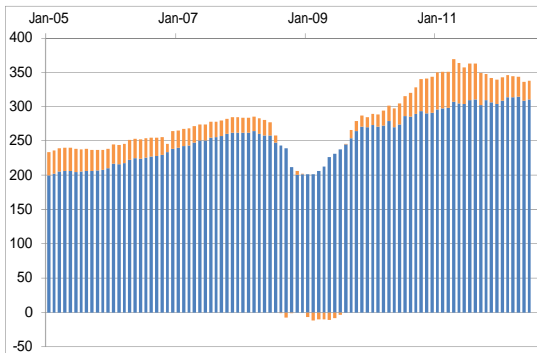
Hong Kong



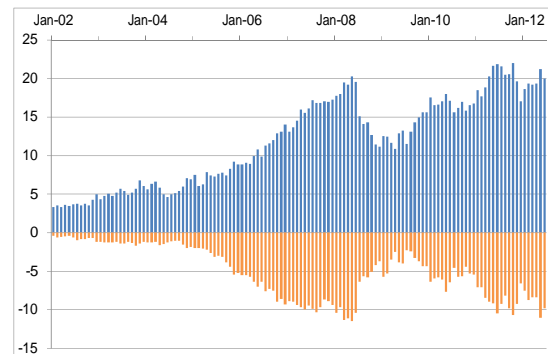
Japan



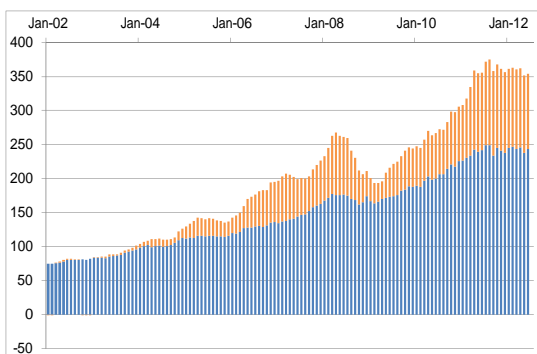
Korea



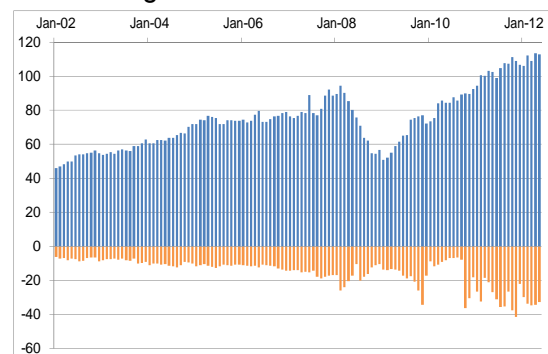
New Zealand



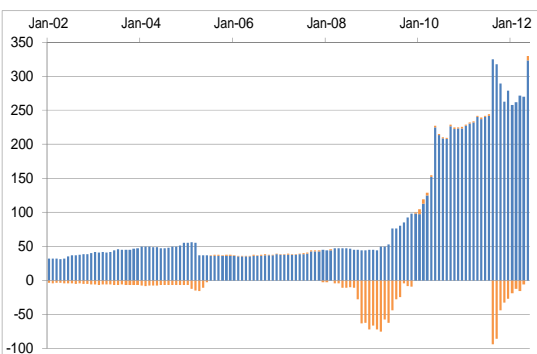
Singapore



United Kingdom <sup>3/</sup>



Switzerland



Source: IMF International Reserves and Foreign Currency Liquidity.

1/ Official reserves excluding gold. 2/ Twelve-month long position in forwards, futures and swaps vis-à-vis the domestic currency minus short positions. 3/ Includes HM Treasury and the Bank of England.

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forward position is the way that some of the Reserve Bank's intervention capacity (foreign currency liquidity) is funded.

### 3 Funding foreign currency liquidity

The objectives of intervention policy and institutional responsibilities have materially influenced thinking about the structure and financing of reserves holdings. A key aspect of the institutional reforms of the 1980s, of which the 1989 Reserve Bank of New Zealand Act was an integral part, was to decentralise responsibility to public sector agencies and their chief executives, and then to hold those agencies to account for their performance (financial or otherwise).

In terms of foreign exchange management, foreign exchange intervention reserves were centralised on the balance sheet of the Reserve Bank,<sup>8</sup> and the Bank was held responsible for its own financial results, including foreign exchange risk associated with its holding of foreign currency reserves.<sup>9</sup> As part of that shift, a decision was made to hedge the foreign exchange risk on the Bank's balance sheet. Doing so removed the largest source of variance in the central bank's own financial results. At the time, the Treasury itself was moving towards immunising all foreign exchange risk on the central government balance sheet.

#### **Borrowed reserves**

The foreign exchange risk on the Bank's reserves portfolio was initially shed by, in effect, assigning some of the Government's then medium- and long-term foreign currency loans (typically 5 to 15 years) to the Reserve Bank. The Treasury lent to the Reserve Bank on much the same terms as it had raised the funds. The Reserve Bank then held the funds in liquid assets across a range of currencies. This approach eliminated foreign exchange

risk from the Bank's balance sheet. We refer to this approach as "borrowed reserves".

Borrowing to fund foreign currency liquidity reduced currency risk, but it generated refinancing risk because the foreign currency borrowing needs to be refinanced as it matures. In the event that such reserves are used, the foreign currency needs to be repurchased to repay the foreign currency debt as it comes due. In the framework of the IMF template, for example, the debt repayment becomes a predetermined drain on foreign currency liquidity when it has a residual maturity of less than a year.

How serious this refinancing risk is depends largely on the maturity of the borrowings and on the likely term of intervention positions. If all the borrowing matured within three months, the foreign currency assets would provide very little effective intervention capability – the authorities would have to be constantly conscious of the need to reverse any interventions very quickly. In contrast, if reserves were funded by issuing 100 year debt, the predetermined drain would be insignificant. In New Zealand's case, the refinancing risk was managed by the Reserve Bank by requiring that no more than 20 percent of the value of the loans would mature in any 12 month period. The portion of the reserves equivalent to the funding due to mature within a year was not counted as effective intervention capability.

Borrowing reserves requires a higher level of gross reserves to achieve the same desired degree of foreign currency liquidity, but there are some offsetting advantages. The reported variance in the value of the Reserve Bank's balance sheet is much reduced (since foreign exchange risk is typically a large source of variance), reducing the amount of capital the government needs to set aside for Bank operations. In addition, the expected cost of holding reserves tends to be quite modest and relatively stable: the holding costs (or "carry costs") of borrowed reserves is the (typically small) margin between the government's foreign currency borrowing cost relative to the return on foreign currency paper held. The fact that intervention to counter extreme disorder in market functioning were envisaged as being quite short-term in nature also increased the alignment of the funding strategy with the reasons for holding reserves.

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<sup>8</sup> The Treasury maintained some foreign currency assets, but these were principally for its own liquidity management purposes.

<sup>9</sup> While the Reserve Bank bears the financial risk associated with the foreign reserves on its balance sheet, the broad level of foreign reserves held by the Bank is set by the Minister of Finance and reviewed from time to time. In practice the range is fairly wide.

## Hedged reserves

The development of the New Zealand dollar cross-currency basis swap market in the 1990s enabled an alternative means of funding foreign currency liquidity. Instead of borrowing in foreign currency (through the government), local currency resources could be swapped into, say, USD (through the cross-currency swap market),<sup>10</sup> and US dollar proceeds held in liquid assets. We refer to this form of funding foreign currency liquidity as “hedged reserves”.

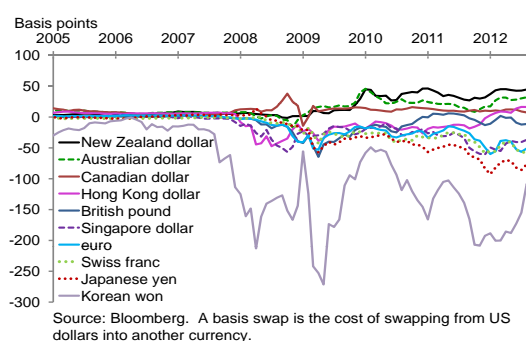
By the mid 1990s, the New Zealand government had achieved a net zero foreign currency debt position, and had ceased borrowing in foreign currency for its own purposes.<sup>11</sup> Any use of international borrowing markets by the Treasury was to finance the Reserve Bank’s holdings of foreign reserves. For a time Treasury generated funding for the Bank’s reserves by issuing more domestic debt and undertaking cross currency swaps itself. However, successive governments used gross public debt targets as a key part of their fiscal management and accountability framework. The target framework meant that taking on additional gross debt to finance reserves became a point of tension, especially when the target level of foreign reserves was raised.

However, the Reserve Bank had large holdings of government bonds on its balance sheet; traditionally the counterpart to the physical currency issue and the Bank’s equity capital. The return on five- to ten-year New Zealand government bonds fell through the early 2000s about 100 basis points below swap in the domestic market. The Bank could capitalise on the high market demand for government debt by swapping out of its government bonds using the proceeds to fund USD directly.

Hedged reserves funded directly from our own balance sheet have been the predominant approach to refinancing

foreign currency liquidity since 2007. The insurance properties of “hedged reserves” are similar to those of “borrowed reserves” in terms of the pre-determined drain on foreign currency liquidity. The Reserve Bank has to return the foreign currency (and receive back New Zealand dollars) as the swaps mature. Again, this risk has been managed by ensuring that typically no more than 20 per cent of the gross position reverts to New Zealand dollars in a given year. This approach also involves modest (collateralised) counterparty credit risk associated with the cross-currency swap. The balance of supply and demand in the cross-currency swap market during a crisis is an important consideration when considering refinancing hedged reserves. Refinancing could be problematic if there were excess demand to swap out of New Zealand dollars, in which case refinancing hedged reserves could further stress the cross-currency swap market, compromising the smooth operation of that market. Although that was not the case in 2008/9 (the basis swap was remarkably stable relative to other countries (see Figure 8), it is important that foreign currency liquidity is available from other sources such as the open position or the option to tap foreign currency markets directly through government borrowing.<sup>13</sup>

Figure 7  
Five-year cross currency basis swaps



<sup>10</sup> Under a cross currency swap, foreign currency funding is exchanged for New Zealand dollar funding for the duration of the swap. At swap maturity, the New Zealand borrower (typically a bank) returns the NZD funding to the swap counterparty and receives its original foreign currency funding with which it repays the underlying foreign currency debt. For explanations of why borrowers engage in such “synthetic” local currency funding, see Munro and Woodrige (2009).

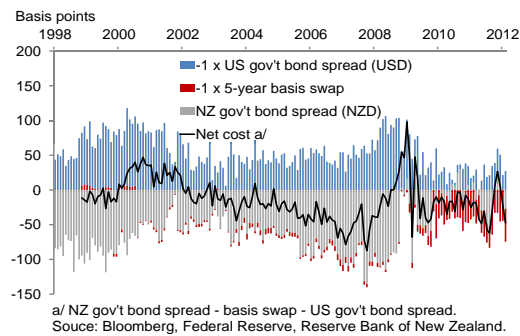
<sup>11</sup> Some long-term debt could not economically be bought back early, and was hedged with a “defeasance portfolio” of foreign currency assets held by The Treasury.

<sup>13</sup> From 2009, the pressures in the cross-currency swap market reversed. Issuance of NZD denominated bonds by non-residents declined sharply. As outstanding bonds have matured, the value of non-resident issued NZD bonds outstanding has declined from a peak of about NZ\$57 billion in 2007 to \$22 billion in December 2011. This decline in supply of NZD into swap markets drove up the cost to New Zealand banks of swapping foreign currency into New Zealand dollars (the basis swap), in turn driving up bank funding margins (relative to the official cash rate). In that case refinancing of Reserve Bank hedged reserves serves to ease pressures in the market.



Indicative costs of hedged reserves are shown in Figure 9. There are three relevant spreads: the spread between New Zealand government bond and the interest rate swap, the spread between say a US government bond and the interest rate swap, and the cost of exchanging the New Zealand dollar funding for US dollar funding, the so-called “basis swap” over the same period.<sup>14</sup>

**Figure 8**  
Indicative costs of five-year hedged reserves



During the 2008-9 crisis, the cost of refinancing hedged reserves rose sharply as the cost of swapping into USD rose, but have since returned to about 50 basis points below swap as the balance of supply and demand in the cross-currency market has shifted in the other direction.

Over this period, using our domestic assets to finance foreign currency liquidity has generated a positive return. That need not generally be the case, and we would typically expect that liquidity would have a modest expected cost - akin to an insurance premium. Over time, that cost will depend on the supply of both New Zealand and US government bonds and the evolution of various risk premia. In principle, when the costs of insurance is negative, the cost-benefit trade-off might seem to imply increasing reserves at least until the marginal cost is zero – but that would often be an inappropriate response, leading us to take on more insurance when it might be

least needed, and reducing insurance when market pricing suggested it might be most needed. In practice, the target level of intervention capacity is periodically set in consultation with the Minister of Finance, who also determines (as required by statute) ranges for the total level of the Bank’s foreign reserves.

## Open position

The Reserve Bank, with the concurrence of the Minister of Finance, decided to move a part of its reserves to an open foreign exchange position following the change to the intervention approach in the mid 2000s.

Holding foreign currency reserves outright (an open foreign currency position) is the standard international approach to obtaining foreign currency liquidity. That partly reflects the fact that most countries historically, with fixed exchange rates, had more of a focus on intervention as a means of influencing the exchange rate. One cannot expect to influence the exchange rate through intervention without changing the net foreign exchange position of the government.

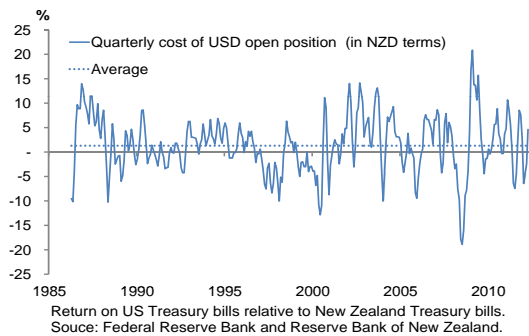
The insurance characteristics of an open position are very good: in times of stress, the value of foreign currency reserves tend to rise in local currency terms as “reserve currencies” appreciate with a flight to quality/liquidity. If the reserves are used (sold), they are sold at a high price and there is no time constraint within which the position needs to be rebuilt, and so there is no refinancing risk. In contrast, selling assets from a borrowed/hedged position can carry some greater risk around refinancing. Buying foreign currency assets or building up a hedged position during a crisis can be expensive, so positions need to be established and carried in normal times to be available in the event of rare, but extreme stress events.

However, the costs of an open position can be relatively high and volatile. From January 1990 to December 2011, New Zealand dollar 3-month Treasury bill yields averaged 3.15 per cent per annum above US Treasury bills of the same maturity. Over the same period, the New Zealand dollar appreciated from about 60 US cents to 77 US cents, giving an annual excess return on New Zealand dollar securities of about 4.5 percent per year. In addition,

<sup>14</sup> The excess return is not actively arbitrated if driven by low New Zealand government borrowing costs because only the New Zealand government can issue New Zealand government debt. The basis swap component can be arbitrated by non-resident issuers of NZD bonds; the elevated basis swap currently reflects low issuance of NZD bonds by non-residents (so relatively low demand to swap from NZD into USD). The low issuance is, in turn driven by low appetite among investors for NZD denominated bonds due to uncertainty in financial markets and the tendency of the NZD to weaken during periods of financial stress.

exchange rate fluctuations can lead to large unrealised valuation effects on the central bank balance sheet (figure 11 shows quarterly excess New Zealand dollar returns). For example, twenty percent annual fluctuations in the currency have not been uncommon. Even on a \$2 billion position, that could lead to unrealised fluctuations in Reserve Bank profits of perhaps \$400 million per year.

**Figure 9**  
Cost of open reserves position



New Zealand's funding of foreign currency reserves is summarised in figure 7. The Reserve Bank's intervention capacity is made up of an open foreign currency position (red area), and of borrowed and hedged reserves (dark blue area) under medium- and long-term contracts that have a residual maturity of more than a year.

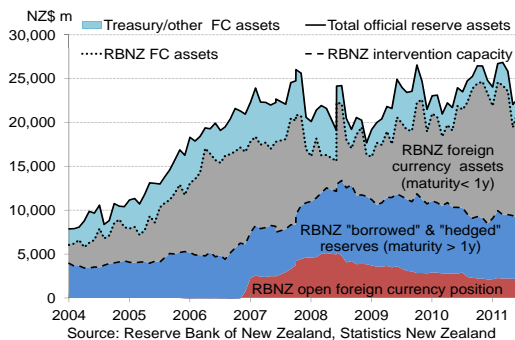
The open position currently accounts for about a quarter of New Zealand's foreign currency liquidity (figure 7). The excess open position of just over US\$2 billion equivalent, built up over 2007-8, was unwound through multiple foreign exchange sales from 2009 (Figure 5) to a more normal open position of about US\$1.5 billion equivalent (about 1 percent of GDP).

From 1985 to 2006, all of the Bank's reserves were funded by the government (largely by foreign currency borrowing, and latterly using cross-currency swaps) and on-lent to the Reserve Bank. The government has not lent to the Bank since December 2006 and reserves funded by borrowings from Treasury accounted for just under a quarter of the Bank's intervention capacity by June 2012.

Hedged reserves have accounted for a growing share of foreign currency liquidity as borrowed reserves mature. By end-June 2012 hedged reserves accounted for just over half of the dark blue area in figure 11. The borrowed and hedged approaches to funding foreign currency

liquidity are unusual internationally, but not unique,<sup>15</sup> and align well with the principal focus of intervention policy of countering extreme disorder in foreign exchange markets. The grey area in figure 11 corresponds to the net short position in figure 6 (but here it is denominated in New Zealand dollars). This is mainly related to FX swaps used in routine liquidity operations, and also includes a small and stable component of the borrowed and hedged reserves with less than a year to maturity (about US \$1.3billion).

**Figure 10**  
Official reserve assets and intervention capacity



Note: The Treasury maintains foreign currency reserves principally for its own liquidity management.

## Emergency facilities

The focus of this article has been on how the Reserve Bank has funded the foreign currency liquid assets held on its own balance sheet. These on-balance-sheet resources are not the only options open to the authorities. At times, our balance sheet resources have been supplemented by explicit commercial credit lines, but over time we concluded that they were too unreliable to count on in a climate of severe stress.

Official agencies can also provide additional access to foreign currency funding during crises. An example during the recent crisis was the Federal Reserve swap line<sup>16</sup> that was available in 2008-9 and provided US dollar liquidity to foreign central banks at an overnight to 3-month maturity.

<sup>15</sup> For other examples, see De Leon (2001) and HM Treasury (2012).

<sup>16</sup> The Fed swap lines established in 2008-9 provided US dollar liquidity to foreign central banks at an overnight to 3-month maturity. See [http://www.federalreserve.gov/monetarypolicy/bst\\_liquidityswaps.htm](http://www.federalreserve.gov/monetarypolicy/bst_liquidityswaps.htm).

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For more severe or sustained balance of payment pressures, member governments have the option of seeking to borrow from the International Monetary Fund. New Zealand has not done so for several decades.

## 4 Conclusions

The quite limited role of foreign currency reserves in New Zealand, as in many advanced economies with freely floating exchange rates, is consistent with the monetary policy framework and open financial account. With free movement of capital across borders and a floating exchange rate, the main role of the Bank's foreign currency reserves is to ensure continued functioning of the foreign currency markets, in quite rare crisis circumstances. To be prepared for such crisis episodes, we ensure ready access to a pool of foreign currency liquidity. That mandate also guides both the funding and our investment management approaches for reserves, with a heavy emphasis on ensuring that the Bank has ready access to foreign currency liquidity.

A variety of approaches is available to obtaining foreign currency liquidity including an open foreign currency position and "hedged reserves", an additional approach used in New Zealand. Each can generate the necessary foreign currency liquidity but each has different costs and risks. A combination of approaches may be desirable to provide the desired insurance for different types of market dysfunction at minimum cost and risk. New Zealand's choice to hedge the foreign exchange risk on most of its reserves is unusual, but is consistent with the predominant approach to thinking about the potential role for intervention, and to the rare, temporary and probably quite short-term nature of such interventions.

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