

## Reserve Bank of New Zealand *Bulletin*

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# Why has inflation in New Zealand been low?

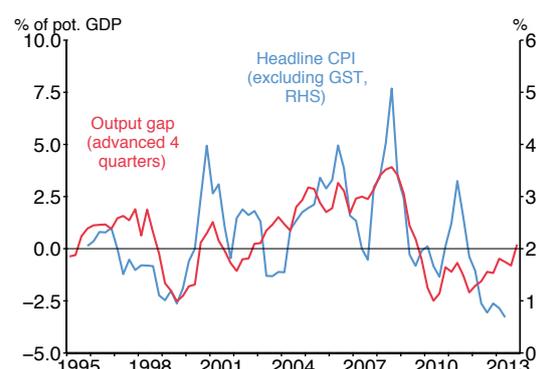
Nikki Kergozou and Satish Ranchhod

Over the past 18 months, inflation in New Zealand has been surprisingly low, even as GDP has strengthened and many measures of excess capacity in the economy have tightened largely as expected. Unexpected strength in the New Zealand dollar, which has reinforced strong domestic and international competitive pressures, has been a key part of the story. Falls in inflation expectations and softness in wage inflation have also contributed.

## 1 Introduction

Monetary policy is focused on maintaining price stability. The specific goal in the Policy Targets Agreement (PTA) between the Minister of Finance and Governor of the Reserve Bank defines this as “future CPI inflation outcomes between 1 percent and 3 percent on average over the medium term, with a focus on keeping future average inflation near the 2 per cent target midpoint.” However, over the past 18 months, and contrary to forecasts, inflation has fallen to low levels, with annual Consumers Price Index (CPI) inflation below the bottom of the target band over the past four quarters. These low levels of inflation occurred even though gross domestic product (GDP) strengthened largely as projected, and excess capacity in the economy appears to have been dissipating (figure 1).

Figure 1  
Annual inflation and the output gap



Source: Statistics New Zealand, RBNZ estimates.

Understanding why inflation has been so low is important. Without being sure how or why economic conditions have evolved as they have, it is difficult to be confident about what will happen in future. This article examines recent inflation in New Zealand.

## 2 How do we think about inflation?

The target inflation measure for New Zealand monetary policy, as defined by the PTA, is the All Groups CPI. This measure aims to capture changes in prices for a basket of goods and services that reflect the broad spending patterns of households.

The CPI can be split into two broad groups: tradables (which account for around 44 percent of the CPI) and non-tradables (which account for around 56 percent).

Tradables (which are mainly goods, but includes some services) are those that are imported or that are produced domestically but compete against imports, such as household furnishings. Prices for tradables can be quite volatile. The biggest single influence on the level of these prices is the international price of those goods. However, fluctuations in exchange rates and in economic activity, both domestically and abroad, can also affect tradables inflation. When modelling tradables inflation, the Reserve Bank looks at movements in the New Zealand dollar, as well as the prices of internationally traded goods, and the strength of economic activity domestically and abroad.

Non-tradables prices mainly relate to the provision of services (though these services may be associated with the provision of a physical good, such as the preparation of take-away foods). In aggregate, prices for these items are strongly influenced by the strength of domestic demand and resource pressures, as well as expectations about the prevailing rate of inflation. In the Reserve Bank's modelling framework, resource pressures are summarised using the “output gap”, which is an estimate of how an economy's current level of output compares to a trend or potential level of output. The modelling of non-tradables prices also accounts for the strength of domestic pricing

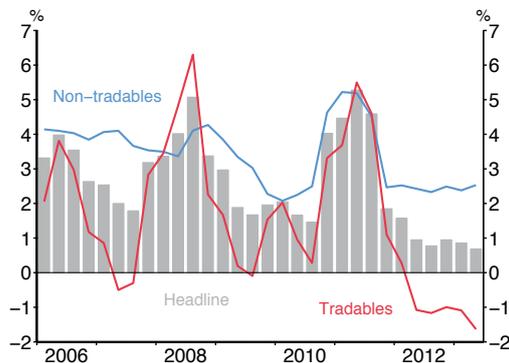
conditions using a range of measures, including surveys of inflation expectations, businesses' pricing intentions and wage costs.

While items in the CPI are classified as either tradables or non-tradables, the final goods or services will often involve elements of both tradables and non-tradables.<sup>1</sup> For instance, courier services are a non-tradables service, but petrol, which is tradable, is an important cost of production. Analogously, the domestic price of goods produced offshore may be affected by the cost of domestic services, such as wages for sales staff in New Zealand retail stores. But despite such overlaps, in aggregate, tradables and non-tradables prices still tend to behave quite differently and hence it is useful to think about them separately.

### 3 Recent inflation trends

In the year to June 2013, the CPI rose by only 0.7 percent (figure 2). This was the fourth consecutive quarter that annual inflation was below the Bank's 1 to 3 percent target band, and the lowest rate of annual inflation since 1999 when the target band itself was lower. The largest contributor to the very low inflation in recent years has

Figure 2  
Headline, tradables, and non-tradables inflation  
(annual)



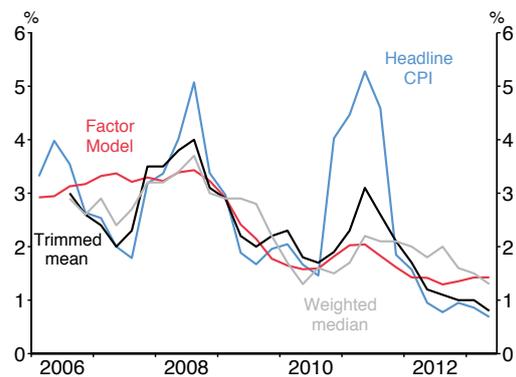
Source: Statistics New Zealand.

1 While non-tradables prices relate mainly to services, some physical goods are also classified as non-tradables, such as cigarettes and tobacco. In this example, retail prices are heavily influenced by government regulation (taxes currently make up just under 70 percent of the price of cigarettes). Other examples of goods that are classified as non-tradables include chicken, bread and eggs, for which there is little or no cross-border trade.

been tradables prices, which fell 1.6 percent in the year to June 2013. Over this same period, non-tradables inflation, which tends to be more stable, did not fall further, but has been considerably lower than average.

The CPI is affected by a range of factors. At times, temporary or idiosyncratic influences affect prices in ways that are unrelated to the underlying strength of domestic demand. One example of this is the sharp decline in the prices of imported fruit and vegetables in late-2011 in response to climatic conditions in Australia. However, even adjusting for such influences, underlying inflationary pressures in the economy have been subdued. Over the past year, measures of core inflation, which attempt to examine underlying trends, have lingered close to the bottom of the Bank's target inflation band (figure 3).

Figure 3  
Headline and core inflation  
(annual)



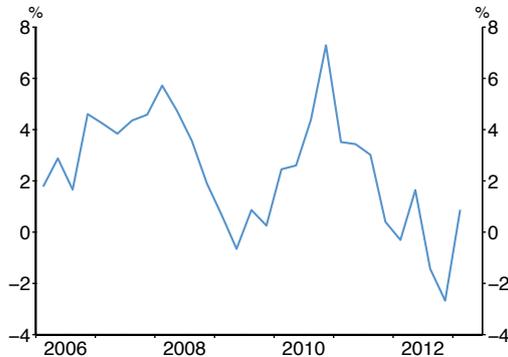
Source: Statistics New Zealand, RBNZ.  
Note: Core inflation measures exclude the effects of the increase in GST in 2010.

This picture of low inflation is not solely confined to consumer prices. The GDP deflator measures the prices for all goods and services produced in New Zealand and, while it is more volatile than the CPI, it has recently also fallen to low levels. In addition, businesses have reported that cost pressures have been moderate, and wage inflation has been surprisingly subdued (figures 4 a to c).

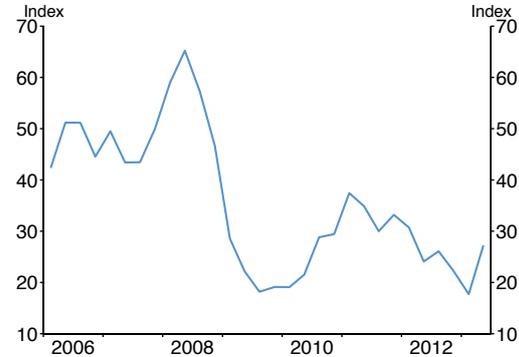
Survey measures of household and businesses' inflation expectations have also fallen (figure 4 d). This is of particular interest for monetary policy as expectations play an important role in wage and price setting behaviour. Taken together, inflation expectations are now more in line

Figure 4  
Measures of inflationary pressure

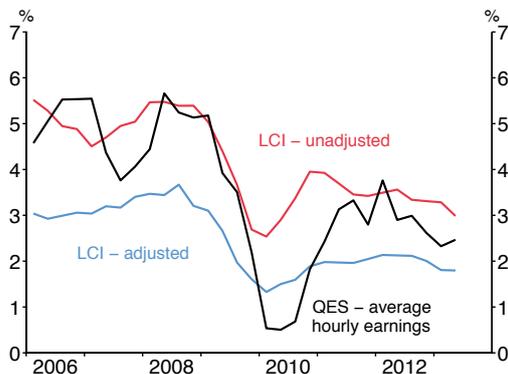
a) GDP deflator  
(annual)



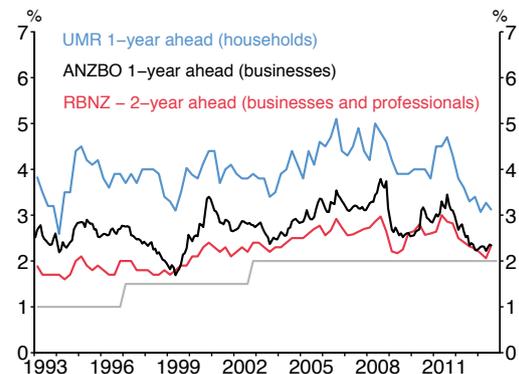
b) QSBO average costs, past 3 months  
(seasonally adjusted)



c) LCI wage inflation  
(annual)



d) Inflation expectations  
(annual)



Source: ANZ Banking Group, NZIER, Statistics New Zealand, RBNZ/UMR Research.

with the mid-point of the target range than at any other time in the inflation targeting era.

While general wage and price inflation is low, there have been strong increases in some asset prices. In particular, nationwide house prices rose by 9 percent over the past year, with particularly strong gains in Auckland and Canterbury (comparing the three months to July to the same period last year). There have also been strong gains in some financial asset prices. For instance, the NZX 50 has risen by around 40 percent since the start of 2012.

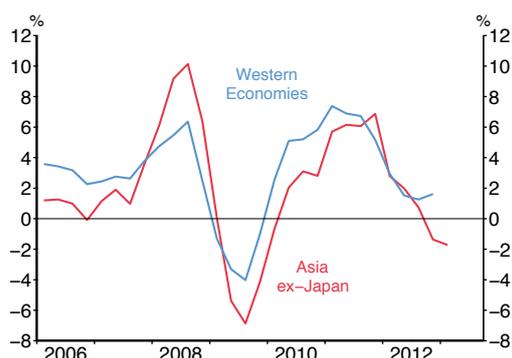
## 4 What has contributed to recent low levels of inflation?

Since the financial crisis in 2008/09, advanced economies (including the United States and the euro area) have been experiencing only gradual recoveries in GDP and employment. In most of these economies, there still appears to be significant excess capacity (i.e. negative output gaps).

Advanced economies still account for the majority of global demand, especially for consumer goods. The slow recovery in these economies has been associated with subdued growth in global trade and, over the past 18 months or so, falling export price inflation in many countries. Prices of exports from Asia (from where 40 percent of New Zealand merchandise imports are

sourced) declined by around 1.4 percent over the past year (figure 5). Prices of durable consumer goods such as appliances and furnishings have been particularly soft, which has been reflected in low rates of inflation in the related components of New Zealand's CPI (figure 6a, opposite).

**Figure 5**  
Export prices in overseas economies  
(annual, local currencies)



Source: Haver Analytics.

Note: Asia ex-Japan includes China, Hong Kong, India, Indonesia, Malaysia, Singapore, South Korea, Taiwan, Thailand and the Philippines. Western economies include the United Kingdom, the United States, Canada, and the euro area.

The direct impact of weak global activity on prices has been reinforced by strength in the New Zealand dollar. The exchange rate appreciated strongly in recent years, reaching a post-float high in trade-weighted terms in early 2013. This appreciation reduced inflation in New Zealand by lowering the domestic prices of imported consumer goods and productive inputs. Strength in the exchange rate also dampened the inflation rate of some domestically produced goods, due to the subsequent increase in domestic competitive pressures.

New Zealand has also been experiencing a rather gradual recovery following the 2008/09 recession. Excess capacity that developed during the recession, reflected in a negative output gap in recent years, has been eroded only gradually. This excess capacity resulted in subdued pressures on the price of productive resources, dampening non-tradables inflation. These subdued pressures have been particularly evident in the labour market, with subdued labour demand resulting in below-average employment growth and unemployment lingering around 6.4 percent (up substantially from levels below

4 percent before the financial crisis). Partly as a result, nominal and real wage growth has been weak.

Households and firms also appear to have been more cautious about spending and investing decisions in recent years. In our regular discussions with businesses, there have been frequent comments that low demand has contributed to increased price competition, and that businesses ability to pass on cost increases has been curtailed, particularly in the retail sector. Businesses have also indicated that the increasing movement towards online purchasing has added to competitive pressures in many parts of the retail sector.

For monetary policy, underlying trends in inflation are of primary interest. However, in a given period there can be a wide range of price changes, both up and down. For instance, there have been particularly sharp declines in the communication component of the CPI, which has fallen by 15 percent since mid-2011 (figure 6b). This pattern is markedly different to previous years, contributed to by regulatory changes and industry-specific competitive pressures.<sup>2</sup> Over this same period, there have also been particularly sharp increases in the cost of dwelling insurance following the Canterbury earthquakes and in tobacco prices (figures 6 c and d).

## 5 Recent inflation trends and the Bank's forecasts

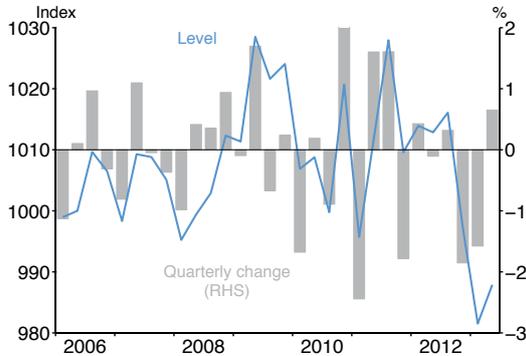
Inflation has also been lower than the Bank and other forecasters expected. Figure 7, opposite, provides a summary breakdown of the sources of the inflation forecast errors for the year to June 2013.

<sup>2</sup> Part of the declines in the communications component of the CPI is due to regulatory changes that have affected telecommunications pricing in recent years, which includes changes to wholesale termination rates for mobile calls, and the unbundling of networks. In addition, although the pricing for some communications services may not have changed greatly, the amount of services received has also increased which results in an effective price decrease, (for instance, the cost of some broadband plans may not change, but the associated data limits may have increased).

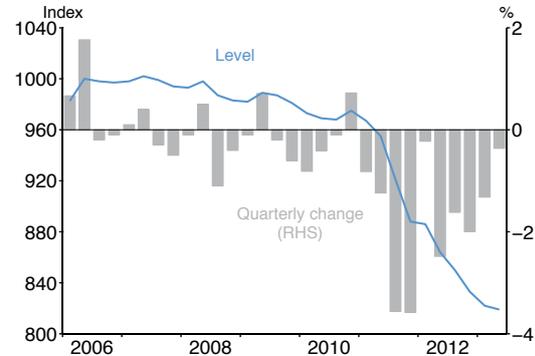
Figure 6

Selected CPI components

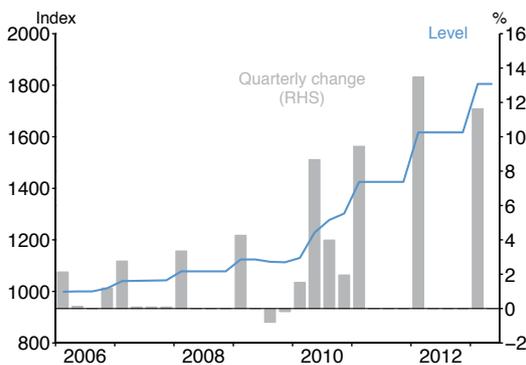
a) Furnishings and appliances  
(3.6 percent of CPI)



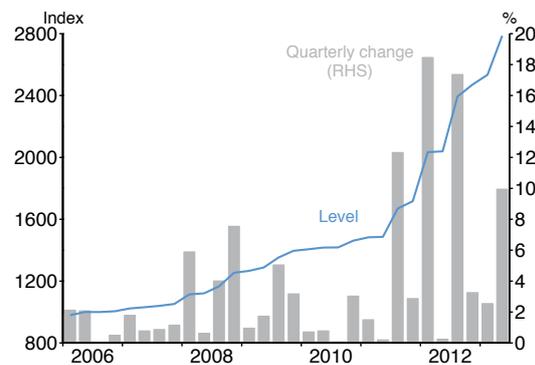
b) Communications group  
(3.5 percent of CPI)



c) Cigarettes and tobacco  
(2.1 percent of CPI)



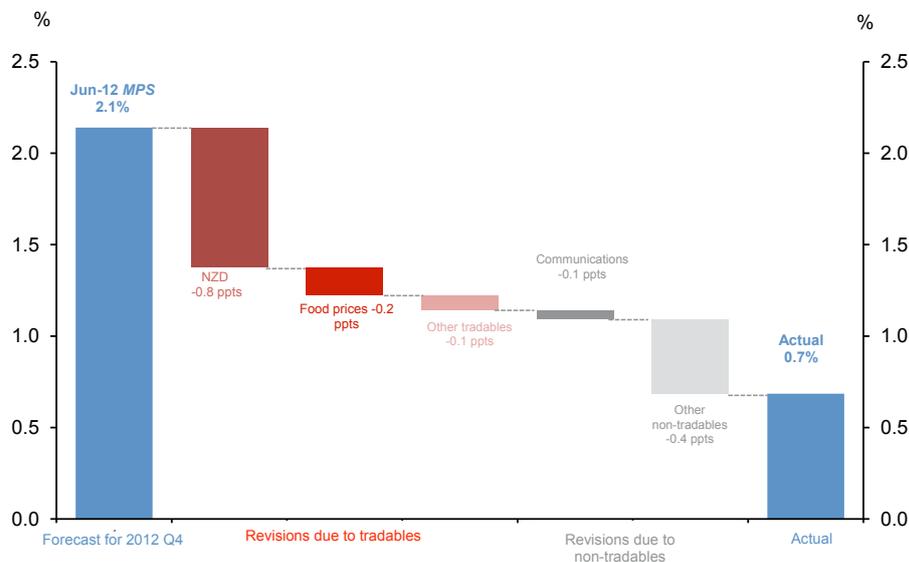
d) Dwelling insurance  
(0.2 percent of CPI)



Source: Statistics New Zealand.

Figure 7

Contribution to inflation forecast errors  
(annual, to June 2013)



Source: Statistics New Zealand, RBNZ estimates.

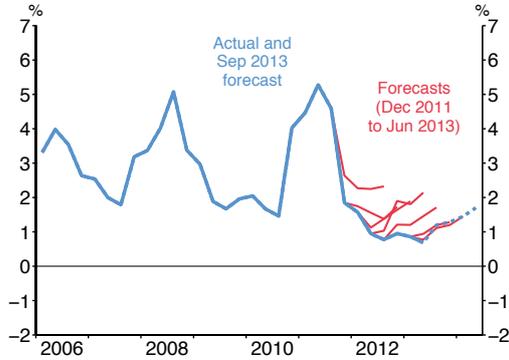
Note: Due to rounding, figures may not add exactly.

Figure 8

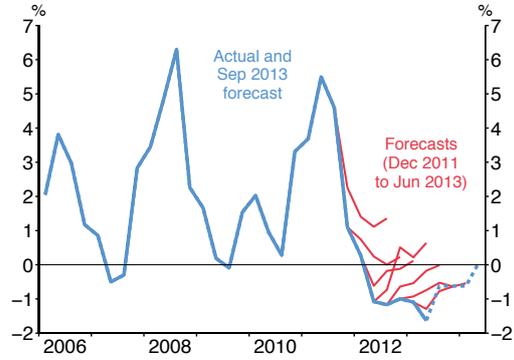
Forecast revisions

(all variables expressed as annual percent change, except for the output gap)

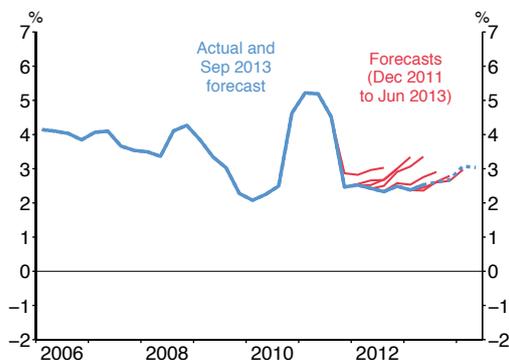
a) Headline inflation forecasts



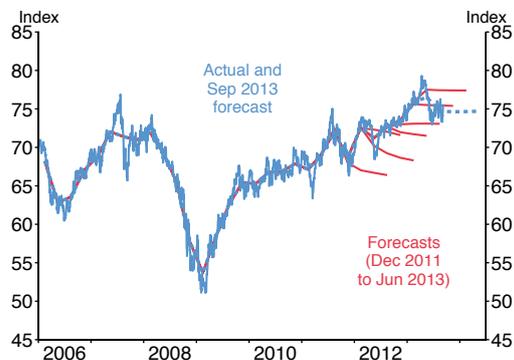
b) Non-tradables inflation



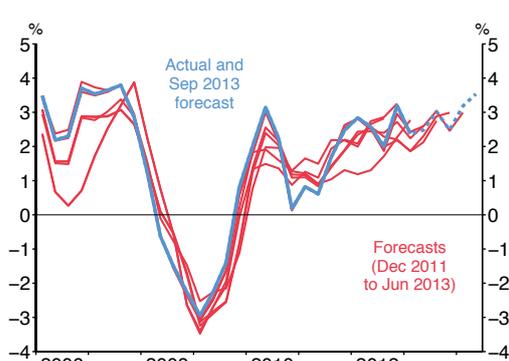
c) Tradables inflation



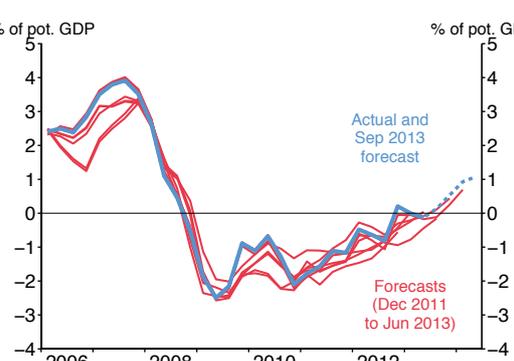
d) TWI



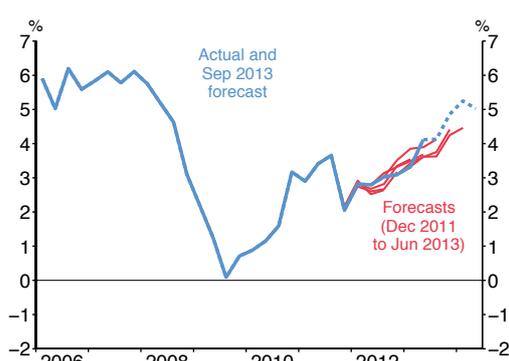
e) GDP



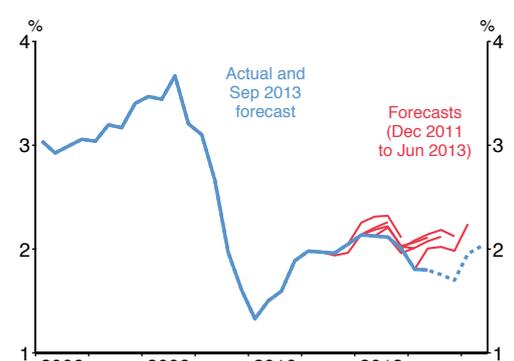
f) Output gap



g) Construction cost inflation



h) LCI wage inflation

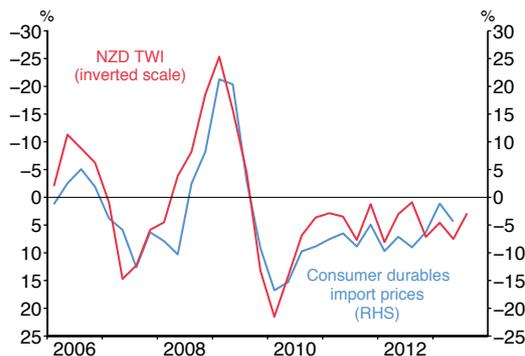


Source: Statistics New Zealand, RBNZ estimates.

Figure 8, opposite, illustrates the successive forecasts (and forecast surprises) for several key elements in our forecasting framework. Over the past 12 months, surprises have been centred on tradables prices (figure 8 c), but non-tradables inflation has also been surprisingly low (figure 8 b).

Lower-than-expected tradables inflation was in large part a result of the stronger-than-expected New Zealand dollar (figure 8 d) that dampened the landed domestic cost of many imported goods (figure 9).<sup>3</sup> However, even accounting for movements in the New Zealand dollar and the international price of imported goods, the retail price of some tradables goods has been softer than expected.

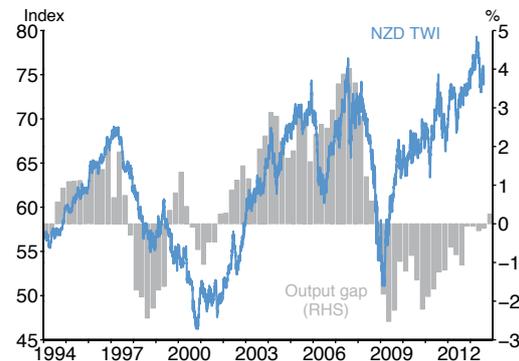
**Figure 9**  
Import prices (annual) and the New Zealand dollar



Source: Statistics New Zealand, RBNZ.

Typically in New Zealand, the exchange rate is strong when the economy is buoyant. However, that has not been the case in the past few years, with the economy recovering only gradually from the 2008/09 recession (figure 10). The exchange rate is a relative price between New Zealand and other countries, and economic activity in many other economies has been even more subdued. As a consequence, monetary policy settings in many other economies have been very accommodative.

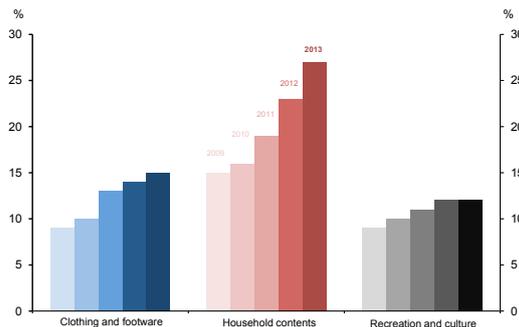
**Figure 10**  
New Zealand dollar TWI and the output gap



Source: RBNZ estimates.

The elevated level of the New Zealand dollar (not just the change in the exchange rate) has had a dampening impact on tradables inflation. The unusual combination of relatively subdued domestic demand and a persistently high exchange rate has resulted in strong price competition, with greater-than-usual levels of price discounting (figure 11) and many retailers reporting pressure on profit margins. Persistent strength in the exchange rate results in imported input costs staying low for a prolonged period. As a result, retailers are likely to be more confident about passing reductions in wholesale costs through to selling prices.

**Figure 11**  
Proportion of prices on special (June quarters)



Source: Statistics New Zealand.

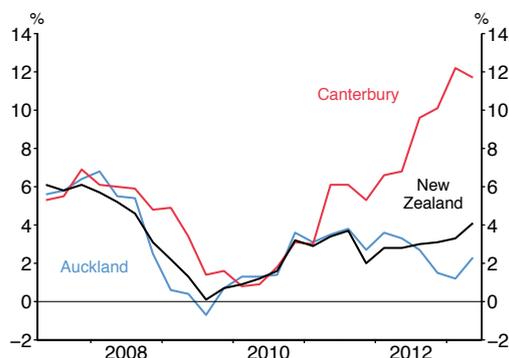
While annual non-tradables inflation has not fallen further in recent quarters, it has been softer than expected, remaining well below average since mid-2011 (figure 8 b). This is particularly surprising as over this period, GDP growth and resource pressures have been increasing in line with or slightly above the Bank's forecasts (figure 8

<sup>3</sup> Weather related declines in vegetable prices also contributed to weaker tradables inflation over some of this period.

e and f). While downside non-tradables surprises have been less pronounced than tradables surprises, they are arguably of more concern for monetary policy. Non-tradables prices are typically less volatile and have tended to be the key elements in cycles in inflation.

While non-tradables inflation has been surprisingly low in aggregate, this masks some differing trends in the underlying components of non-tradables inflation. Notably, there has been a build-up of pressure in the housing sector. Housing construction cost inflation has been increasing (although no faster than forecast) and is currently around historical averages (figure 8 g). Similarly, there have been increases in the cost of housing rents and dwelling insurance. Increases in rents and construction costs have been centred in Canterbury, with modest increases in other regions (figure 12).

**Figure 12**  
Construction costs  
(annual)



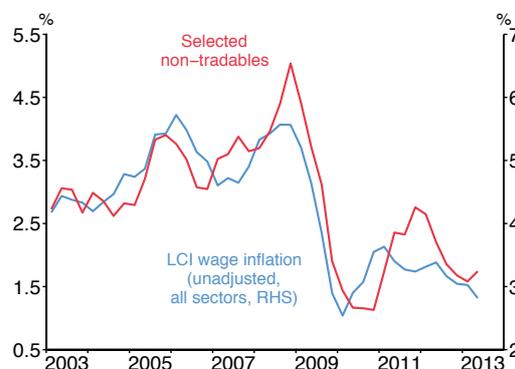
Source: Statistics New Zealand.

In contrast, inflation in other non-tradables components have tended to be softer than expected. Much of this unexpected softness was a result of the declines in communication group prices in late 2011 described above. However, there has also been more general softness in non-tradables inflation recently.

An important contributor appears to have been a decline in inflation expectations (which in turn has been influenced by recent declines in inflation). Compared to history, measures of inflation expectations over short- to medium-term horizons have fallen to low levels relative to the mid-point of the target band (figure 4d on page 5). These declines in inflation expectations have probably had

a dampening impact on price setting behaviour, especially in the case of wages. Low wage inflation is of particular importance for non-tradables inflation as it mainly relates to the prices for services, and wages account for a large proportion of service provision costs. Combined with the gradual pace of recovery in economic activity, declines in inflation expectations appear to have resulted in low rates of nominal wage growth, and are likely to have restrained increases in output prices for many services (figure 13).

**Figure 13**  
Non-tradables inflation and wage inflation  
(annual)



Source: Statistics New Zealand.

Note: The non-tradables inflation measure shown here excludes prices for construction, communications and government charges.

Low imported inflationary pressures resulting from the high New Zealand dollar may also have dampened some non-tradables prices. Even for items classified as non-tradables, inputs into their production may be imported (for instance, imported coffee beans and disposable cups may be used in the production of takeaway coffee). Consequently, low levels of inflation in the price of imported intermediate goods may have dampened input cost inflation for many firms throughout the economy.

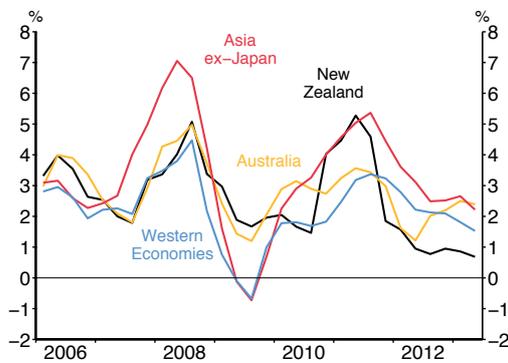
## 6 International comparison

Inflation in many of our trading partner economies has also been low. In part, such similarities reflect the impact of common global factors. Lingering softness in global economic conditions has dampened pressure on resources and, consequently, the prices of many internationally traded goods.

However, while global inflationary pressures have softened, inflation experiences in our trading partner

economies have still been varied, reflecting regional and country specific factors. Prices have tended to increase more strongly in emerging market economies, such as those in Asia (figure 14). In contrast, in advanced economies such as the euro area and the United States, inflation has tended to be very low. Recoveries in advanced economies have been more gradual, with lingering spare capacity and softness in labour markets.

Figure 14  
Inflation in New Zealand and other selected economies  
(annual)



Source: Statistics New Zealand, Haver Analytics.  
Note: Asia ex-Japan includes China, Hong Kong, India, Indonesia, Malaysia, Singapore, South Korea, Taiwan, Thailand and the Philippines. Western economies include the United Kingdom, the United States, Canada, and the euro area.

## 7 Conclusion

Understanding why inflation has persisted at low levels is a vital part of understanding the outlook for inflation and appropriate stance of monetary policy. However, doing so can be a challenging task. In real time it is often not possible to distinguish structural changes in economic activity from the normal volatility in prices, with the former often only identifiable with the benefit of hindsight. To assist in this process, the Bank considers a wide range of economic information and regularly reviews its forecasting processes.

Over the past 18 months, the continuing strength in the exchange rate, the fairly gradual pace of the domestic recovery, and strong competitive pressures have contributed to annual inflation falling to low levels. In addition, the combination of soft demand and persistent strength in the New Zealand dollar has had a more pronounced dampening impact on tradables inflation than has historically been the case, and has probably contributed to lower-than-expected non-tradables inflation also. There have also been encouraging declines in inflation expectations, which are currently closer to the mid-point of the target than has historically been the case. These relatively low inflation expectations have contributed to soft nominal wage growth (despite increases in real wages), as well as more general softness in non-tradables prices.

There have been signs in recent quarters of a levelling out in underlying inflationary pressures and some, perhaps short-term, increases in tradable price pressures. In addition, as is noted in the September *Monetary Policy Statement*, there is reason to expect that price and wage inflation will begin to lift soon, rising gradually towards the midpoint of the target band.

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# A new approach to macro-prudential policy for New Zealand

Lamorna Rogers,<sup>1</sup> Adviser, Macro Financial Department

This article outlines the Reserve Bank's new macro-prudential policy framework and the governance arrangements surrounding it. Macro-prudential tools can help address the build-up of systemic risk in the financial system. Such tools can create additional buffers for financial institutions and help to dampen growth in credit and asset prices directly, but they are not a 'silver bullet'. The macro-prudential approach is still in its infancy and there is scope to refine the framework in the light of local and international experience. A recent Memorandum of Understanding between the Minister of Finance and the Governor of the Reserve Bank sets out expectations for macro-prudential policy accountability and transparency.

## 1 Introduction

The global financial crisis (GFC) has prompted a fundamental rethink on financial stability policy, including the shape and reach of prudential regulation and supervision, and the role of central banks. Initial central bank responses could be likened to that of fire brigades called to put out a fire (in New Zealand's case, for example, through the provision of emergency liquidity and deposit guarantee facilities). As the immediate danger has receded, the focus has passed to developing the financial stability equivalents of smoke detectors and sprinkler systems.<sup>2</sup>

The 'smoke detector' or 'macro-prudential' role emphasises that the central bank has a fundamental responsibility to act before the first flames of financial crisis appear (Kroszner, 2012).<sup>3</sup> Macro-prudential policy involves proactive monitoring of individual institutions and interconnected markets for signs of froth and fragility, which may indicate rising 'systemic risk'. It also requires the willingness and capacity to act before those first signs of financial fragility develop into a fully fledged financial crisis. This is a big responsibility, and highly challenging to undertake, but the GFC has demonstrated that the costs of financial crises can be extremely large, that they have

the potential to wreak significant and enduring damage on economies and financial systems, and that they can even undermine the very foundations of political and social stability.

In New Zealand, the Reserve Bank has always taken a 'protect the whole' approach to financial stability, reflecting its legislated purpose of promoting and maintaining financial system soundness. This whole of system approach recognises that protecting the financial system is about more than maintaining sound individual institutions: feedback effects between the financial system and the real economy also need to be considered. Thus, baseline bank capital and liquidity requirements take into account the risks banks can be expected to face over an economic cycle, as well as in response to extreme events that could give rise to large losses.<sup>4</sup>

Macro-prudential policy goes a step further, by directly targeting systemic or system-wide risk. Borio (2009) provides a useful categorisation of systemic risk:

- i) how aggregate risk evolves over time – the 'time dimension', and
- ii) how risk is distributed in the financial system at a given point in time – the 'cross-sectional dimension'.

Pro-cyclicality of the financial system is a source of systemic risk in the 'time dimension'. In the upswing of the financial cycle, increasing exuberance on the part of lenders, borrowers and financial markets can lead to an underpricing of risk, an excess of risk taking, and

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<sup>1</sup> The author is grateful to colleagues at the Reserve Bank for their helpful comments and advice.

<sup>2</sup> Early warning indicators, such as excessive credit growth, act as macro-prudential smoke detectors; lending controls and higher capital and funding requirements act as macro-prudential sprinkler systems, helping to dampen excesses in the financial cycle.

<sup>3</sup> In some jurisdictions, macro-prudential policy is a shared responsibility between the central bank and various supervisory authorities.

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<sup>4</sup> An overview of the Reserve Bank's prudential approach can be found in Fiennes and O'Connor-Close (2012).

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increasingly leveraged household, business and financial sector balance sheets. The reverse process operates more rapidly in the downswing, with lenders and borrowers tending to be overly cautious, choking off the flow of credit to the economy, and exacerbating the economic downturn.<sup>5</sup> The 'cross-sectional' distribution of risk can exacerbate the cycle, and stems from common exposures across the financial system or from the particular role that large and important financial institutions might play within the financial system.<sup>6</sup>

A common characteristic of macro-prudential policy development in New Zealand and elsewhere in recent years has been the emphasis on the interaction of business and financial cycles and on the objective of dampening the pro-cyclicality of financial sector behaviour. The macro-prudential toolkit developed by the Reserve Bank provides it with the capacity to mitigate the build-up of risks in the upswing in the financial cycle, and reduce the impact of the subsequent downswing. It does not aim to prevent financial cycles, but to mitigate the excesses that often accompany and feed such cycles.

In developing its macro-prudential framework, the Reserve Bank has paid careful attention to international developments in the macro-prudential policy field, both at the level of the international regulatory agenda, and in individual jurisdictions. The GFC has prompted a major overhaul of international financial regulation. One important aspect, known as Basel III, focuses on higher regulatory standards for bank capital and liquidity.<sup>7</sup> Broader global regulatory reform efforts are continuing.

Not all of the measures that are being proposed at the international level are necessarily appropriate in the New Zealand context. New Zealand is a small open economy,

heavily exposed to the ebbs and flows of international markets, with a financial system that is dominated by four Australian banks, and around half of domestic bank lending concentrated in housing. The Reserve Bank's choices on the macro-prudential front reflect these considerations. Developments on the international and Australian regulatory fronts are relevant but not decisive; the Reserve Bank is highly conscious of the need to mitigate offshore funding risk; tools to address risks in specific sectors, such as the housing and farming sectors, have been prioritised.

This article outlines the state of macro-prudential policy in New Zealand. The objectives of macro-prudential policy are explained, along with the powers and responsibilities of the Reserve Bank, the broader framework, and the specific tools. The article also provides some flavour of when and how macro-prudential policy tools might be used, although it should be emphasised that this article is intended to be read as a general piece on macro-prudential policy rather than being grounded in prevailing economic and financial circumstances. Macro-prudential policy is a fast developing area, and the framework will evolve as the Reserve Bank gains experience in its implementation, as new information becomes available internationally, and as financial systems and markets grow and innovate.

## 2 Macro-prudential policy

### 2.1 Background

Before to the GFC, New Zealand was facing very strong house price inflation (and rapid credit growth across all sectors), together with upwards pressure on the exchange rate and the tradables sector of the economy. At that time, Treasury and the Reserve Bank investigated the potential for 'supplementary' tools, with a direct bearing on the housing market and/or housing lending, to ease the load on monetary policy without exacerbating external pressures (Blackmore *et al*, 2006).

As the GFC unfolded, the Reserve Bank began investigating the potential for macro-prudential tools to complement its existing prudential framework. Spencer (2010) discussed the evolving macro-financial stability function of the Reserve Bank, including the interaction

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<sup>5</sup> Craigie and Munro (2010) explore some of the channels through which the financial system can amplify business cycles in New Zealand.

<sup>6</sup> In New Zealand, the Reserve Bank addresses the cross-sectional dimension in several ways. The baseline prudential and payment systems frameworks reduce both the probability of an individual failure and vulnerability to contagion. Timely release of buffers in times of stress can further reduce vulnerability and help to moderate the cross-sectional amplification associated with the downturn.

<sup>7</sup> In December 2010 the Basel Committee on Banking Supervision released new global regulatory standards for bank capital adequacy and liquidity (BCBS, 2010). The counter-cyclical capital buffer is one element of the Basel III standards, which is expressly designed to be used as a macro-prudential tool that can be deployed in times of rising system-wide risk. Other elements include the Liquidity Coverage Ratio and the Net Stable Funding Ratio.

between macro-prudential policy and monetary policy, and highlighted a number of areas for further analysis and research. In 2011, the Reserve Bank hosted a macro-prudential policy workshop, which saw the presentation of a paper, 'Macro-prudential instruments for New Zealand: A preliminary assessment' (Ha and Hodgetts, 2011). This paper formed the basis of the Reserve Bank's subsequent macro-prudential work agenda, culminating in the signing of a 'Memorandum of Understanding on Macro-prudential policy and operating guidelines' ('the MoU') between the Governor of the Reserve Bank and the Minister of Finance in May this year (RBNZ, 2013a).

The MoU plays a critical role in anchoring macro-prudential policy. The Reserve Bank's powers to implement macro-prudential policy derive from the Reserve Bank of New Zealand Act ('the Act'), but macro-prudential policy exercises these prudential powers in new ways and with a different focus (refer box 1, opposite).

Given this different focus, the MoU helps to provide clarity around the broad parameters of macro-prudential policy – the objective, goals, governance and instruments (figure 1). For example, the Reserve Bank can deploy the agreed set of instruments in pursuit of the objective set

out in the MoU. However, should the Reserve Bank wish to use additional instruments, it would have to agree their inclusion in the macro-prudential toolkit with the Minister of Finance. Similarly, the MoU applies to registered banks; should it be desirable to extend the regulatory perimeter to a wider set of institutions in the future, any change in institutional coverage would also be agreed with the Minister.

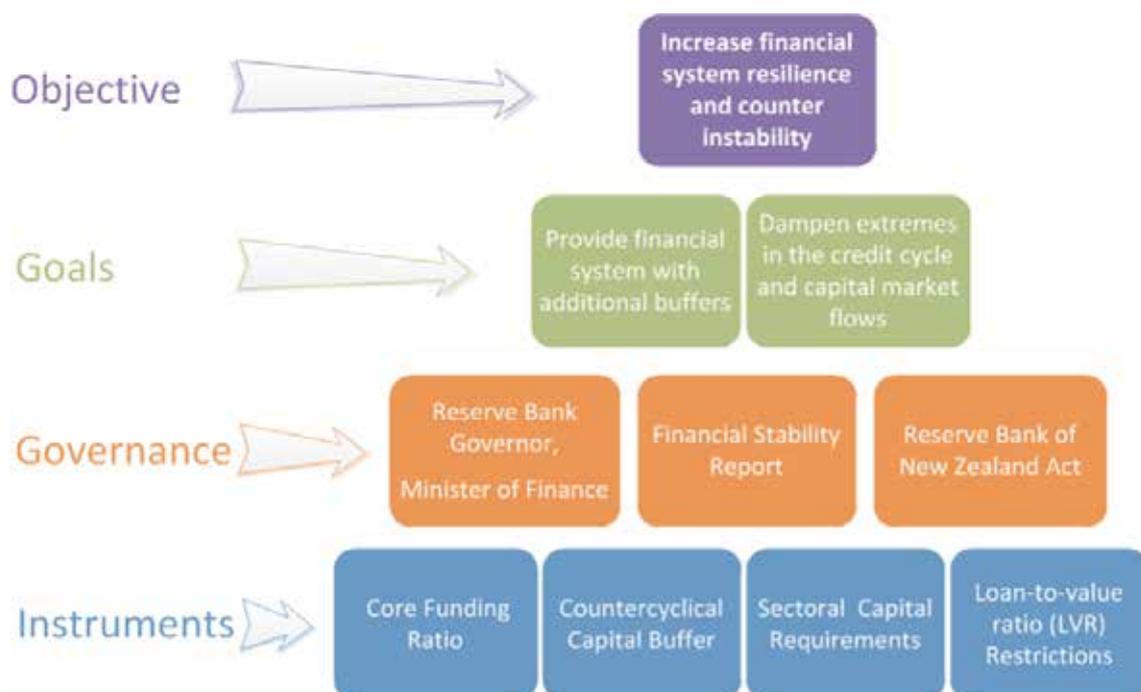
## 2.2 Objectives

*"The objective of the Bank's macro-prudential policy is to increase the resilience of the domestic financial system and counter instability in the domestic financial system arising from credit, asset price or liquidity shocks. The instruments of macro-prudential policy are designed to provide additional buffers to the financial system (e.g. through changes in capital, lending and liquidity requirements) that vary with the macro-credit cycle. They may also help dampen extremes in the credit cycle and capital market flows."*

- extract from the MoU (RBNZ, 2013a).

The Reserve Bank's work on macro-prudential policy

Figure 1  
Key elements of the MoU on macro-prudential policy



## Box 1

### The relationship of the objectives of macro-prudential policy to the Act

Under section 1A of the Act, the Reserve Bank is responsible, among other things, for promoting the maintenance of a sound and efficient financial system. The Reserve Bank's banking regulatory and supervisory framework is governed by Part 5 of the Act. Section 68 of this requires the Reserve Bank to exercise its powers for the purposes of: (a) promoting the maintenance of a sound and efficient financial system, and (b) avoiding significant damage to the financial system that could result from the failure of a registered bank.

In fulfilling these purposes, macro-prudential policy aims to *promote the soundness of the financial system* by increasing the resilience of the domestic financial system when it appears credit and asset price developments have become or are becoming unsustainable. It aims to *promote the efficiency of the financial system* by mitigating excessive growth in credit and unsustainable asset price developments, which might otherwise see asset prices diverge significantly from fundamentals, and the flow of credit sharply disrupted in a downturn. These two goals also have the extra benefit of reducing the risk of bank failure.

has been marked by a gradual evolution in thinking about what the specific policy objectives should be. It has always been clear that the aim should be to increase the resilience of the system to adverse shocks, but is it possible to be more ambitious? The traditional prudential approach has had a strong focus on shock-absorbing capacity; for example, increasing capital requirements so that banks are better able to absorb loan losses. This approach largely takes movements in credit and asset price cycles as a given, and aims to provide an adequate safety net should systemic risks be realised. A more ambitious approach is to try to reduce the amplitude of the financial cycle – in a sense lopping off the extremes of the cycle. Swing low but not too low; swing high but not too high. The potential benefits of this approach are obvious but it is also much more demanding, as it requires the authorities to answer some difficult questions: How much is too much? When is intervention justified, given that intervention will have immediate and tangible costs, while the benefits may be longer term and possibly even intangible? Can macro-prudential tools be effective in dampening the cycle?

In developing its framework, the Reserve Bank has come to the conclusion that while ambitious, macro-prudential policy does indeed have the potential to mitigate excesses in the cycle. This evolution reflects progress in,

firstly, developing the Reserve Bank's risk assessment capacity and, secondly, evaluating the potential for macro-prudential tools to meet the twin goals of building financial system resilience and dampening extremes in the credit cycle.<sup>8</sup>

Again, the Reserve Bank's motivations in this area have been profoundly affected by the experience of the GFC. The GFC was an object lesson in the potential for a disorderly unwinding of a credit boom to impose substantial losses on the financial system, leading to an adverse feedback cycle with the real economy and substantial damage in the form of lost economic output, jobs and wealth. The arguments for leaning against excesses in credit cycles, rather than just cleaning up afterwards, are stronger in that light.

### 2.3 Instruments

The MoU lists four macro-prudential instruments for addressing the systemic risks of financial instability:

- adjustments to the core funding ratio (CFR);
- the counter-cyclical capital buffer (CCB);

<sup>8</sup> RBNZ (2013d) reviews each instrument, including its operation and likely effectiveness. Rogers (2013) contains an instrument-level discussion of the transmission channels of macro-prudential policy, with respect to firstly, the goal of building financial system resilience and, secondly, the goal of reducing extremes in the financial cycle.

- adjustments to sectoral capital requirements (SCR); and
- quantitative restrictions on the share of high loan-to-value ratio (LVR) loans to the residential property sector.

In choosing to include these instruments in the macro-prudential toolkit, a primary consideration has been the potential effectiveness of each instrument in meeting the intermediate goals of building financial system buffers and dampening extremes in the credit, asset price and funding cycles.

Table 1 describes each instrument at a high level, including how it is expected to work and what some of the pitfalls might be. Each instrument is designed to be

varied across the cycle, with LVR restrictions expected to be relatively more effective in dampening the cycle than the other instruments.

The Reserve Bank has also prioritised the ability to tailor the solution to the problem. Broad-based instruments such as the CFR and CCB provide the capacity to affect banks' balance sheets as a whole, whereas instruments such as the SCR or LVR restrictions could be targeted at particular problem sectors, such as housing or agriculture, or specific borrower segments such as housing investors.<sup>9</sup>

A toolkit which includes a variety of instruments – both capital-based and the others related to funding and lending shares – also has the advantage of diversifying the ways in which the Reserve Bank can respond to a build-up in

Table 1  
The macro-prudential toolkit

Instrument	Description	How the tool works	Potential issues
<b>Adjustments to the core funding ratio</b>	Varies the share of lending that banks are required to fund out of stable, or 'core', funding sources over the cycle, to reduce vulnerability to disruptions in funding markets.	Reduced share of short-term funding increases the amount of time that banks are able to withstand stresses in funding markets; easing in times of stress could also provide a safety valve for the system.	Potential leakages if banks opt to run down voluntary buffers. May also increase banks' vulnerability to term funding market shocks if not eased in a timely fashion.
<b>Counter-cyclical capital buffer</b>	Requires additional capital when 'excessive' private sector credit growth is leading to a build-up of system-wide risk.	Creates additional capital buffer that can be used to absorb losses and allow banks to continue lending in the downswing.	Welfare costs partly mitigated by 'price-based' nature; potential leakages if banks opt to run down voluntary buffers.
<b>Adjustments to sectoral capital requirements</b>	Requires additional capital against lending to a specific sector or segment in which excessive private sector credit growth is leading to a build-up of system-wide risk.	Provides additional capital buffer and may alter relative attractiveness of lending to targeted sector.	Welfare costs partly mitigated by 'price-based' nature; potential leakages if banks opt to run down voluntary buffers. Could be subject to avoidance.
<b>LVR restrictions</b>	A restriction on the share of new high-LVR residential mortgage lending.	Likely to have greatest impact on the cycle, as it directly acts on the supply of bank lending. May also build resilience due to stronger bank balance sheets and less financially vulnerable households.	Likely to have the highest welfare costs, although mitigated by 'speed limit' approach. Greatest regulatory coverage as applies to all registered banks, but greater effectiveness could also increase incentives for avoidance and/or leakage to unregulated financial intermediaries.

<sup>9</sup> See Hunt (2013) for a counter-factual exercise highlighting how the Reserve Bank's new macro-prudential framework and specific tools may have been employed over the last financial cycle.

systemic risk. Relying too heavily on any one instrument can create strong incentives for regulated banks to invest in avoidance mechanisms.

## 2.4 Operation

As noted earlier, the Reserve Bank has invested heavily in developing its risk assessment framework (a.k.a. early warning systems). The Reserve Bank routinely monitors a broad set of indicators in making judgements about the state of the financial system, and risks to the outlook (see table 2). The degree of focus on particular indicators will vary with developments in the economy and financial system. For example, there is presently a strong focus on levels of household debt, developments in household credit, and house prices. This reflects the currently elevated risks posed by the housing market, where household debt ratios and house prices are historically high. At another time, the Reserve Bank might pay greater attention to risks arising from commercial property markets – a sector that has been a weak point in the past – and focus on data that allow it to assess associated business sector vulnerabilities and risks to banks' balance sheets.

One school of thought suggests that the criteria for systemic risk assessments should be identified in

advance, allowing rules to be set around the deployment of macro-prudential tools. There are advantages to such an approach, including greater transparency and certainty for banks and other market participants around the likely policy path. In practice however, it is very difficult to identify a robust, standard set of indicators that could be used in this way, and threshold identification would be similarly challenging.

The Reserve Bank approach therefore is one of guided discretion, with final decisions involving a healthy dose of policymaker judgement. This is also true of monetary policy decision-making. A critical factor in the Official Cash Rate (OCR) decision, for example, is the extent of spare capacity in the economy. There is no single measure of 'spare capacity'; rather, it is a matter of assembling a range of information, both quantitative and qualitative, and making a judgement that draws on that information and policy experience.

While not able to provide the degree of certainty and transparency inherent in a rules-based approach, the Reserve Bank does place a high priority on communicating and explaining its views on systemic risks. For example the recent decision to deploy LVR restrictions was accompanied by a *Regulatory impact assessment*, which set out the detailed thinking behind the decision (RBNZ,

Table 2  
Examples of macro-prudential indicators

Type of indicator	Macro-prudential indicator	Financial condition
<b>Macroeconomic</b>	Credit	Leverage and credit market conditions
	Household credit	Leverage and credit market conditions
	Business Credit	Leverage and credit market conditions
	Agricultural credit	Leverage and credit market conditions
	Government debt	Leverage
<b>Banking sector</b>	Capital adequacy (actual)	Balance sheet strength
	Non-performing loans	Asset quality
	Sectoral watchlist loans*	Asset quality
	High-LVR lending	Leverage and risk appetite
<b>Market-based</b>	House prices	Asset market conditions
	Commercial property prices	Asset market conditions
	Farm prices	Asset market conditions
	Market funding spreads	Funding and credit market conditions
<b>Qualitative</b>	Bank lending standards	Risk appetite

\* Household, business and agriculture sectors

2013b). The Reserve Bank's semi-annual *Financial Stability Report* also provides on-going coverage of the Reserve Bank's assessment of systemic risks, supported by detailed coverage of the economic and financial developments underpinning those judgements.

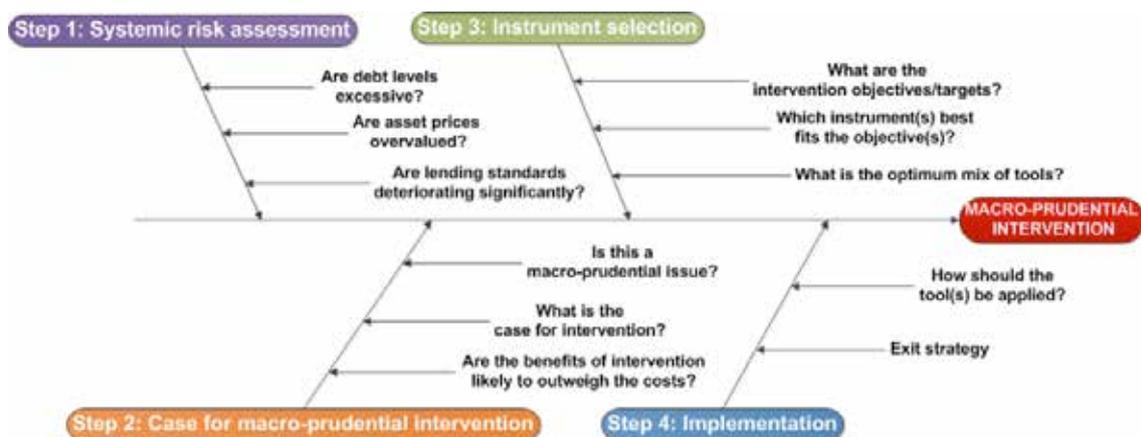
The *systemic risk assessment* is only the first step in the macro-prudential decision process. As illustrated in figure 2, once the Reserve Bank judges that risks are sufficiently elevated to warrant investigation of macro-prudential intervention, this triggers a number of other steps. In assessing the *case for macro-prudential intervention*, an important question is whether the systemic risk is best addressed through macro-prudential policy measures, or whether other policy settings should be reviewed. For example, a conventional mechanism to restrain systemic risk stemming from an overheated housing market would be to raise the OCR, which would directly feed into higher mortgage rates and thus weigh on housing demand. Where housing demand was judged to be contributing to overall inflation pressures, this might be a first-best response. However, such a response would place additional pressure on exchange rates and the tradables sector. Given systemic concerns about an overheated housing market, a macro-prudential response might be the better policy option. An example is the recent decision to implement LVR restrictions, which has the potential to support monetary policy by allowing greater flexibility in the timing and magnitude of future increases in the OCR (Wheeler, 2013a). The interaction between

macro-prudential policy and monetary policy is not well understood, and is an area which the Reserve Bank is continuing to research (box 2).

Assessing the case for macro-prudential intervention is intertwined with the *instrument selection* decision. In selecting the instrument(s), the first questions to be asked are: what are the objectives of the intervention and which macro-prudential instrument(s) are best able to achieve these objectives? The Reserve Bank's recent decision to impose LVR restrictions was driven by risks surrounding the housing market, and the likely greater effectiveness of LVR restrictions in dampening housing demand than other instruments (box 3, overleaf). Modelling of the costs and benefits of macro-prudential intervention is in its infancy, and is an important area where the Reserve Bank is looking to develop its capacity. Over time, the Reserve Bank's analytical capacity will benefit from access to more granular data and experience in instrument deployment.

Instrument selection feeds into and overlaps with the *implementation* of the macro-prudential instrument(s). For example, it might be decided to target the intervention to reduce welfare costs, assuming it was still possible to meet a minimum effectiveness threshold. An example would be targeting housing investors. The Reserve Bank is improving its capacity to undertake targeted interventions: for example, new data collections are being put in place, which will provide breakdowns of housing lending by categories such as investors, first-home buyers and businesses.

Figure 2  
The macro-prudential decision framework



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## Box 2

### The interaction between macro-prudential policy and monetary policy

*“... these [macro-prudential] instruments can play a useful secondary role in stabilising the macro economy. As a result, the Reserve Bank will consider any interaction with monetary policy settings when implementing macro-prudential policy and will explain the implications, if any, for monetary policy.”*

*- extract from the MoU (RBNZ, 2013a).*

Macro-prudential policy and monetary policy have the respective objectives of financial stability and price stability. However, the instruments of each policy function – the four macro-prudential tools in the case of macro-prudential policy and the OCR in the case of monetary policy – also have the potential to affect the objectives of the other. Macro-prudential policy can help to stabilise an overheating economy by dampening excessive credit demand and hence domestic demand, and may also have a modest effect on price stability by slowing asset price inflation. During a downturn, macro-prudential policy easing could support domestic demand by helping banks to maintain the flow of credit

to the economy. Conversely, monetary policy can help to stabilise an overheating financial system, by raising the cost of credit, thus weighing on credit and asset price growth.

These overlapping effects raise the question of how best to manage the potential policy interactions. The Reserve Bank has the choice of actively coordinating its macro-prudential policy and monetary policy decisions, or making these decisions independently of each other. In the former case, a joint decision would be made on the optimal mix of policies to target the overall policy objectives of the Reserve Bank, subject to the instruments being used in a manner that is consistent with each instrument's primary objective. In the latter case, the policy decision would be made with sole reference to the objective of the policy function, taking the policy settings of the other function as given.

Policy coordination has the advantage of enabling policymakers to take into consideration the interdependencies that exist between different policies. However, it is less transparent and more complex, making it harder for households and firms to predict the future path of each strand of policy, thus complicating the process of setting expectations. The Reserve Bank is continuing to explore options around how best to manage potential interactions between the two policy strands in the future.

A key implementation decision is the timing of the intervention. The ideal timing will be early enough to allow an effective build-up of buffers, and to prevent excessive exuberance gaining broad momentum. The need for early intervention, however, has to be balanced against the fact that the earlier in the cycle it is, the more difficult the task of assessing whether excesses are likely to continue or to self-correct. Timing is also important in deciding when to ease or lift the macro-prudential intervention. Where the primary motivation for the intervention is to lean against the cycle, a key consideration will be the effectiveness of the intervention. Once credit markets are judged to be better balanced, the policy would be eased. Again, it will be challenging to time the release; too early a release might

see the build-up in risk pick up where it left off. Where building financial system resilience is the key motivation for intervention, timing the release so that banks are able to use that extra resilience to support their lending will be key. In making such decisions, the Reserve Bank would look at indicators of financial system stress, such as a sharp contraction in credit growth or widening in funding spreads.

## 2.5 Governance

The final element of the macro-prudential policy framework is the governance structure. As noted earlier, the Act sets out the Reserve Bank's powers. It also outlines a system of checks and balances on these

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## Box 3

### The decision to implement LVR restrictions

From 1 October 2013, the Reserve Bank is imposing 'speed limits' on the share of new high-LVR housing loans that banks can make (RBNZ, 2013c). Whereas banks can normally make as many high-LVR loans as their in-house risk management practices permit, a regulatory restriction of 10 percent will come into force on the share of total new high-LVR housing lending (loans with an LVR above 80 percent, which is equivalent to a deposit of less than 20 percent).

The decision to restrict banks' high-LVR housing lending reflects heightened concerns about the rate at which house prices are increasing and the potential risks this poses to the financial system and the broader economy. Rapidly increasing house prices increase the likelihood and the potential impact of a significant fall in house prices at some point in the future. Given these concerns, a prime objective of the intervention is to help slow the rate of housing-related credit growth and house price inflation, thereby reducing the risk of a substantial downward correction in house prices that would damage the financial sector and the broader economy.

The Reserve Bank evaluated a number of options for addressing the growing systemic risk posed by the

housing market. In particular, estimates were made of the likely impact of both sectoral capital requirements and LVR restrictions on house price growth and credit growth. This modelling work also included estimates of efficiency and equity costs, as well as possible policy leakages.

Although sectoral capital requirements may have been less costly in terms of efficiency, the Reserve Bank's modelling work suggests that they would be significantly less effective in dampening housing demand. In opting to use LVR restrictions, the Reserve Bank is adopting a 'speed limit' approach rather than outright limits. This will allow banks to continue some high-LVR housing lending to creditworthy borrowers, which will partly mitigate the welfare costs of LVR restrictions, namely, constraining the access of some borrowers to credit that banks would otherwise be willing to provide.

The Reserve Bank is aware that imposing LVR restrictions could create incentives for banks and others to introduce products designed to circumvent the regulation. The Reserve Bank is providing banks with guidance on the types of arrangements that might be deemed 'avoidance' measures if used to circumvent the new regulations, and expects bank senior management and bank boards to respect the spirit and intent of LVR restrictions.

powers. These are designed to ensure that the Reserve Bank is accountable for its decisions, that there is sufficient transparency in its actions, and that the Reserve Bank's powers are exercised in appropriate consultation with the Government.

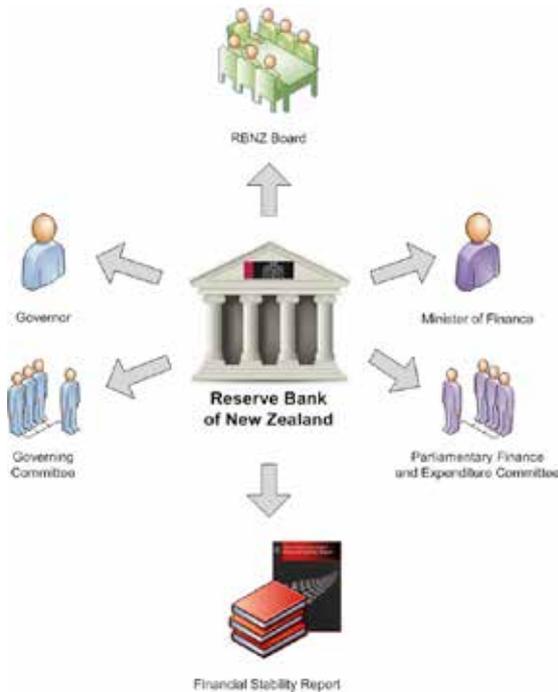
Figure 3, opposite, sets out some of the Reserve Bank's key governance mechanisms. The Reserve Bank has recently formalised and expanded the decision-making role of the Reserve Bank's Governors. There is now a Governing Committee, comprising the Governor, the two Deputy Governors and the Assistant Governor, under the chair of the Governor (Wheeler, 2013b). The Governing Committee discusses all major monetary and financial policy decisions falling under the Reserve Bank's

responsibilities, including decisions on macro-prudential policy, though the Governor retains the right of veto on committee decisions. The Macro-Financial Committee of the Reserve Bank also plays an important role in debating macro-prudential policy. Major analytical and policy papers are discussed by this committee, which is chaired by the Deputy Governor and Head of Financial Stability.

There are considerable checks and balances relating to the Reserve Bank's operation of macro-prudential policy, including:

- Publication of the Reserve Bank's *Financial Stability Report* twice a year. These are reviewed by Parliament's Finance and Expenditure Committee, the Board of Directors of the Reserve Bank, and

Figure 3  
Key governance mechanisms for macro-prudential policy



the Reserve Bank provides press conferences upon publication.

- Publication of regulatory impact assessments of any macro-prudential policy that it is adopted, and public consultation on any such measures. In developing its macro-prudential policy framework, the Reserve Bank has staged two macro-prudential consultations to date: an initial consultation on the macro-prudential policy framework, and a subsequent consultation on the framework for restrictions on high-LVR residential mortgage lending (RBNZ, 2013e; RBNZ, 2013f).<sup>10</sup>
- Monitoring and oversight by the Board of Directors of the Reserve Bank, which acts as agent to the Minister of Finance in reviewing how well the Reserve Bank meets its legislative responsibilities. The Board reviews the Reserve Bank's efforts to promote the maintenance of a sound and efficient financial system, assesses the Reserve Bank's performance in meeting its obligations and responsibilities, discusses this with

the Minister of Finance, and publishes its review in the Reserve Bank's *Annual Report*.

### 3 Conclusion

This article has provided an overview of the Reserve Bank's new macro-prudential policy framework. While a substantial amount of work has already gone into developing the framework, the macro-prudential approach remains in its infancy, and the framework will continue to evolve over time. The article highlights a number of areas where the Reserve Bank will be looking to enhance its macro-prudential policymaking capacity. There remains much uncertainty around the best and most effective ways of implementing macro-prudential tools and the Reserve Bank will be 'learning-by-doing' to some extent, as well as drawing on a growing body of international experience and research. We do not see macro-prudential instruments as 'set and forget' tools; once deployed, there will be on-going assessments of their effectiveness, which will condition their use and their eventual release.

Although macro-prudential policy is expected to provide a useful complement to the Reserve Bank's other policy instruments, it is not a 'silver bullet'. Imbalances in the economy and financial system that are driven by fundamentals can be resolved only by appropriate medium- and long-term policy measures, and private sector adjustments. And only some of these measures will fall within the Reserve Bank's mandate. Within the broad context of economic policy, macro-prudential policy offers breathing space, a way to alleviate short-term pressures and to help prevent such imbalances taking on a life of their own. By reducing the probability of a self-propelling cycle of excessive asset price and credit growth, it is hoped that macro-prudential policy will reduce the likelihood and severity of financial crises, and all the hardships that such crises bring.

<sup>10</sup> Consultation on the counter-cyclical capital buffer was included in the 2012 consultation on the implementation of Basel III capital adequacy requirements in New Zealand. Consultation on the operational details of using sectoral capital requirements and adjusting the core funding ratio for macro-prudential purposes will be undertaken in due course.

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# The Reserve Bank's capital adequacy framework

Martin Fraser

The Reserve Bank's operations involve a variety of financial risks, which influence the appropriate amount of capital the Bank should hold. This article outlines some of the approaches used to help formulate advice on the Bank's capital needs. Recent innovations have been designed to reduce the pro-cyclicality of those estimates, and to encompass a wider range of risks.

## 1 Introduction

The Basel Committee on Banking Supervision (BCBS) sets standards for the capital adequacy of commercial banking groups. These standards apply to international banking groups headquartered in BCBS member countries, but they have been adopted much more widely as they are recognised as international best practice. In its prudential supervision of registered banks in New Zealand, the Reserve Bank imposes capital adequacy requirements that are broadly in line with the Basel standards.<sup>1</sup>

The BCBS has significantly strengthened its capital adequacy framework in recent years in light of the global financial crisis, by issuing the documents known as "Basel 2.5" (BIS, 2011a) in 2009 and "Basel III" (BIS, 2011b) in 2010. These build on the so-called "Basel II" (BIS, 2006), which contains many of the central principles of the BCBS's current approach to capital adequacy.

In managing its own capital adequacy the Reserve Bank is not subject to regulatory capital requirements, but keeps abreast of regulatory requirements and banking industry best practice, as approaches to risk and capital modelling evolve. In particular, the Reserve Bank has adopted various components of the most recent BCBS developments as appropriate, while running additional methods tailored to fit its own balance sheet.

The Reserve Bank's balance sheet reflects its policy needs and objectives, and is rather different from those of commercial banks. Nevertheless, the Reserve Bank is subject to some of the same risks as commercial banks, namely market risk (profit or loss arising from changes in interest rates and foreign exchange rates), credit risk

(arising from financial market derivative contracts and debt investments), and operational risk. Section 2 of this article explains the composition of the Reserve Bank's balance sheet and the risks it gives rise to, and the reasons why the Reserve Bank needs adequate capital to manage those risks.

Section 3 of this article outlines the Reserve Bank's approach to financial risk measurement. The section defines both market and credit risk, describing the processes and methods used to allocate capital to these risk factors, including enhancements drawn from recent BCBS changes. This risk-based capital allocation is analogous to the regulatory capital requirement that a commercial bank is required to calculate.

Section 4 explains how the Reserve Bank considers whether to add an additional capital overlay or buffer on top of its risk-based capital calculation. It does so using a set of forward-looking stress tests, to assess whether the results of the risk-based capital modelling are adequate. As at other institutions, the Reserve Bank uses the term 'economic capital' to describe the total amount of capital the organisation proposes to hold, including any buffer.

Section 5 concludes.

## 2 The Reserve Bank's balance sheet risk profile

The Reserve Bank's capital is provided by the New Zealand Government, and under the Reserve Bank of New Zealand Act 1989 (the Act), the Reserve Bank makes annual dividend payments to the Crown. The Act (section 162) requires the Reserve Bank to recommend to the Minister of Finance the amount of the dividend to be paid, and to do so in accordance with principles set out in the Reserve Bank's annual *Statement of Intent* (SOI) (RBNZ,

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<sup>1</sup> The details are available at [http://www.rbnz.govt.nz/regulation\\_and\\_supervision/banks/banking\\_supervision\\_handbook/](http://www.rbnz.govt.nz/regulation_and_supervision/banks/banking_supervision_handbook/)

2013). The dividend principles in the SOI are:

- The Bank should maintain sufficient equity for the financial risks associated with performing its functions. Equity in excess of that required to cover those risks will be distributed to the Crown.
- In general, unrealised gains (profits) should be retained by the Bank until they are realised in New Zealand dollars. However, the Bank may recommend the distribution of unrealised gains where the Bank believes that the probability of the gain being realised is high.

Given this accountability, and policy commitments under the Act, the Reserve Bank aims to maintain adequate capital to support its functions and commitments while minimising the possibility that balance sheet risks could cause it to run short of capital and report negative equity. This article outlines how the Reserve Bank reaches a view on what that ‘adequate capital’ is.

(Negative equity would have quite different implications for the Reserve Bank than for a commercial bank. It would still be able to carry out its day-to-day functions,<sup>2</sup> but having negative or low reported equity could undermine the institution’s credibility, and – in a worst case scenario – potentially diminish its ability to implement policy.)

Viewed from a financial risk management perspective, the Reserve Bank’s key facilities are its New Zealand Dollar (NZD) liquidity operations that support monetary policy and New Zealand’s money markets, and its portfolio of foreign reserve assets that can be used to finance market intervention, including FX intervention, to support monetary policy and/or reduce market dysfunction.

Figure 1 includes a stylised picture of the Reserve Bank’s balance sheet. This broadly illustrates the relative composition of the Reserve Bank’s assets and liabilities in the 2012/2013 financial year, and the ‘transformation trades’ that the Reserve Bank uses to transform the balance sheet to achieve its strategic composition of asset and foreign currency positions.

The illustration highlights three key elements: the

<sup>2</sup> A central bank is often able to operate ‘normally’ despite negative equity, as seigniorage can be used to recapitalise it through time. The long-term nature of seigniorage-related income finds seigniorage sometimes referred to by central banks as ‘shadow capital’.

dominance of the foreign reserve assets portfolio (foreign reserve assets); a large and variable foreign currency position (foreign currency purchases);<sup>3</sup> and the use of foreign exchange swaps to transform NZD liabilities into foreign currency funding (without taking on additional foreign exchange risk).<sup>4</sup>

There are also two key internal policy decisions that vary the risk impact of these three balance sheet elements: the aforementioned strategic composition of assets and foreign currency positions; and the Reserve Bank’s counterparty credit policy that controls the level of credit risk arising from the foreign exchange swap portfolio.

Figure 1  
Stylised Reserve Bank balance sheet

Assets	Transformation Trades	Liabilities & Equity
Foreign Reserve Assets	Foreign Currency Loans	
	Foreign Currency Purchases	Deposits from Banks
	Foreign Exchange Basis Swaps	Currency in Circulation
	Foreign Exchange Swaps	Crown Settlement Account
Other NZD Assets incl. Reverse Repo		
NZ Govt Bonds		Equity & Reserves

### Strategic Asset Allocation

As the Reserve Bank needs to maintain its crisis intervention capability at all times, it holds its ‘core’ foreign reserves assets in markets and instruments that demonstrate deep liquidity under all market conditions. This choice of instruments and currencies is collectively referred to as the Reserve Bank’s Strategic Asset

<sup>3</sup> The Reserve Bank has a policy of maintaining a portion of its foreign reserves on a currency unhedged basis (unhedged foreign reserves). The size of this position largely depends on the Reserve Bank’s exchange rate intervention operations, where buying (selling) NZD would result in a decrease (increase) in the unhedged foreign reserves. (See Eckhold (2010a) and Eckhold (2010b) for more details.)

<sup>4</sup> The majority of foreign reserves, in the illustrated example, are funded by NZD denominated liabilities. A portfolio of foreign currency loans from the New Zealand Debt Management Office makes up the remainder.

Allocation (SAA)<sup>5</sup>

Figure 2 outlines the Reserve Bank's current SAA across the six major sovereign debt and currency markets to which core reserve assets are allocated. The sovereign debt allocation determines the Reserve Bank's target mix of sovereign debt instruments, while the foreign exchange allocation determines the composition of the Bank's foreign currency position. Bonds and bills are differentiated in this process, as they have different duration and liquidity characteristics<sup>6</sup>

As the SAA determines a large part of the Reserve Bank's balance sheet composition, it has a high impact on the risk profile of the balance sheet. It drives in particular:

- the credit risk the Reserve Bank faces in holding debt obligations (bills and bonds) issued by selected governments;
- the interest rate risk arising from the purchase of fixed rate debt obligations (where bonds have a longer duration than bills and as a result generate greater interest rate risk); and
- the characteristics of the foreign exchange risk arising from the Reserve Bank's foreign currency position.

Figure 2  
The current SAA

Sov. Debt	Bills	Bonds	Foreign Ex.	
USA	36.5%	7.5%	USD	25%
Europe	12.5%	5.0%	EUR	25%
Japan	8.5%	6.5%	JPY	5%
UK	7.0%	2.1%	GBP	15%
Canada	6.5%	3.5%	CAD	10%
Australia	0.0%	4.4%	AUD	20%
Total		100.0%	Total	100%

### Counterparty credit risk policy

The Reserve Bank maintains a portfolio of derivative contracts, including foreign exchange swaps and 'reverse repos' (securities purchase and resale agreements).

<sup>5</sup> Foreign currency investments (or foreign reserves) raised and funded through domestic market liquidity operations are not deemed 'core' reserves. Rather than being diversified into SAA specified markets, these reserve assets, which tend to be short-dated in nature, are predominantly invested in USD denominated supra-nationals and government agency debt.

<sup>6</sup> Bonds are generally more market liquid but also carry greater interest rate risk, depending on the target duration for bonds (as identified in the SAA modelling process).

These are the 'transformation trades' shown in figure 1. Each of these contracts exposes the Reserve Bank to the creditworthiness of the counterparty to the trade, for as long as it is outstanding.<sup>7</sup> These include trades associated with the provision of NZD liquidity facilities for New Zealand's registered banks. To keep levels of counterparty risk low, the Reserve Bank requires counterparties to provide collateral to mitigate credit exposures as they arise, and continuously vets the banks with which it transacts. This credit risk management process includes a credit scoring system that is not unlike those run by credit rating agencies, but with a greater emphasis on market indicators, such as credit spreads. Exposure limits are set for these counterparties depending on their credit score.

## 3 Risk-based capital methodology

The Reserve Bank's capital adequacy framework ensures that its capital is adequate to support its functions and commitments. The framework minimises the possibility that balance sheet risks and/or financial market conditions could cause the Reserve Bank to run short of capital and report negative equity. This is a continuous process which chiefly involves the monitoring of daily Value at Risk (VaR) numbers and measures of operational risk. However, the Reserve Bank's risk management team also monitors its asset and liability portfolios in light of market activity on an on-going basis.

These processes ensure that the Bank is unlikely, over certain specified time periods,<sup>8</sup> to suffer a financial loss through credit, market or operational risk that would result in negative equity.

The processes for assessing the potential loss from credit, market and operational exposures are different from one another, and accordingly are discussed separately in the following.

<sup>7</sup> The exposure arising at any given time on such a contract is the amount (if any) that the counterparty owes the Reserve Bank under the contract, based on current market prices, and taking account of any collateral provided to the Reserve Bank. This is typically much less than the 'notional principal', that is, the reference amount of the underlying instrument(s) on which the contract is based.

<sup>8</sup> Various time periods are considered. VaR produced as part of the Bank's daily risk reporting processes is calibrated to test potential loss over one day (24 hours), while stress and capital models consider longer periods.

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## Market risk measurement

Market risk is the risk that the value of an asset or liability changes due to movements in the market variables that affect its pricing, normally foreign exchange rates, interest rates or yields, credit spreads, and basis spreads.<sup>9</sup>

As already noted in the balance sheet risk section, the Reserve Bank's principal market risks are foreign exchange and interest rate risk. These vary through time according to SAA decisions and the size of the Reserve Bank's foreign exchange position.

No matter the asset class, four key components drive the magnitude of the market risk arising from taking a position in a given instrument. These are the size of the position, the volatility of the factors affecting the instrument's pricing, the liquidity or holding period of the position, and, if the position is part of a portfolio, the correlation of factors across the portfolio, that is, the extent to which various factors move together.

The Reserve Bank uses Value at Risk (VaR) models to capture these factors and estimate the potential loss from holding a given portfolio for a specified period. (VaR is a statistical measure that uses historical market price data to estimate the maximum potential loss from holding a given portfolio over a certain time frame, normally one or ten days, to a certain degree of confidence, often 99 percent or 99.9 percent).

VaR models are used by the Reserve Bank both on a daily basis, as part of its routine risk management process, and to calculate risk-based capital.<sup>10</sup> VaR results not only estimate potential losses, but also give the Reserve Bank useful insight into the variability of the potential loss as less visible elements (namely factor volatility and correlation) change through time.

A critical component in the Reserve Bank's routine VaR computations is the liquidity of each position. In the context of market risk, liquidity is the expected time it takes to sell down or unwind a position or portfolio, and is typically measured in days. The Reserve Bank's core reserves, for example, are extremely liquid and could

be sold down within one day if necessary, whereas its currency swap portfolio is less liquid, and would take longer to unwind or neutralise (if the need were to arise), potentially exposing the Reserve Bank to greater losses.

However, for determining risk-based capital for market risk, it is important for the Reserve Bank to consider the extent to which it would actually reduce its individual positions or portfolios, given its policy obligations and the circumstances at the time. For example, if faced with falling prices for US Treasury debt, the Reserve Bank might not act as quickly as a commercial bank to reduce its positions in those assets. Rather, the Reserve Bank would likely hold those positions in the short to medium term to maintain the strategic composition of foreign reserves. The Reserve Bank therefore needs to use holding period assumptions that take account not only of observations of actual market liquidity (such as market-wide trade volumes or market turnover), but also of how long the Reserve Bank expects that it would hold the positions in practice.

Holding periods (for each of the Bank's positions) are an influential factor in computing market risk capital, since they define the observation periods over which pricing factor volatility is measured.

The results of the market risk capital VaR calculations are included in figure 4 (overleaf).

The concept of 'stressed VaR' was introduced under Basel 2.5 during 2009, and was subsequently introduced in many jurisdictions outside New Zealand in 2011. The normal VaR method uses a 'trailing window' of input data, that is, the most recent historical data up to the calculation date. Regulatory capital based on the results of trailing window VaR is inherently pro-cyclical, in the sense that it is lower during periods when price volatility is lower: a bank that relies on this measure may therefore reduce its capital during such a period, and may then turn out to have insufficient capital to handle losses when volatility increases again. The stressed VaR approach was developed to help combat this pro-cyclicality in the trailing window approach.

The stressed VaR approach is a relatively simple enhancement of standard VaR, in that it uses essentially the same calculation methodology, but with different input

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<sup>9</sup> Under the terms of a foreign exchange basis swap, for example, one party receives a fixed spread (throughout the life of the trade) known as the 'basis swap spread'.

<sup>10</sup> Both delta-normal and historical simulation models are used for risk-based capital calculations

data. Rather than using the trailing window of historical data, stressed VaR uses data from a fixed historical period over which the institution in question suffered particularly heavy losses from market price movements. For many commercial banks, this was the period immediately following the Lehman Brothers collapse on 15 September 2008.

By measuring market risk using the stressed VaR as well as the standard VaR approaches, the Reserve Bank can see the impact that elevated market volatility has on market risk, and is more aware of the historical scenarios which would be most disruptive for the current balance sheet.

**Figure 3**  
Distribution of VaR and stressed-VaR simulation results

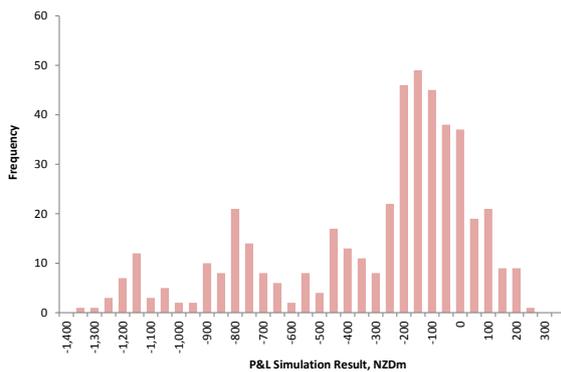


Figure 3 illustrates the distribution of the Bank's market risk VaR results using market data captured between October 2008 and April 2013. As the dataset includes the stressed period, which is selected to produce the most extreme possible losses, it is not surprising to see that the distribution is negatively skewed.

### Credit risk measurement

Credit risk is the risk that a counterparty fails to meet a financial obligation, either defaulting on the obligation altogether, or making a deferred or discounted payment.

As noted in the balance sheet risk section above, the principal credit risks borne by the Reserve Bank arise from holdings of government debt instruments within the SAA, and counterparty credit exposures that arise from derivative transactions, or 'issuer risk' and 'counterparty credit exposure', respectively.

The Reserve Bank determines its capital allocation for credit risk using a modified version of the Basel II credit VaR approach.<sup>11</sup> The data inputs to this methodology include issuer risk positions, counterparty credit exposures, the probability of issuer or counterparty default, correlations between defaults across different counterparties and issuers, and the expected percentage of the exposure recovered in the case of issuer or counterparty default.

As with market risk, the Reserve Bank calculates credit risk capital using two different sets of input data: one drawn from a three year trailing window of the most recent historical data, and one drawn from a period of credit stress.

The Basel II credit VaR approach is relatively prescriptive about the credit risk factors to be used, with the exception of default probabilities. For these, the Reserve Bank, like other financial institutions, mostly uses historical default statistics published by the credit rating agencies. This approach allows the Reserve Bank to base default probabilities on actual default rates, rather than using default probabilities implied by market prices (which are, generally speaking, both higher and more volatile). This in turn provides a relatively stable capital result.

However, for counterparties with the strongest credit rating (AAA or equivalent), historical observations persistently give a one-year default probability of zero. And while the likelihood of an AAA-rated entity defaulting in any given year is certainly very remote (based on historical default rates), it is doubtful that the default probability is truly zero. Instead of using 0 percent, in the trailing window VaR calculation the Reserve Bank uses the Basel II stipulated minimum default rate of 0.03 percent, and in the stressed VaR calculation, uses one tenth of the cumulative ten year default probability for AAA-rated entities.<sup>12</sup>

<sup>11</sup> Basel III has adapted the Basel II capital requirements for counterparty credit risk (CCR) to include projected counterparty exposures using stressed factors. As the Reserve Bank does not take uncollateralised exposure to its commercial banking counterparties, the most useful aspect of Basel III CCR is the concept of stressing input factors.

<sup>12</sup> The credit risk models include a default probability for the New Zealand Government, but this is largely offset by high recovery rate assumptions for holdings of New Zealand Government debt. These assumptions reflect the New Zealand Government's role as the Reserve Bank's capital provider.

## Combined risk-based capital

Figure 4 shows the outputs of the Reserve Bank's market and credit risk capital models using both standard VaR and stressed VaR. As the stressed VaR results are the largest, the stressed VaR results combine with the operational risk allocation to make up the Bank's risk-based capital requirement.<sup>13</sup>

Simply summing the capital needed for each risk, as in figure 4, implies an assumed correlation of 100 percent between the risks. In practice however, it is unlikely that all risk factors would crystallise at the same time: in other words, there are benefits from having a diversified portfolio. Indeed, summing the capital components listed in figure 4 using an 85 percent correlation assumption would give a \$2,200 million capital requirement. However, as correlations tend to change significantly during financial crises, the Reserve Bank is generally cautious about correlation modelling and assumes the worst case (100 percent).<sup>14</sup>

Figure 4  
Combined risk-based capital

Capital Model	Result (NZD)
Market Risk VaR	425m
Market Risk Stressed VaR	1,350m
Credit Risk VaR	350m
Credit Risk Stressed VaR	900m
Operational Risk	50m
<b>Proposed Capital</b>	<b>2,300m</b>

## 4 Stress-testing risk-based capital

To supplement VaR measures – which are historically bound in their use of historical volatility and correlation data – the Reserve Bank's stress-testing process aims to find hypothetical market and credit risk related scenarios that generate significant financial loss.<sup>15</sup>

<sup>13</sup> Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. The Reserve Bank uses a Basel II standardised approach to quantify operational risk.

<sup>14</sup> By historical observation, correlation between the Reserve Bank's interest rate risk and credit risk factors is high because of its large holdings of government and agency debt. However correlation between credit and foreign exchange risk is not so intuitive, and is heavily dependent on the observation period.

<sup>15</sup> Although scenarios are forward-looking, many are calibrated to historical data. For example the NZD appreciation modelling in scenario (1) is calibrated in light of recent NZD appreciation (from early 2009).

In the context of the capital framework, stress testing is used to test the adequacy of risk-based capital. Where stress scenario results are found to exceed risk-based capital, the Reserve Bank's ALCO (Asset and Liability Committee<sup>16</sup>) will consider the case for establishing a buffer of additional capital. As these considerations relate to the results of hypothetical extreme events, the process is not prescriptive.

As part of reviewing its level of economic capital, the Reserve Bank has considered the results of four stress tests. Each of the four stress scenarios includes changes in credit risk, in the form of modified default probabilities, and in market risk, in the form of modified foreign exchange rates, interest rate spreads, and basis spreads. The main features of each stress scenario are as follows:

- Scenario (1) assumes a disruption to food supplies beyond New Zealand's borders, resulting in a sharp appreciation of the NZD against the currencies of all of New Zealand's main trading partners.
- Scenario (2) – a global supply or inflationary shock – pushes interest rates higher in all of the major markets in which the Reserve Bank holds its reserves. Such a shock could for instance be triggered by disruption to primary energy markets.
- Scenario (3) models the impact of elevated default probabilities and market volatility, triggered by a significant credit event in the financial or government sector outside New Zealand.
- Scenario (4) considers the market and credit risk repercussions of an international humanitarian crisis and/or displacement event, such as a bird-flu pandemic, or a major act of terrorism.

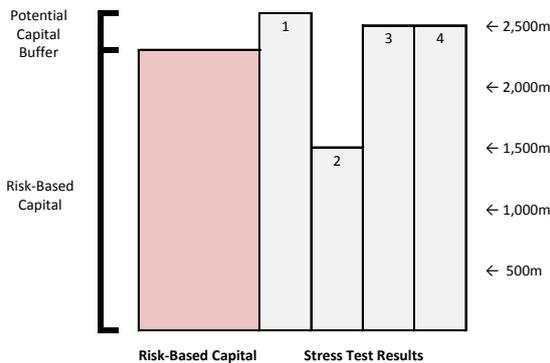
The Reserve Bank's risk management team presents the stress testing results to the ALCO alongside the VaR results, and in some instances where stress testing results are positive, replaces them with VaR results (which reflect losses). For example, in scenarios (3) and (4), credit risk losses are expected to be partially offset by a falling NZD exchange rate, which would generate mark-to-market profit for the Reserve Bank on its foreign exchange

<sup>16</sup> ALCO is responsible for overseeing the risk management of the Reserve Bank's balance sheet, and related to that, makes recommendations on all decisions relating to its capital adequacy.

position. However, although NZD weakness is indeed the more likely market reaction as economic activity contracts under this scenario, it is possible that the NZD does not move significantly (or appreciates). In scenario (4) for instance, the NZD might be supported by demand for it as a relatively safe haven currency, depending on the countries affected by the incident and the relative demand for New Zealand assets or exports. In this instance the foreign exchange gains projected under the stress scenario are replaced by the potential loss calculated using the VaR model. In this way the Reserve Bank is careful not to rely on common presumptions about the correlations between different market variables, a factor that has proven over the years to be notoriously unpredictable.

Figure 5 illustrates each of the stress testing results alongside risk-based capital.

**Figure 5**  
Risk-based capital and stress scenario results



The Reserve Bank's ALCO has chosen not to recommend a capital buffer on top of the increased amount of \$2,300 million of risk-based capital. This decision was made on the basis that: only the most extreme stress scenarios produced losses sufficient to completely wipe out risk-based capital; the capital shortfall in these scenarios was relatively small and potentially sustainable and/or recoverable (through seigniorage); and in many circumstances the Crown would be able to inject capital as a last resort backer.

## 5 Conclusion

An advanced capital adequacy framework ensures the Reserve Bank remains appropriately capitalised consistent with its policy commitments and risk choices. Capital plays a different role in the Reserve Bank than in a commercial bank – where, for example, it is a key basis for performance measurement. However, as is the case at other financial institutions, the Reserve Bank must continuously question the effectiveness of its processes for identifying and measuring the risks that it faces, and the suitability of its underlying model assumptions.

The recent application of new risk capture methods has further enhanced the robustness of the Reserve Bank's capital adequacy framework. These new techniques reduce capital cyclicality and allow management to better understand both the market and credit conditions that the Bank is able to withstand, and those to which it is potentially vulnerable. The changes to the framework have in this way improved transparency.

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## ANALYTICAL NOTES

**AN2013/04**

### **Estimated Taylor Rules updated for the post-crisis period**

*Ross Kendall and Tim Ng*

The Taylor Rule is often used to describe simply how central banks adjust short-term interest rates in response to economic conditions. We use this approach to analyse monetary policy in New Zealand, Australia, and the United States since the early 1990s. We find that the response of monetary policy to changing economic conditions is similar in New Zealand and Australia. Robust results could not be found for the United States, and in recent years it has become even more difficult to do so as the Federal Reserve has been constrained by the zero lower bound on nominal interest rates.

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## NEWS RELEASES

### **RBNZ committed to strong performance in challenging times**

26 June 2013

The Reserve Bank's commitment to strong performance is underlined in the Bank's Statement of Intent (SOI) for 2013-2016.

Governor Graeme Wheeler said the SOI reflects the Bank's strategic approach to responding to the challenging environment, and outlines the priorities for the next three years.

"The New Zealand economy has been growing more rapidly than many other advanced economies, but it also faces several challenges, including the high New Zealand dollar, the effects of drought, Government fiscal consolidation, the Christchurch rebuild, and the housing market. The Reserve Bank's people, processes and resources are committed to a vision of being a high-performing small central bank.

"The Bank has adopted 10 strategic priorities, many of which run across several functions and departments. These priorities aim to continue to strengthen the Bank's performance, develop a more integrated approach to policy, and further improve infrastructure and reduce enterprise risk," Mr Wheeler said.

Mr Wheeler said the Bank is establishing a new Macro-Financial Department and will undertake more work on the interface between monetary policy and macro-prudential policy.

"The global financial crisis had challenged monetary policy frameworks, including policy objectives and the choice of policy instruments. The Bank will continue to review international experience, and ensure that monetary and macro-prudential frameworks are framed appropriately."

In addition to this, the Bank is progressing towards its goal of delivering a sound and comprehensive prudential regulatory regime.

"The quality of management is a critical factor in continuing to strengthen the Bank's performance culture, and this will be a priority for the years ahead."

Communicating on a broader front, using a wider range of media and an expanded on-the-record speech

programme will also help to strengthen performance by enhancing understanding of the Bank's policy choices, he said.

Other priorities include further investment in developing operational systems and strengthening business continuity.

### **Loan restrictions could help maintain stability**

27 June 2013

The current overheated housing market is a threat to future financial stability and the Reserve Bank is seriously considering the use of macro-prudential tools to help moderate house price inflation pressures.

Macro-prudential policy is intended to be used as needed, to reduce significant but transitory risks affecting the broad financial system.

"With some slack still in the economy, housing cannot yet be described as a threat to overall inflation. Higher interest rates are not the right policy response at this time," Deputy Governor Grant Spencer said in a speech today to Business New Zealand.

While limited house supply is at the heart of the problem, strong demand supported by easy credit is underpinning the rapid escalation of house prices, Mr Spencer said.

New mortgage approvals and loans have been growing at a faster rate and are now comparable with the pre-GFC peak levels.

"The new macro-prudential policy framework has been developed to address just this kind of macro-financial imbalance. The Reserve Bank is therefore seriously considering the use of macro-prudential policy," he said.

The four potential macro-prudential instruments included in a Memorandum of Understanding between the Reserve Bank and the Minister of Finance all work in quite different ways to reduce financial system risk.

"Of the four instruments, the loan-to-value-ratio (LVR) instrument is the one with the best scope to dampen the current strong demand for housing, as well as reducing the risk to bank balance sheets," Mr Spencer said.

"While we believe that LVR restrictions could have

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significant benefits in terms of reducing systemic risk in the housing market, they are not a panacea.

We know that LVR restrictions could introduce market distortions. However, we need to assess inefficiencies against the potentially significant economic and financial damage that could result from a housing boom that ends in a severe housing downturn.

“While macro-prudential policy measures might make credit less accessible for a period, they should help to make house prices more affordable in the longer term,” Mr Spencer said.

In the pre-GFC housing boom, with hindsight and with the macro-prudential framework we now have, we would most likely have applied macro-prudential instruments with the aim of reducing systemic risk. In the current situation, with house prices and household debt ratios starting from much higher levels, and with interest rates at historically low levels, the risks to financial stability may well be greater,” Mr Spencer said.

## **Reserve Bank Bulletin released**

*1 July 2013*

The Reserve Bank today released the June 2013 edition of the Reserve Bank Bulletin.

The Bulletin’s first article looks at how the Reserve Bank’s new macro-prudential framework and associated tools could have been used if they had existed over the past financial cycle. The article says that with hindsight, there would have been a case for macro-prudential intervention from 2005 onwards.

The Bulletin’s second article outlines the background of the covered bond market then goes on to look at the benefits, and challenges, arising from banks’ issuance of covered bonds and the Reserve Bank’s response to the development of a covered bond market in New Zealand.

The Bulletin’s third article examines New Zealand exchange rate and monetary regimes over the past five decades, and whether or not different regimes have made a difference to long-term real effective exchange rates. The article suggests that fixed, managed and floating exchange rate regimes have had little effect on overall movements in the real effective exchange rate.

The exchange rate regimes article was developed from a paper delivered at a Reserve Bank/Treasury forum in March. A summary of that forum by Assistant Governor John McDermott, published in the Bulletin, concludes that reducing the average real exchange rate matters for reversing New Zealand’s poor long-term economic performance but that monetary policy can’t make a sustained difference to the real exchange rate. Other policy measures that might alter the savings / investment mix warrant serious consideration.

The *Bulletin* also carries abstracts from three Analytical Notes published recently by the Reserve Bank, a collection of recent news statements issued by the Reserve Bank, and an index of discussion papers and analytical notes published over the past two years.

## **Rod Carr new Chair of Reserve Bank Board**

*23 July 2013*

Dr Rod Carr has been elected Chair of the Reserve Bank’s Board of Directors, replacing Dr Arthur Grimes, who is stepping down from the Board after 11 years’ service as Chair of the Board.

The Board has also re-elected Sue Sheldon CNZM as Deputy Chair, a position she has held since September 2009. Dr Grimes’ term as Chair and a Director ends on 18 September and Dr Carr’s appointment will take effect from 19 September.

Governor Graeme Wheeler paid tribute to Dr Grimes’ contribution. “Arthur has been an outstanding Chair over the past 11 years, and we have benefited greatly from his expertise. A highly respected economist, Dr Grimes has brought intellectual rigour and sound judgment in chairing the Board and monitoring the Bank’s performance.”

Dr Carr is Vice-Chancellor of University of Canterbury, and was re-appointed to the Reserve Bank Board in July 2012. He was previously Managing Director of Jade Software Corporation Ltd, and had a distinguished career in the banking sector, most recently at the Reserve Bank, where he served as Deputy Governor and director between July 1998 and July 2003, and was Acting Governor for five months. Prior to this, Dr Carr spent 11 years in commercial

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banking, including as a senior executive at the National Australia Bank in Melbourne.

Dr Carr holds a PhD in Insurance and Risk Management from The Wharton School, University of Pennsylvania, an MBA in Money and Financial Markets from Columbia University, New York, MA in Applied Economics and Managerial Science and undergraduate honours degrees in law and in economics. In 2006 he was named NZ Hi-Tech Company Leader of the Year.

Dr Carr is a director of Lyttelton Port Company Ltd. He chairs the National Infrastructure Advisory Board is a Trustee of the Christchurch Appeal Trust and a director of the Canterbury Employers' Chamber of Commerce.

Married with four children, Dr Carr spends his spare time swimming and running and has completed 18 international marathons on six continents over the past 10 years.

Reserve Bank Directors are appointed by the Minister of Finance for five-year renewable terms, and Directors elect their Chair and Deputy Chair from among their numbers for one-year terms.

The Board's primary function is to monitor the performance of the Governor and the Bank on behalf of the Minister of Finance. It has the responsibility of assessing whether the quarterly Monetary Policy Statements are consistent with the Policy Targets Agreement between the Minister and the Bank, and it monitors the Bank's six-monthly Financial Stability Reports.

## **OCR unchanged at 2.5 percent**

*25 July 2013*

The Reserve Bank today left the Official Cash Rate (OCR) unchanged at 2.5 percent.

Reserve Bank Governor Graeme Wheeler said: "The global outlook remains mixed, with the euro area still in recession and signs of slower growth in China and Australia, but more positive recent indicators in the United States and Japan. Global debt markets have become more cautious due to uncertainty around the Federal Reserve's anticipated exit from quantitative easing.

"Growth in the New Zealand economy is picking up and, although uneven, is becoming more widespread across

sectors. Consumption is increasing and reconstruction in Canterbury will be reinforced by a broader national recovery in construction activity, particularly in Auckland. This will support aggregate activity and eventually help to ease the housing shortage.

"In the meantime rapid house price inflation persists in Auckland and Canterbury. As previously noted, the Reserve Bank does not want to see financial or price stability compromised by housing demand getting too far ahead of the supply response.

"Despite having fallen on a trade-weighted basis since May 2013, the New Zealand dollar remains high and continues to be a headwind for the tradables sector, restricting export earnings and encouraging demand for imports. Fiscal consolidation will weigh on aggregate demand over the projection horizon.

"CPI inflation has been very low over the past year, reflecting the high New Zealand dollar and strong international and domestic competition. However, inflation is expected to trend upwards towards the mid-point of the 1-3 percent target band as growth accelerates over the coming year.

"The extent of the monetary policy response will depend largely on the degree to which the growing momentum in the housing market and construction sector spills over into inflation pressures.

"Although removal of monetary stimulus will likely be needed in the future, we expect to keep the OCR unchanged through the end of the year."

## **Two new appointments to RBNZ board**

*12 August 2013*

The Minister of Finance, Hon Bill English, has appointed two directors to the Reserve Bank board to fill two vacancies.

Jonathan Ross, who joins the Board today, is a barrister and solicitor with experience in corporate, securities, capital markets and banking transactions law.

Mr Ross replaces Dr Chris Eichbaum, whose five-year term expired on 31 July.

Bridget Liddell joins the board as a director on 1 October. Ms Liddell has venture capital and investment

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background, with international governance experience across a range of global companies and enterprises.

She will replace Dr Arthur Grimes whose term as Chair and a Director ends on 18 September. Dr Rod Carr was last month elected as Chair, and his appointment takes effect from 19 September.

Reserve Bank directors are appointed by the Minister of Finance for five-year renewable terms.

## **Reserve Bank releases response to submissions on high-LVR restrictions**

*13 August*

The Reserve Bank today released its response to submissions (PDF 245KB) following its public consultation on the framework for restrictions on high loan-to-value ratio (LVR) residential mortgage lending.

The Reserve Bank has also released a revised chapter of its Banking Supervision Handbook (BS19) (PDF 252KB) that sets out the draft conditions of registration that would apply in the event that LVR restrictions were introduced.

Deputy Governor Grant Spencer said LVR restrictions are one of four macro-prudential tools the Reserve Bank can use to manage financial system risks that can arise from asset price, credit or liquidity cycles. Use of the tools by the Reserve Bank was recently agreed in a memorandum of understanding with the Minister of Finance.

“LVR restrictions on residential mortgage lending can help to dampen excessive house price growth in periods when credit growth is boosting housing demand beyond housing supply,” Mr Spencer said. “In so doing, they can reduce the risk of a rapid correction in house prices and the economic and financial instability that would ensue.

“In situations where house prices are overvalued, the further that house prices rise, the more likely it is that a disruptive downward correction will occur. Such a correction would be very damaging if combined with a significant deterioration in economic or financial conditions.”

Mr Spencer said that, as a result of feedback received during the consultation, the Bank was making some changes to the way it would implement LVR restrictions.

“High LVR restrictions would involve setting a limit on the proportion of new high-LVR lending that banks are able to do, rather than restricting it altogether. This ‘speed limit’ approach would enable many high-LVR borrowers to continue to obtain mortgages.

“As we originally proposed, banks would be permitted to exempt a limited number of categories of high-LVR loans, when calculating their compliance with a specific speed limit. These include Housing New Zealand mortgage-insured loans, bridging loans, refinancing loans and high-LVR loans to borrowers who are moving home but not increasing their loan amount.

“Banks commonly issue mortgage borrowers with pre-approvals, which represent a firm commitment to provide housing finance and may be valid for up to six months. Some banks have indicated that they might be unable to meet a speed limit in the first few months of it being introduced due to the pipeline of pre-approved loans.

“To address this issue, we have decided that banks would initially be required to meet a speed limit on high LVR lending measured as an average rate over a six-month window. Thereafter, the speed limit for banks with lending in excess of \$100 million per month would apply to the average rate over three-month windows, as originally proposed. However, we would expect the banks to modify their approach to issuing pre-approvals, in order to ensure that they fall within any speed limit on an ongoing basis.

“Banks with mortgage lending below \$100 million per month will be required to meet the speed limit on the average high-LVR lending rate over six-month rolling windows, to reflect the greater volatility seen in their high-LVR mortgage lending.

“We have also clarified our intended treatment of branches of overseas banks operating in New Zealand. LVR restrictions would apply only to the New Zealand balance sheet of the registered bank and not the offshore branches of the international bank. However, the registered bank branch in New Zealand would be prohibited from assisting other parts of the international bank to write high LVR mortgage loans.”

Mr Spencer said that if LVR restrictions are implemented, bank management and directors will be

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expected to follow the spirit, not just the letter of the restrictions.

“In particular, they will need to ensure that the policy is not avoided or undermined through innovative lending practices. We will be maintaining a close dialogue with the banks.

“As previously advised, the Reserve Bank would announce any decision to implement LVR restrictions at least two weeks in advance of the restrictions taking effect.”

## **Limits for high-LVR mortgage lending**

*20 August 2013*

Reserve Bank Governor Graeme Wheeler today announced that from 1 October banks will be subject to restrictions on high loan-to-value ratio (LVR) housing mortgage loans.

Banks will be required to restrict new residential mortgage lending at LVRs of over 80 percent to no more than 10 percent of the dollar value of their new housing lending flows.

In a speech today at Otago University, Mr Wheeler said: “Housing plays a critical role in our economy. It represents almost three quarters of household assets, and mortgage credit accounts for over half of banking system lending. Housing is a major source of value and of risk to the household sector and the banking system.

“The Reserve Bank is concerned about the rate at which house prices are increasing and the potential risks this poses to the financial system and the broader economy. Rapidly increasing house prices increase the likelihood and the potential impact of a significant fall in house prices at some point in the future. This is particularly the case in a market that is already widely considered to be over-valued.

“House prices are high by international standards when compared to household disposable income and rents. Household debt, at 145 percent of household income, is also high and, despite dipping during the recession, the percentage is rising again. Furthermore, the growth in house prices is occurring after only a small correction following the house price boom of 2003-2007

that saw New Zealand house prices increase more rapidly than in any other OECD country.

“The Reserve Bank is not alone in expressing these concerns. Over the past several months the IMF, OECD, and the three major international rating agencies have pointed to the economic and financial stability risks associated with New Zealand’s inflated housing market.

“The LVR restrictions are designed to help slow the rate of housing-related credit growth and house price inflation, thereby reducing the risk of a substantial downward correction in house prices that would damage the financial sector and the broader economy.

“The conventional mechanism to help restrain housing demand, while working on the supply response, would be to raise the Official Cash Rate (OCR), which would feed through directly into higher mortgage rates.

“However, while higher policy rates may well be needed next year, as expanding domestic demand starts to generate overall inflation pressures, this is not the case at present. CPI inflation currently remains below our 1 to 3 percent inflation target. Furthermore, with policy rates remaining very low in the major economies, and falling in Australia, any OCR increases in the near term would risk causing the New Zealand dollar to appreciate sharply, putting further pressure on New Zealand’s export and import competing industries.

“In the current situation, where escalating house prices are presenting a threat to financial stability but not yet to general inflation, macro-prudential policy offers the most appropriate response,” Mr Wheeler said.

“The Reserve Bank considers that LVR speed limits will be more effective than other macro-prudential tools in constraining private sector credit growth in the housing sector, and dampening housing demand. Other macro-prudential instruments, such as counter-cyclical capital buffers and capital overlays on sectoral capital requirements, are likely to have less effect on the demand for housing-related credit and on house price growth.

“We are concerned to ensure that specially designed lending products are not developed with the purpose of avoiding or undermining the LVR restrictions. The Reserve Bank expects bank senior management and bank boards

to respect the spirit and intent of the LVR restrictions and to closely monitor the level of high LVR lending.

“How long LVR restrictions may remain in place depends on the effectiveness of the measures in restraining the growth in housing lending and house price inflation. LVR limits will be removed if there is evidence of a better balance in the housing market and we are confident that their removal would not lead to a resurgence of housing credit and demand,” Mr Wheeler said.

“It is critical that priority be given to implementing measures needed to relieve the shortage of housing and land supply, which is the dominant cause of the increase in house prices in Auckland and Christchurch. But the LVR restrictions have a useful role to play alongside the supply measures.”

## **RBNZ MPS/OCR and FSR dates for 2014-2015**

*22 August 2013*

Following is the Reserve Bank’s schedule for the release of its quarterly Monetary Policy Statements (MPS), the intervening Official Cash Rate (OCR) reviews, and the six-monthly Financial Stability Reports. The schedule covers 2014 and the first half of 2015.

Each Monetary Policy Statement includes an OCR announcement.

Announcements are made at 9.00am on the day concerned and are posted to the Reserve Bank website shortly after. Media conferences are held at the release of all MPS and FSRs, and these are webcast live on the website.

### **Monetary Policy Statement/Official Cash Rate announcements**

30 January 2014	OCR
13 March 2014	OCR & MPS. Media conference and webcast.
24 April 2014	OCR
12 June 2014	OCR & MPS. Media conference and webcast.
24 July 2014	OCR
11 September 2014	OCR & MPS. Media conference and webcast.

30 October 2014	OCR
11 December 2014	OCR & MPS. Media conference and webcast.
29 January 2015	OCR
12 March 2015	OCR & MPS. Media conference and webcast.
30 April 2015	OCR
11 June 2015	OCR & MPS. Media conference and webcast.

### **Financial Stability Report**

14 May 2014	FSR. Media conference and webcast.
12 November 2014	FSR. Media conference and webcast.
13 May 2015	FSR. Media conference and webcast.

The Reserve Bank reserves the right to make changes to this schedule, if required, due to unexpected developments. In such an event, the markets and the media would be given as much warning as possible.

## **Westlake Boys High School wins Monetary Policy Challenge**

*23 August 2013*

The Reserve Bank has announced today that Westlake Boys High School from Auckland is the national winner of the Reserve Bank 2013 Monetary Policy Challenge (MPC). Saint Kentigern College from Auckland was placed second and Christchurch Girls’ High School came third.

The MPC is designed to expand senior secondary school economics students’ understanding of monetary policy, and it links to NCEA achievement standards.

The national final took place at the Reserve Bank in Wellington yesterday and was strongly contested. The judges were Assistant Governor John McDermott and two Bank economists, Geordie Reid and Nick Sander.

The judges said that all the presentations were excellent, using appropriate frameworks to provide sound justifications for each team’s individual decision. They were particularly impressed with the clear understanding of the role and limits of monetary policy shown by the Westlake Boys High School team.

“All the schools coped extremely well with some very challenging questions and their teamwork was first rate,”

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Dr McDermott said.

Westlake Boys High School won \$2500 in prize money for their school and will visit the Reserve Bank on 12 September to watch the release of the next Monetary Policy Statement by Governor Graeme Wheeler.

Saint Kentigern College won \$1500 and Christchurch Girls High School won \$750 in prize money for their respective schools. The other competitors in the national final were Hutt Valley High (Wellington), Waitaki Girls' High (Oamaru) and Tauranga Boys' College.

Just like economists working in the Reserve Bank, each team analyses the economic conditions facing New Zealand and the outlook for inflation. On the basis of that analysis, they decide on an appropriate setting for the Official Cash Rate (the Reserve Bank's interest rate). Each team provides the reasons for their decision in a written submission and, if selected as a regional or national finalist, an oral presentation.

"It was really great to see how much effort teams had put into the competition, and their breadth of knowledge about economic principles and the role of the Reserve Bank," Dr McDermott said.

The MPC is open to all New Zealand secondary school economics students and runs annually from May to August.

## **Foreign exchange and derivative turnover survey**

*6 September 2013*

New Zealand's foreign exchange market handled an average of US\$12.4 billion per day in April 2013 according to a Reserve Bank survey released today. This is greater than the April 2010 turnover figure of US\$9.5 billion but remains below the high reached in April 2007.

Commenting on the survey, Head of Financial Markets Mark Perry said: "The appreciation of the New Zealand dollar accounts for around two-thirds of the increase in foreign exchange turnover (which is measured in USD terms). In New Zealand dollar terms, average daily turnover rose 10.3 percent. Global foreign exchange turnover rose from US\$4.0 trillion to US\$5.3 trillion per day over the past three years.

These results are part of a triennial survey coordinated by the Bank for International Settlements (BIS) and reported in US dollars. In New Zealand, the survey captured the activity of the five major banks participating in the local wholesale financial markets.

"Foreign exchange spot turnover in New Zealand is dominated by trading Asia-Pacific currencies such as NZD/USD, USD/AUD, NZD/AUD, and USD/JPY. Together, this accounted for 84 percent of all local spot turnover in April 2013.

Most foreign exchange trading occurs in major international financial centres. NZ dollar turnover accounts for one percent of global turnover, and 91 percent of all New Zealand dollar turnover occurs offshore."

"Turnover in derivative products is also reported, with average daily cross currency basis swap turnover in New Zealand increasing by US\$701 million over the past three years to US\$844 million. This reflects a variety of factors, including local banks' preferences to increase the duration of funding in response to the Global Financial Crisis (and in order to meet domestic prudential liquidity requirements), as well as a notable increase in New Zealand dollar-denominated bond issuance by offshore parties."

More details of the results are included below and the BIS preliminary global report can be found on the BIS website: Central Bank FX Survey.

## **Reserve Bank issues licences to 99 insurers**

*9 September 2013*

The Reserve Bank today announced it had issued licences to 99 insurers.

After a law change in September 2010 all insurers that wanted to continue doing business in New Zealand had three years to apply for and receive a licence. The Insurance (Prudential Supervision) Act is designed to ensure a sound and efficient insurance sector, and to promote public confidence in the insurance sector. New insurers entering the New Zealand market must apply for a licence.

Reserve Bank Head of Prudential Supervision Toby Fiennes said the law recognised the importance of

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adequately protecting policyholder interests, and the public interest, while also ensuring any failure of an insurer didn't significantly damage New Zealand's financial system or economy.

"The Reserve Bank achieves this through a system of licensing insurers, prudential requirements, supervising compliance and acting when an insurer is in financial distress or other difficulties.

"The purpose of the legislation is not to eliminate all risk of insurer failure, but to reduce the likelihood of failure."

Since March 2012 insurers have been operating under provisional licences, while being assessed for a full licence.

Three insurers that are no longer writing new policies in New Zealand continue to retain provisional licences.

#### *More information*

A list of licensed insurers is on the Reserve Bank of New Zealand website.

More information on the Reserve Bank's role as prudential regulator and supervisor for insurers.

## **OCR unchanged at 2.5 percent**

*12 September 2013*

The Reserve Bank today left the Official Cash Rate (OCR) unchanged at 2.5 percent.

Reserve Bank Governor Graeme Wheeler said: "The global outlook remains mixed. GDP growth in Australia and China has slowed and some emerging market currencies have come under considerable downward pressure. At the same time, the major developed economies continue to recover and New Zealand's export commodity prices remain very high.

"Although long-term interest rates have risen globally in recent months, largely due to uncertainty around the timing of the Federal Reserve's exit from quantitative easing, global financial conditions overall continue to be very accommodating.

"In New Zealand, GDP is estimated to have increased by 3 percent in the year to the September quarter. Consumption is rising and reconstruction in Canterbury

will be reinforced by a broader national recovery in construction activity, particularly in Auckland. This will support aggregate activity and start to ease the housing shortage.

"In the meantime rapid house price inflation persists in Auckland and Canterbury. As has been noted for some time, the Reserve Bank does not want to see financial or price stability compromised by continued high house price inflation. Restrictions on high loan-to-value residential mortgage lending, which will come into effect next month, are expected to help slow the national housing market.

"Despite having fallen on a trade-weighted basis since May 2013, the exchange rate remains high. A lower rate would reduce headwinds for the tradables sector and support export industries. Fiscal consolidation will weigh on aggregate demand over the projection horizon.

"CPI inflation has been very low over the past year, partly reflecting the high New Zealand dollar and strong international and domestic competition. However, inflation is expected to rise towards the mid-point of the 1 to 3 percent target band as growth strengthens over the coming year.

"OCR increases will likely be required next year. The extent and timing of the rise in policy rates will depend largely on the degree to which the momentum in the housing market and construction sector spills over into broader demand and inflation pressures. We expect to keep the OCR unchanged in 2013."

## **RBNZ consults on measurement of housing lending**

*20 September 2013*

The Reserve Bank today released a second housing capital consultation paper that reviews how housing loans should be measured.

This follows changes earlier this year to banks' capital requirements for high LVR housing loans and the introduction of LVR restrictions.

Reserve Bank Deputy Governor Grant Spencer said that it is desirable to be more precise about how the loan and valuation terms are defined and calculated.

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The aim of the proposal is to enhance the consistency of these definitions for all banks subject to the LVR restriction and capital requirements for housing loans.

Submissions on the proposals are sought by 25 October 2013.

The consultation paper (PDF 614) is available on the Reserve Bank website:

[http://www.rbnz.govt.nz/regulation\\_and\\_supervision/banks/policy/5463896.pdf](http://www.rbnz.govt.nz/regulation_and_supervision/banks/policy/5463896.pdf)

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## PUBLICATIONS

### Regular publications

*Annual Report*

Published in October each year.

*Financial Stability Report*

Published six-monthly. A statement from the Reserve Bank on the stability of the financial system.

*Monetary Policy Statement*

Published quarterly. A statement from the Reserve Bank on the conduct of monetary policy.

*Reserve Bank of New Zealand Statement of Intent, 2012-2015*

### Recent Reserve Bank Discussion Papers

#### 2012

DP2012/01

The financial accelerator and monetary policy rules

*Güneş Kamber and Christoph Thoenissen*

DP2012/02

Modifying Gaussian term structure models when interest rates are near the zero lower bound

*Leo Krippner*

DP 2012/03

The information content of central bank interest rate projections: evidence from New Zealand

*Gunda-Alexandra Detmers and Dieter Nautz*

DP2012/04

Measuring the stance of monetary policy in zero lower bound environments

*Leo Krippner*

DP2012/05

The macroeconomic effects of a stable funding requirement

*Chris Bloor, Rebecca Craigie and Anella Munro*

DP2012/06

Matching efficiency and business cycle fluctuations

*Francesco Furlanetto and Nicolas Groshenny*

#### 2013

DP2013/01

Export performance, invoice currency, and heterogeneous exchange rate pass-through

*Richard Fabling and Lynda Sanderson*

### Analytical Notes

#### 2012

AN 2012/01

House price expectations of households: a preliminary analysis of new survey data

*Graham Howard and Özer Karagedikli*

AN 2012/02

Kiwi drivers - the New Zealand dollar experience

*Chris McDonald*

AN 2012/03

Currency intervention – the profitability of some recent international experiences

*Enzo Cassino and Michelle Lewis*

AN 2012/04

In search of greener pastures – improving the REINZ farm price index

*Ashley Dunstan and Chris McDonald*

AN 2012/05

A model for interest rates near the zero lower bound: An overview and discussion

*Leo Krippner*

AN 2012/06

Not a jobless recovery, just a slow one

*Rebecca Craigie, David Gillmore and Nicolas Groshenny,*

AN 2012/07

Risk, return, and beyond: A conceptual analysis of some factors influencing New Zealanders' investment decisions

*Elizabeth Watson*

AN 2012/08

Extending the Reserve Bank's macroeconomic balance model of the exchange rate

*James Graham and Daan Steenkamp*

AN 2012/09

Do actual and/or expected OCR changes affect the New Zealand dollar?

*Jason Wong and Bevan Cook*

AN 2012/10

Modelling New Zealand mortgage interest rates

*Enzo Cassino*

AN 2012/11

Building a picture of New Zealand manufacturing

*Gael Price*

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AN 2012/12	Market perceptions of exchange rate risk <i>Michelle Lewis</i>
<b>2013</b>	
AN 2013/01	Productivity and the New Zealand dollar - Balassa-Samuelson tests on sectoral data <i>Daan Steenkamp</i>
AN 2013/02	Drying out: Investigating the economic effects of drought in New Zealand <i>Gunes Kamber, Chris McDonald and Gael Price</i>
AN 2013/03	New Zealand's short- and medium-term real exchange rate volatility: drivers and policy implications <i>Willy Chetwin, Tim Ng and Daan Steenkamp</i>
AN 2013/04	Estimated Taylor rules updated for the post-crisis period <i>Ross Kendall and Tim Ng</i>

### **Pamphlets**

*Explaining Currency*

*Explaining Monetary Policy*

*The Reserve Bank and New Zealand's Economic History*

*This is the Reserve Bank*

*Your Bank's Disclosure Statement – what's in it for you?*

*Upside, downside – a guide to risk for savers and investors, by Mary Holm*

*Supervision of the insurance industry: a quick reference guide*

*For further information, go to [www.rbnz.govt.nz](http://www.rbnz.govt.nz), or contact:*

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## Articles in recent issues of the Reserve Bank of New Zealand *Bulletin*

### **Vol. 75, No. 3, September 2012**

Alan Bollard – Reflections from 2002-12

The economic impact of the Canterbury earthquakes

Asset returns and the investment choices of New Zealanders

Foreign currency reserves: why we hold them influences how we fund them

Dealing with debt: speech to the Auckland Employers and Manufacturers Association

Learnings from the Global Financial Crisis: Sir Leslie Melville Lecture, Australian National University, Canberra

### **Vol. 75, No. 4, December 2012**

Matching workers with jobs: how well is the New Zealand labour market doing?

What is the repo market? Why does it matter?

Recent trends and developments in currency 2011/2012

Financial accounts and flow of funds

### **Vol. 76, No. 1, March 2013**

Measures of New Zealand core inflation

Open Bank Resolution - the New Zealand response to a global challenge

Reserve Bank payment system operations: an update

Developments in New Zealand's overnight indexed swap market

### **Vol. 76, No. 2, June 2013**

The last financial cycle and the case for macro-prudential intervention

Discovering covered bonds - the market, the challenges, and the Reserve Bank's response

Exchange rate fluctuations: how has the regime mattered?

Exchange rate policy forum: Bringing it all together, where does this leave us, and where to from here?

Updating the Reserve Bank Museum