

Reserve Bank of New Zealand *Bulletin*

Volume 76 No. 4, December 2013

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This document is also available at www.rbnz.govt.nz

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ISSN 1174-7943 (print)

ISSN 1177-8644 (online)



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The 2012 Policy Targets Agreement: an evolution in flexible inflation targeting in New Zealand

Ross Kendall and Tim Ng¹

The Policy Targets Agreement (PTA) frames monetary policy conduct. It sets out New Zealand's approach to 'flexible' inflation targeting, which seeks to maintain price stability over the medium term while accommodating, to some degree, shocks that can cause unnecessary economic volatility. A new PTA took effect in September 2012 with the appointment of Governor Graeme Wheeler. This article discusses the new PTA and how the changes fit within the overall monetary policy framework.

1 Introduction

As required by the Reserve Bank of New Zealand Act 1989 (the Act), the Policy Targets Agreement (PTA) between the Minister of Finance and the Governor of the Reserve Bank sets an operational target for the conduct of monetary policy. The target must be consistent with the statutory purpose, set out in section 8 of the Act, of maintaining stability in the general level of prices. The PTA also sets out a range of agreed matters that the Reserve Bank must consider in pursuing the target. The PTA is a key part of the framework for holding the Reserve Bank accountable for its handling of monetary policy.

A new PTA must be agreed whenever there is a change of Governor, and so a new one took effect in September 2012.² It retains a CPI inflation target, but now gives explicit mention to the midpoint of the target range. The new PTA also explicitly requires the Reserve Bank to monitor asset prices, and reiterates the Reserve Bank's longstanding statutory obligation to have regard to the efficiency and soundness of the financial system when pursuing price stability. The rest of this article discusses the main features of the new PTA and how it sets out New Zealand's approach to flexible inflation targeting, and briefly reviews some recently proposed alternatives to CPI inflation targets.

2 Price stability, the PTA and flexible inflation targeting

It is now well established across many countries with floating exchange rates that monetary policy should be geared towards maintaining price stability, reflecting the strong evidence that this is the best contribution monetary policy can make to long-run growth.³

Flexible inflation targeting is a common way of making operational the conduct of monetary policy focused on price stability. More than 20 countries now maintain inflation targeting monetary policy regimes (Roger, 2009).

The basic features of flexible inflation targeting are:

- a. a numerical inflation target, usually specified in terms of CPI inflation;
- b. responding to shocks in such a way that when inflation deviates from the target it returns to target over the medium term (and is expected to do so), without generating unnecessary volatility in the economy in the process; and
- c. transparency about the inflation target and how the central bank responds to shocks, with quantitative economic forecasts often a key feature.

These features aim to provide a high degree of medium-term predictability about the inflation rate (constraining the central bank), while providing the short-term flexibility to recognise broader economic

¹ Tim Ng is now employed by The Treasury. This article was substantially written while he was at the Reserve Bank of New Zealand.

² Both the current and previous PTAs can be viewed at http://www.rbnz.govt.nz/monetary_policy/policy_targets_agreement/

³ See Gillmore (2008) for reviews of the relevant literature.

circumstances. If successful, they help provide a clear anchor for inflation expectations, and facilitate public understanding and endorsement of the role of monetary policy.

Each country sets out its flexible inflation targeting framework somewhat differently. In some cases, the central bank itself sets the target. In other cases, the Minister of Finance sets the target. In many countries, the target is set jointly, as in New Zealand. New Zealand, though, is one of the few countries with a statutory requirement to have, and publish, a formal operational goal.

New Zealand's current (2012) PTA is reproduced in the Appendix.

The numerical inflation target is set out in clause 2. That clause provides the constraint: it requires the Reserve Bank to target a specific, low rate of inflation, which in turn provides a reference point for inflation expectations.

The flexibility around that target is provided by such features as:

- the "on average over the medium term" articulation of the target;
- the 2 percentage point wide target range;
- the special circumstances (such as indirect taxes, price effects of natural disasters and commodity price fluctuations) that are recognised as reasons for temporary deviations of CPI inflation from the target range (clause 3); and
- the requirement, in the pursuit of price stability, to avoid unnecessary volatility in a range of other macroeconomic variables (output, interest rates, the exchange rate), and (as of the 2012 PTA) to have regard to the soundness and efficiency of the financial system (clause 4).

The PTA's inflation target specification is similar to those in other countries, both in terms of its expression and its quantitative parameters. Some emphasise a band while others emphasise a point (Table 1). In most developed countries, inflation targets are clustered around 2 percent.

Table 1
Inflation target specifications in selected economies

Country/Region	Inflation target
New Zealand	Future CPI inflation outcomes between 1 and 3 percent on average over the medium term, with a focus on keeping future average inflation near the 2 percent target midpoint
Australia	CPI inflation between 2 and 3 percent, on average, over the cycle
United Kingdom	2 percent as measured by the 12-month increase in the CPI
Sweden	Annual CPI inflation of 2 percent
Canada	2 percent midpoint of the 1 to 3 percent inflation-control range for the 12-month rate of change in the total CPI
Norway	Annual CPI of approximately 2.5 percent over time
Israel	Annual rate of increase in the CPI between 1 and 3 percent
United States	Inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures
Euro area	A year-on-year increase in the Harmonised Index of Consumer Prices for the euro area of below 2 percent, aim to maintain inflation rates close to 2 percent over the medium term
Japan	2 percent in terms of the year-on-year rate of change in the CPI
Poland	Continuous inflation target of 2.5 percent with a permissible volatility bandwidth of ± 1 percentage point assessed on the basis of the CPI on a year-over-year basis
Chile	Annual CPI inflation around 3 percent most of the time, within a tolerance range of plus or minus one percentage point

Sources: Reserve Bank of Australia (2013), Osborne (2013), Riksbank (2010), Bank of Canada (2011), Norges Bank (2001), Bank of Israel (2012), Bank of Japan (2013), ECB 2003, Federal Reserve (2012), National Bank of Poland (2003), Banco Central de Chile (2007).

The source documents cited above outline both inflation targets and other considerations that the central bank takes into account (whether by choice or by formal requirement) in conducting monetary policy. In that sense, they have some parallels to New Zealand's PTA. Such documents, read as a whole, make clear that there are short-term trade-offs between keeping inflation near target and other economic variables, including output and employment. For example, in the United Kingdom, the Chancellor of the Exchequer's recently renewed monetary policy 'remit' to the Bank of England stated that it may wish to allow inflation to deviate from the target temporarily, in order to avoid undesirable volatility in output or the exacerbation of financial imbalances. In Sweden, the Riksbank's explanation of the monetary policy framework mentions a concern to stabilise production and employment around long-term sustainable paths and to avoid risks linked to developments in the financial markets. Both are important considerations in the conduct of Sweden's inflation-targeting monetary policy.

New Zealand's PTA is unusual in explicitly mentioning unnecessary interest rate and exchange rate volatility as concerns. Hunt (2004) discusses the reasoning behind this provision. Volatility in interest rates creates uncertainty for businesses and households, and may cause incorrect or delayed decisions. Volatility in the exchange rate may adversely affect the export sector by squeezing profits when the exchange rate is very high, and could lead to the demise of some firms that might otherwise have turned out to be innovative and profitable in the long run. A very low exchange rate could encourage marginal businesses to set up that then become unprofitable when the exchange rate returns to more typical levels, utilising scarce resources that might have been better employed elsewhere.⁴ Reflecting these concerns, the PTA also requires that the Bank, in conducting monetary policy in pursuit of price stability, seek to avoid unnecessary instability in the exchange rate and interest rates.

⁴ The exchange rate can also play an important shock-absorbing role. For example, when New Zealand's terms of trade weaken (and hence inflationary pressures decline), the exchange rate typically depreciates, providing some cushion for tradables sector producers and economic activity.

The desire to avoid unnecessary variability in output, interest and exchange rates has been one of the reasons why countries have consistently preferred a flexible approach to inflation targeting. Countries have recognised that attempting to offset the short-term impact on inflation of an oil price shock, for example, would typically exacerbate any associated economic downturn. Doing so would be unnecessary if the public remains confident that inflation will settle back in the target range over the medium-term. While the principle is uncontroversial, putting it into practice can be more challenging. In general, the concern to avoid unnecessary variability means that interest rates are sometimes adjusted more gradually than they would be otherwise.

Changes to the PTA in 2012

PTAs have evolved considerably since the first one in 1990. In general, PTAs have, over time, become more explicit about the nature of the flexibility the Reserve Bank should exercise in pursuing the inflation target (see Reserve Bank of New Zealand, 2000). In 2002 and 2007, the Reserve Bank reviewed the successive PTAs in the light of domestic and international experience with inflation targeting.⁵ More recently, the global financial crisis has led many central banks to focus more heavily on how financial system developments should be treated by monetary policy, and there has also been renewed debate about the role of monetary policy in stabilisation policy more generally.

There were three additions to the 2012 PTA.

First, clause 2a of the PTA now explicitly requires the Reserve Bank to monitor "asset prices" among the "range of price indices" it regularly examines. Successive PTAs have required that, while targeting CPI inflation, the Reserve Bank monitor a range of prices. The Bank has always monitored asset prices and taken them into account in both monetary and prudential policy (see

⁵ The 2002 briefing paper on the PTA and related monetary policy issues is available at http://www.rbnz.govt.nz/monetary_policy/policy_targets_agreement/0124760.html, and the Reserve Bank's submissions to the Finance and Expenditure Select Committee inquiry into the future monetary policy framework are available at http://www.rbnz.govt.nz/monetary_policy/about_monetary_policy/3074316.html

Bollard, 2004, for further discussion). The *Monetary Policy Statement* regularly reports analysis of movements in a range of price measures, including asset prices. The new reference to asset prices in the PTA explicitly recognises the important role played by asset prices in the recent domestic and international global financial cycle and in the crises experienced in many countries, even though asset prices are not part of the formal target.

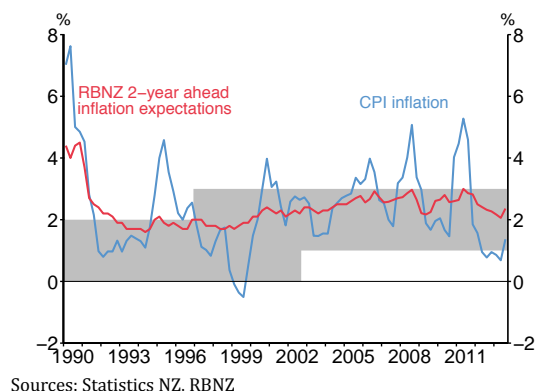
Second, clause 4b incorporates in the PTA the longstanding statutory requirement (section 10 of the Act) that the Reserve Bank have regard to “the efficiency and soundness of the financial system” in pursuing price stability. This addition recognises that monetary policy decisions often have implications for financial stability. For example, very low interest rates, that might be consistent with low CPI inflation outcomes, can exacerbate growing credit and asset prices imbalances, or high interest rates aimed at countering CPI inflation pressures might intensify a downturn in asset prices. The phrasing of the clause makes financial system considerations clearly subsidiary to the inflation target in the conduct of monetary policy. But, at times, such considerations might be relevant to judging how quickly to act to keep inflation on target over the medium term.

The global financial crisis galvanised debate about how monetary policy should respond to financial system developments. This debate is not particularly new (see Bloor et al., 2008 for a discussion), but the enormous macroeconomic and financial disruption of 2008/09 has shifted many policymakers and analysts towards considering a more pre-emptive approach for monetary policy (see e.g. White, 2009). Even before the crisis, the Bank envisaged a case for being pre-emptive in some circumstances (Bollard, 2004), and the additions to clause 2a and clause 4b are consistent with an increased emphasis on asset price and credit developments.

Finally, clause 2b adds “a focus on keeping future average inflation near the 2 percent target midpoint” to the CPI target itself. The target midpoint has been increased twice (in 1996 and 2002), but the 1 to 3 percent range has remained since 2002. Inflation expectations have been close to the upper end of the target band for most of the

inflation targeting period (figure 1).⁶ The addition to clause 2b, in conjunction with the recent period of surprisingly low inflation, should help anchor inflation expectations more firmly around the 2 percent level. It explicitly requires the Reserve Bank, while remaining flexible, to aim to return inflation to the midpoint of the target band over the medium term. Acting, when required, to keep projected inflation near 2 percent will reinforce public and market confidence that longer-term inflation outcomes will average around 2 percent. Well-anchored expectations reduce the degree to which the OCR needs to be adjusted in response to future economic shocks.

Figure 1
CPI inflation and inflation expectations
(annual)



The additions to the PTA are incremental in nature, as part of a framework that has combined flexibility and constraint since its inception. The clause 4b addition continues in the direction of making more explicit the flexibility considerations that have always been important, while the clause 2b addition adds some additional constraint by adding a midpoint focus (making it more explicit that not all areas of the target range are equally satisfactory for projected medium-term inflation). How monetary policy is conducted over time will be the key determinant of the impact of the new provisions.

⁶ Other measures of inflation expectations have also tended to be above the midpoint of the target range.

3 The PTA and the conduct of monetary policy in practice

Since low inflation was re-established in New Zealand in the early 1990s, monetary policy has faced several episodes that illustrate some of the trade-offs between keeping projected inflation close to target, and not generating unnecessary volatility in the economy in the process.

For example, during the mid-2000s, the Official Cash Rate (OCR) was raised from 4.75 percent in 2002 to 8.25 percent in 2008. Despite that marked tightening, core inflation measures rose to around the 3 percent upper end of the range, while headline inflation was often outside the target range. During this time, output was growing strongly, as were house, farm and commercial property prices and credit. As well, the exchange rate was highly elevated and, later in the period, commodity prices were booming. With hindsight, monetary policy should probably have been tightened earlier during that period, in view of the credit developments at the time (see Chetwin and Reddell, 2012). However, in facing these emerging pressures there was a real concern that a sharper tightening might also have exacerbated pressures on the exchange rate “unnecessarily”. Another example during this period relates to the oil price spike in 2008, when oil prices rose to US\$150 per barrel and headline inflation rose well above the upper end of the inflation target range. The Reserve Bank expressed concerns about the risks of inflation expectations becoming unanchored, but was able to use the flexibility in the framework to cut the OCR in July 2008 even while CPI inflation was above the top of the target range. Dealing with such issues is, of course, not unique to New Zealand. In fact, the conduct of monetary policy in New Zealand in response has been similar to other countries over the past two decades, including Australia (Kendall and Ng, 2013).

More recently, the New Zealand economy has again shown signs of pressures in different dimensions that the PTA requires monetary policy to consider. While CPI inflation has been very low during much of 2012 and 2013, tracking near or below the bottom of the target range, the exchange rate has been quite high relative to historical

averages, reflecting strong commodity export prices and domestic interest rates at levels well above those of most major trading partners. At the same time, house prices and credit growth have strengthened materially.⁷ One element of the PTA might have pointed to further cuts in the OCR, possibly easing pressure on the exchange rate in the short-term, while other elements might instead have suggested earlier increases in the OCR, which might have further increased the near-term pressure on the exchange rate.

Considered judgement of the specific circumstances at hand, and transparent conduct of policy, are central to handling these sorts of pressures. They are also central to the accountability of the Reserve Bank to its Board, to the Minister of Finance, and to the general public as the Bank makes those choices and trade-offs.

4 Alternatives to the current flexible inflation-targeting framework

The new Policy Targets Agreement was agreed against a backdrop of more challenging times for monetary policy in many other countries. During the global financial crisis, several advanced economies, such as the United States, the United Kingdom, Canada, Switzerland, and Sweden, reached the “zero lower bound” effective constraint on how low short-term nominal interest rates could go.⁸ This experience has led to renewed debate about whether alternatives to a low CPI inflation target might better stabilise inflation and economic activity in the presence of extreme economic weakness. Suggestions have included nominal GDP targeting (e.g. McCallum, 2011) and price level targeting (Carney, 2012).

Both price level targeting and nominal GDP (level or growth rate) targeting can be quite consistent with the goal of medium-term stability in the general level of prices. Proponents argue that these approaches would reduce overheating during boom times and, in particular, would better stabilise economies in severe downturns, especially when the zero bound is hit. In the current international

⁷ Governor Wheeler (2013a, 2013b) discusses the current forces affecting the New Zealand economy and how the Reserve Bank is viewing them.

⁸ Joining Japan, which had already experienced near-zero interest rates for the majority of the previous decade.

context, the argument is that a credible commitment to get nominal GDP back to its pre-crisis trend - which in some countries might require several years of strong GDP growth and rapid inflation – would help to reduce real interest rates and build greater confidence that monetary conditions would be kept loose for a lengthy period.

There has been little debate over any of these options in the New Zealand context. That is understandable, since even after the deep recession of 2008/09, interest rates have still been consistently well above the zero lower bound. But even internationally, despite the debate, no country has abandoned its inflation target. Indeed, in the United States and Japan the respective central banks have recently moved to adopt explicit inflation targets. The costs involved with a regime shift may be quite large, due to a lack of public familiarity with the target measures, and revisions in the case of nominal GDP, creating transparency and accountability issues. Level targets, based on either prices or nominal GDP, could be more difficult to credibly commit to than inflation targets, because, faced with some types of shocks, cycles in economic activity may need to be larger. Carney (2012) discusses nominal GDP targeting and price level targeting and the choice of the Bank of Canada – where the idea of price level targeting was explored in considerable depth over several years – to retain its flexible inflation targeting framework.

Alternative treatments of exchange rate volatility within an inflation-targeting framework have also come under consideration internationally in recent years, with the IMF being among those prompting renewed debate, especially for emerging economies (see e.g. Ostry et al., 2012). Intervention in foreign exchange markets to smooth short-term exchange rate volatility alongside inflation targeting is most likely to be effective in economies with less developed and integrated financial markets.⁹ In developed economies, however, the evidence suggests little effect of intervention beyond very short time horizons (e.g. Fatum, 2006). IMF authors (Blanchard et

al (2013, p8)) have recently noted that “the answer to the feasibility question [regarding using foreign exchange market intervention to actively target the exchange rate] is probably no for economies with highly integrated financial markets (and almost certainly no for small, very open, advanced economies—say, New Zealand).”

5 Conclusion

Price stability is the statutory goal for New Zealand’s monetary policy. That reflects the widely-accepted principle that monetary policy’s best contribution to long-run economic growth comes through ensuring low and stable inflation. Experience – and the bulk of the theory – suggests that monetary policy is unable to do much to improve the long-run productive potential of the economy. Potential output is determined by structural factors such as innovation and the supply of labour and capital. Monetary policy, by maintaining medium-term price stability, helps sets the background for these other factors to flourish.

Monetary policy also has an important role to play in handling the shorter-term economic shocks that face every economy. Responding very actively with monetary policy to shocks that boost inflation temporarily can generate unnecessary and costly volatility. But excessively lax policy can allow imbalances to build up and inflation expectations to increase, which is also costly.

The New Zealand monetary policy framework – very similar in its essential features to those of other advanced countries with floating exchange rates – recognises all these imperatives. However, it does not, and cannot, specify a mechanical approach to handling all possible economic circumstances; instead, the complex and difficult trade-offs have to be judged and explained by the Reserve Bank in each particular case.

New Zealand’s PTA-based approach to flexible inflation targeting has evolved with experience. The modification of the inflation target in the 2012 PTA, to require a focus on keeping future average inflation near the 2 percent target midpoint, is intended to help to solidify the midpoint as an anchor for inflation expectations. The explicit inclusion of requirements to have regard to the

⁹ See Chetwin and Munro (2013) for a discussion of different emerging and developed economies’ choices regarding exchange rate intervention, independent monetary policy and openness of capital markets.

efficiency and soundness of the financial system and to monitor asset prices emphasises the post-crisis world in which financial developments are given more prominence. These amendments to the PTA continue the evolution of New Zealand's approach to flexible inflation targeting, while keeping a strong emphasis on the importance of transparency in the conduct of monetary policy.

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Appendix A

Policy Targets Agreement

This agreement between the Minister of Finance and the Governor of the Reserve Bank of New Zealand (the Bank) is made under section 9 of the Reserve Bank of New Zealand Act 1989 (the Act). The Minister and the Governor agree as follows:

1. Price stability

- a) Under Section 8 of the Act the Reserve Bank is required to conduct monetary policy with the goal of maintaining a stable general level of prices.
- b) The Government's economic objective is to promote a growing, open and competitive economy as the best means of delivering permanently higher incomes and living standards for New Zealanders. Price stability plays an important part in supporting this objective.

2. Policy target

- a) In pursuing the objective of a stable general level of prices, the Bank shall monitor prices, including asset prices, as measured by a range of price indices. The price stability target will be defined in terms of the All Groups Consumers Price Index (CPI), as published by Statistics New Zealand.
- b) For the purpose of this agreement, the policy target shall be to keep future CPI inflation outcomes between 1 per cent and 3 per cent on average over the medium term, with a focus on keeping future average inflation near the 2 per cent target midpoint.

3. Inflation variations around target

- a) For a variety of reasons, the actual annual rate of CPI inflation will vary around the medium-term trend of inflation, which is the focus of the policy target. Amongst these reasons, there is a range of events whose impact would normally be temporary. Such events include, for example, shifts in the aggregate price level as a result of exceptional movements in the prices of commodities traded in world markets, changes in indirect taxes, significant government policy changes that directly affect prices, or a natural disaster affecting a major part of the economy.
- b) When disturbances of the kind described in clause 3(a) arise, the Bank will respond consistent with meeting its medium-term target.

4. Communication, implementation and accountability

- a) On occasions when the annual rate of inflation is outside the medium-term target range, or when such occasions are projected, the Bank shall explain in *Policy Statements* made under section 15 of the Act why such outcomes have occurred, or are projected to occur, and what measures it has taken, or proposes to take, to ensure that inflation outcomes remain consistent with the medium-term target.
- b) In pursuing its price stability objective, the Bank shall implement monetary policy in a sustainable, consistent and transparent manner, have regard to the efficiency and soundness of the financial system, and seek to avoid unnecessary instability in output, interest rates and the exchange rate.
- c) The Bank shall be fully accountable for its judgements and actions in implementing monetary policy.



Hon Bill English

Minister of Finance



Graeme Wheeler

Governor Designate
Reserve Bank of New
Zealand

Dated at Wellington 20 September 2012

Measuring systemic risk: the role of macro-prudential indicators

Tony Wolken¹

This article outlines some of the key indicators the Reserve Bank uses to help inform macro-prudential policy decisions. Macro-prudential indicators (MPIs) play an important role in the identification of financial system risk; the assessment of the banking system's capacity to weather periods of financial stress; and in signalling periods of financial stress. The indicators inform decisions to both deploy and remove macro-prudential instruments. The article explains how the MPI framework helped to frame the recent decision to impose residential mortgage loan-to-value (LVR) restrictions.

1 Introduction

In May 2013, the Governor of the Reserve Bank and the Minister of Finance signed a Memorandum of Understanding setting out the objectives, governance, and instruments for macro-prudential policy.² The memorandum stipulates that the Reserve Bank will publish information on its risk assessment framework, including the indicators that it uses to guide its macro-prudential policy settings (RBNZ, 2013).³ Accordingly, the Reserve Bank has been developing its indicators in this area as part of the development of the macro-prudential framework.

This article provides an overview of the role of macro-prudential indicators (MPIs) currently used in assessing 'systemic risk' – the risk of disruptions to financial services caused by an impairment of all or parts of the financial system, that can have serious negative consequences for the real economy (IMF, 2011). It presents some of the key MPIs the Reserve Bank analyses to assess the build-up of risk across the New Zealand financial system, including those indicators that helped frame the recent decision to implement residential mortgage loan-to-value (LVR) restrictions. The article concludes with a brief discussion of the role of some

indicators in determining when to remove or release macro-prudential policy.

2 Macro-prudential indicators – an overview

2.1 Role of MPIs in the Reserve Bank's macro-prudential policy framework

Good policy needs sound data. The collection and reporting of MPIs mark the first step in the Reserve Bank's macro-prudential decision framework (figure 1, overleaf). MPIs are an integral part of a systemic risk assessment which includes consideration of emerging risks such as whether debt levels are becoming 'excessive', asset prices 'over-valued', or lending standards becoming too loose.

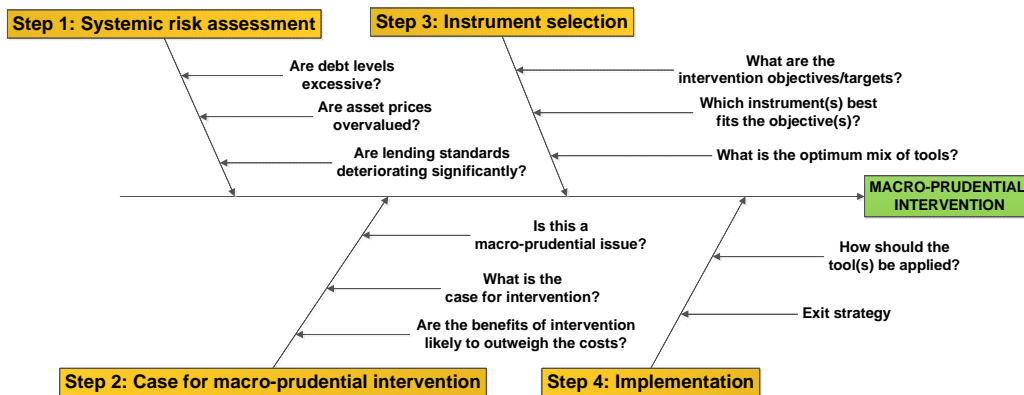
Individual MPIs can offer a general guide based on the past historical experience of the indicator concerned, but the indicators are not used mechanically to implement macro-prudential policy. Risks can build up in the financial system from different sources and in many different ways. Consequently, judgement is required in considering the case for macro-prudential intervention, selecting the appropriate instrument to deploy, and in deciding when to remove any instrument (steps 2-4). Nevertheless, robust and reliable indicators provide the basis for better decision making.

¹ The author would like to thank Chris Hunt, Anella Munro, Roger Perry and other colleagues at the Reserve Bank for their helpful comments.

² See Rogers (2013) for an overview of the macro-prudential policy framework.

³ The Reserve Bank will begin publishing a full set of MPIs in March 2014. The data for MPIs discussed in the main text of this article are available here: http://www.rbnz.govt.nz/research_and_publications/reserve_bank_bulletin/2013/2013dec76_4wolken_data.xls

Figure 1
The macro-prudential decision framework



2.2 Types of indicators

Systemic risk indicators can be grouped into two main categories (Borio and Drehmann, 2009a):

- 'Time-dimension' indicators, which measure how systemic risk evolves over the financial cycle.
- 'Cross-sectional' indicators, which measure how systemic risk is distributed within the financial system at a point in time.

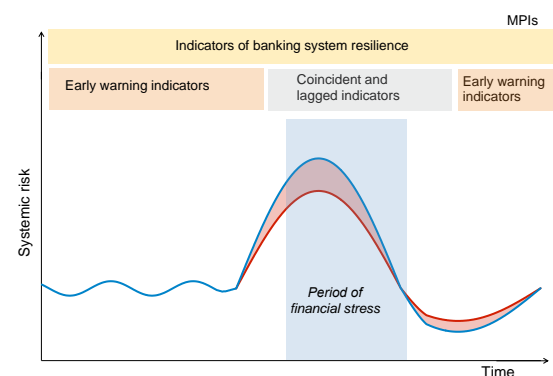
The time dimension is linked to the idea that there is a strong tendency for both financial intermediaries and borrowers to take on excessive risk in the upswing of a financial cycle, and become overly risk averse in a downturn. This procyclicality as a source of systemic risk arises from a number of features of the financial system such as information frictions, and incentive and coordination problems.⁴ MPIs in this dimension aim to give a sense of the degree of procyclicality and benchmark at what point risk-taking, debt levels or asset price developments are becoming excessive or unsustainable.

Cross-sectional systemic risks arise from institutional concentration (the 'too-big-to-fail' phenomenon); the interconnectedness of different financial institutions, and; common exposures, where different institutions are exposed to the same risk. Cross-sectional risk can provide an important amplification mechanism for cyclical developments. In New Zealand, many of these

aspects of cross-sectional risk are addressed through the underlying prudential framework, rather than through the use of specific macro-prudential instruments per se.

The Reserve Bank's Macro Financial Committee (MFC) examines a set of indicators in a quarterly *MPI Report* (primarily focused on indicators across the time dimension). Some indicators in the *Report* help identify the build-up of risk (early warning indicators); benchmark the capacity of the banking system to absorb risk; or signal when a period of financial stress has materialised (near-coincident indicators, figure 2). The latter set of indicators can help to assist decisions concerning the removal of macro-prudential policy.

Figure 2
Stylised financial system risk and MPIs



Note: The red shared area illustrates cyclical amplification arising from cross-sectional risks.

⁴ For further discussion see Bank of England (2009) and Nicolò, G *et al* (2012). See Craigie and Munro (2010) for a discussion of procyclicality in the New Zealand financial system.

2.3 What is a good indicator?

The Reserve Bank's macro-prudential decision framework suggests several desirable features of a good indicator that help to identify the build-up of systemic risk, the subsequent materialisation of stresses in the financial system, and the capacity of the system to absorb risk.

Relevant

Some risks to financial stability, such as excessive credit expansion, are characteristic of all financial systems and therefore imply a common set of MPIs. Other risks might be more country-specific and relate to the particular structure of the financial system (see section 3), or the way the economy is exposed to the global environment. For example, the New Zealand financial system is exposed to risks arising from the importance to the economy of the agricultural sector and, in recent years, of the dairy sector in particular.

Collectable

While New Zealand has many of the core indicators used overseas, some indicators used in other jurisdictions might be unavailable in New Zealand. For example, most New Zealand banks are not listed on the domestic stock exchange, so indicators that use market pricing of bank equity risk are unavailable.

Comprehensive and dynamic

Macro-prudential indicators should aim to cover the whole financial system. Attention has naturally focused on banks as the largest participants in the financial system, but the GFC drew attention to the risks concentrated in parts of the 'shadow' or non-bank system (Adrian, Covitz and Liang, 2013). Even though the non-bank lending sector is currently very small in New Zealand, it is important to monitor developments there as the sector could be a source of systemic risk in the future. Regulators need to be dynamic to keep abreast of building risks, particularly if the implementation of macro-prudential tools directed at the banking system results in

'regulatory leakage'.⁵ We expect the indicator set to evolve over time.

Forward looking

Indicators are required that provide an early warning of building financial stress in sufficient time for policy action to be taken. In practice, different indicators give warnings at different time horizons, and therefore it will be necessary to assess a mix of indicators, including 'contrarian' indicators that might suggest when current financial conditions look 'too benign'.

Accurate

The signal from early warning indicators will never be exact. If an indicator warns of a crisis that does not eventuate, then efficiency costs may be incurred that reduce overall welfare. If no signal is issued and a period of financial stress or, worse still, a crisis occurs, then there may be large social costs of the kind seen in many economies during and after the GFC. Policymakers have to assess the probability of both types of 'errors' occurring as part of a cost-benefit analysis of macro-prudential action (or inaction). An accurate indicator should therefore minimise 'noise' or the extent of false calls.

3 Structural features of the New Zealand financial system and the choice of MPIs

Four key features of the New Zealand financial system influence the specific choice of MPIs.

Banks play a large role

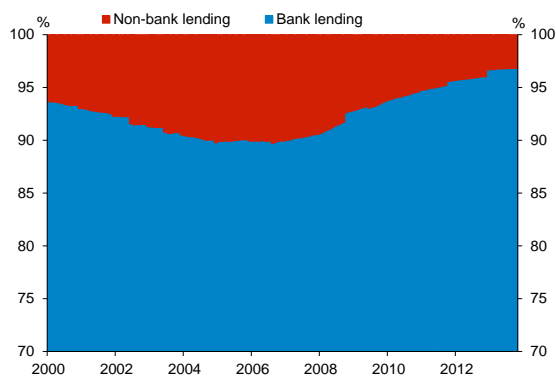
New Zealand banks account for around 80 percent of total financial system assets and around 97 percent of lending from domestic financial institutions.⁶ Total bank lending is around \$320 billion, or 148 percent of annual gross domestic product (GDP).

⁵ See box C of the November 2013 *Financial Stability Report* for a discussion of regulatory leakage.

⁶ Lending from financial institutions located offshore is another potential source of credit for New Zealand households and firms. Data from the Balance of Payments accounts suggest, however, that this direct cross-border lending is very small. This contrasts with many other jurisdictions where direct cross-border lending plays a greater role.

Lending outside of the banking sector is small by comparison (figure 3).⁷ Non-bank lenders accounted for 10 percent of total lending just before the GFC, but receiverships, mergers and exit to the banking sector have meant the sector now accounts for a much smaller share of total lending. In addition, equity and corporate bond markets play a much smaller role as a source of business finance in New Zealand than in most other developed economies.

Figure 3
Domestically intermediated private credit by sector
(share of total lending)



Source: RBNZ *Standard Statistical Return* (SSR).
Note: Non-bank lenders comprise non-bank deposit-takers regulated by the Reserve Bank, and non-deposit taking finance companies.

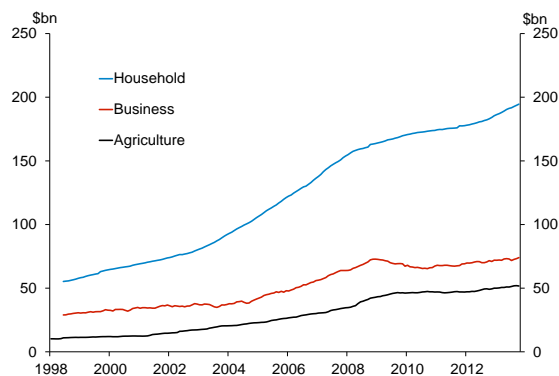
Housing lending is a large proportion of bank lending

Half of domestic bank lending is residential housing (figure 4). Although housing lending is typically less risky than business or agricultural lending, a sharp decline in house prices could force many households into negative equity and financial difficulty, and weaken bank balance sheets. An increase in unemployment could also place households under financial strain, and increase the likelihood of default. An increase in systemic risk concentrated in the housing sector lay behind the Reserve Bank's decision to impose restrictions on high-

⁷ There is also very little 'off-balance' activity by New Zealand banks used to fund lending (such as that involved in the 'securitisation' of residential mortgages), compared to banks elsewhere.

LVR residential mortgage lending in October 2013 (see box B, page 25).

Figure 4
Bank lending by sector

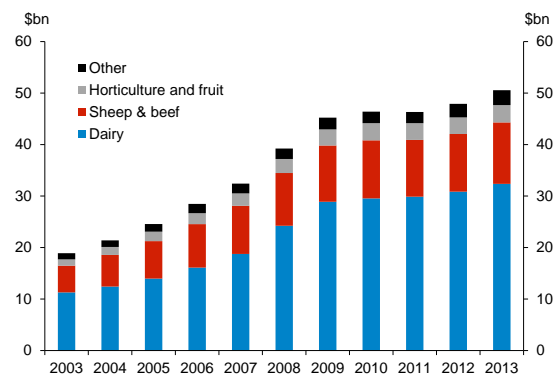


Source: RBNZ SSR.

Dairy sector lending is a large proportion of agricultural lending

Risks in the agriculture sector stem from drought, or a sharp decline in commodity prices which could negatively affect rural incomes and land values. A decline in rural incomes and land values would fall hardest on those farms most in debt. Agricultural lending amounts to around 15 percent of total bank lending, and of this, around 60 percent is lent to the dairy sector (figure 5).

Figure 5
Agricultural debt by sector
(June years)

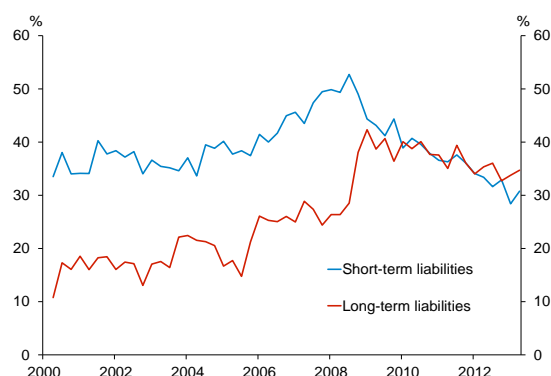


Source: RBNZ *Annual Agricultural Survey*.

Offshore funding has been a high proportion of bank funding

In recent decades the banking system has relied heavily on offshore wholesale funding. This has reflected inadequate domestic savings relative to the investment needs of the economy, and hence persistent current account deficits and a large net external liability position. A key source of financial system risk has been the roll-over risk associated with this reliance on global funding sources – much of which was previously very short-term (figure 6). The introduction of the core funding ratio (CFR) requirement in 2010, designed to increase the stability of banks' funding, has moderated that risk. Nevertheless, the banking system still relies on a greater share of offshore funding relative to banks in other jurisdictions.

Figure 6
Offshore bank funding
(percent of GDP)



Source: Statistics New Zealand.

Note: Series derived from Balance of Payments data. Short-term is less than one-year to maturity.

The features of New Zealand's financial system described above imply a set of MPIs heavily weighted to assessing the risks specific to the banking system as well as the banking system's capacity to weather a shock to balance sheets. Given the nature of banks' exposures, a broad set of indicators related to developments in both the housing and agricultural sector are important, as are funding-related indicators.

4 Constructing MPIs for New Zealand

This section explains some of the key indicators used in the Reserve Bank's *MPI Report*, and the risk factors they each aim to capture. The MPIs in the *Report* can be categorised into those indicators that:

1. Identify the build up of risk (early warning indicators), including those related to:
 - an 'excessive' build up in credit;
 - ability to repay debt;
 - inflated asset prices, and;
 - deteriorating lending standards.
2. Signal when a period of financial system stress has materialised.
3. Assess the banking system's capacity to absorb risk.

Each group of indicators is briefly explained below, with a fuller set of MPIs the Reserve Bank currently considers listed in the appendix.

4.1 Identifying the build up of risk

Assessing whether a build up in credit is 'excessive'

During a financial cycle, rising business and household optimism leads to an increased demand for loans to fund projects and asset purchases. Credit growth may be amplified by a relaxation in lending standards as banks respond to a decline in non-performing loans and the rising value of borrowers' collateral. This makes credit measures some of the most important indicators of rising systemic risk.

The Reserve Bank examines a range of credit measures for the financial system as a whole, and for each of the major sectors – household, business and agriculture.

- The *rate of growth of credit*. While not all credit booms end with a period of financial stress, severe financial crises are almost always preceded by a rapid increase in credit. By itself, however, the rate of growth is an unreliable indicator as credit may be expanding for a range of reasons, including productivity growth in the economy. The rate of credit growth may provide lead information on

developments in the credit-to-income 'gap' (see below).

- The *ratio of credit relative to income*. At the economy-wide level this is the ratio of total system credit relative to GDP. At the sectoral level a proxy measure for income is used. A rise in credit relative to income can be a concern with international experience showing that rapid increases in the ratio often precede financial crises. However, there can also be reasons unrelated to system risk for increases in credit-to-income measures. For example, emerging countries have found that financial system liberalisation has been associated with a significant rise in the ratio. A

similar effect may have occurred in New Zealand after the financial deregulation of the 1980s.

- The *credit-to-income 'gap'*. This measure shows the difference between the level of credit-to-income and its trend, and therefore allows for other influences on the trend such as financial deepening within the economy. The Bank for International Settlements (BIS) recommends credit-to-income gaps as a useful early warning indicator of future periods of financial system stress.⁸ The Reserve Bank calculates credit-to-income gaps for the system (the credit-to-GDP gap), and for each of the major sectors (see figure 7).

Figure 7
Sectoral credit gaps

Figure 7a

Household credit-to-disposable income

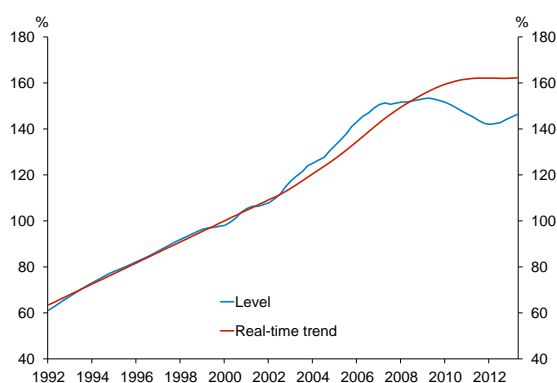


Figure 7b

Household credit gap and credit growth

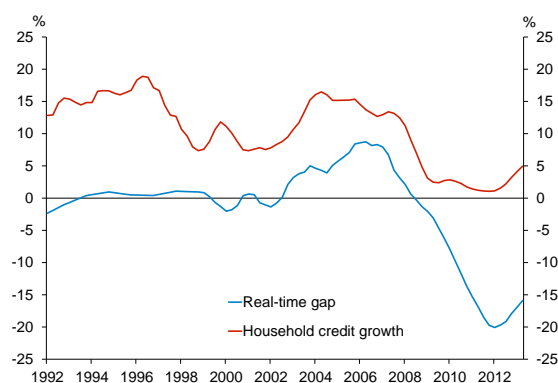


Figure 7c

Business credit-to-operating surplus

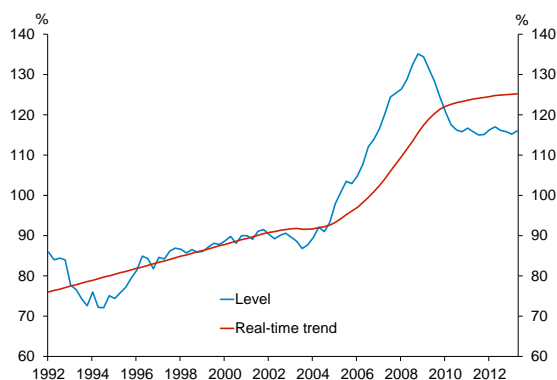
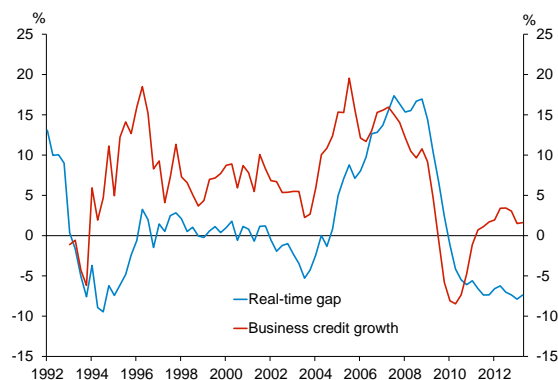


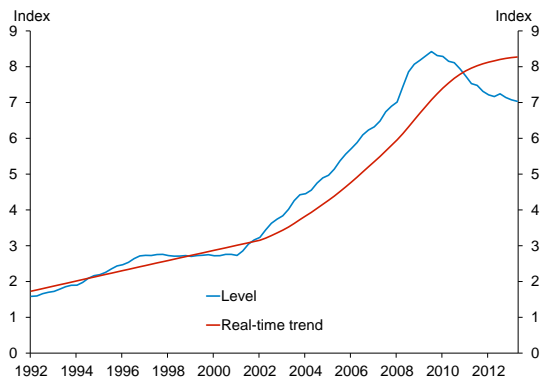
Figure 7d

Business credit gap and credit growth



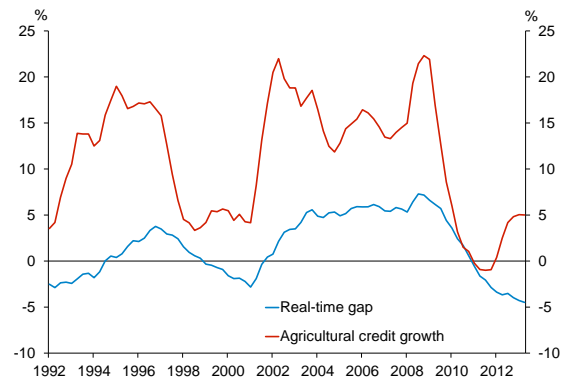
⁸ See, for example, Borio and Drehmann (2009b), Drehmann *et al* (2011) and Drehmann and Juselius (2013).

Figure 7e
Agricultural credit-to-agricultural GDP



Note: See the appendix for explanations of each indicator.

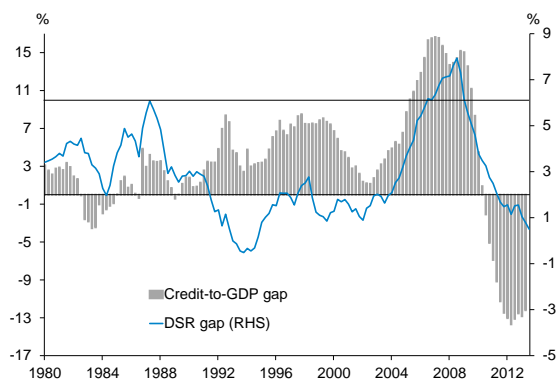
Figure 7f
Agricultural credit gap and credit growth



Deteriorating ability to repay debt

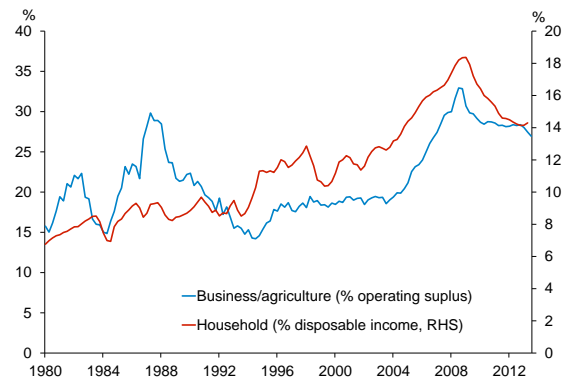
A significant deterioration in borrowers' ability to repay debt increases the fragility of the financial system. The debt service ratio (DSR) measures the proportion of income that is required to service both principal and interest costs. This indicator can be calculated as a 'gap' or level measure for the system as a whole (figure 8), and for the major sectors (figure 9).⁹ An elevated DSR suggest borrowers have less spare income after debt repayments to absorb an unexpected rise in debt service costs or other expenses, or a loss of income.

Figure 8
Credit-to-GDP and DSR gaps
(percent of GDP)



Source: Statistics New Zealand, RBNZ SSR, RBNZ calculations.
Note: The horizontal line indicates the upper threshold of the credit-to-GDP gap range for when a crisis signal is issued at the three-year horizon, aligned with the six percent DSR threshold at a one-year ahead horizon.

Figure 9
Sectoral DSRs levels
(principal and interest as a share of income)



Source: Statistics New Zealand, RBNZ SSR, RBNZ calculations.
Note: Where available, the average interest rate paid is used to compute interest payments. Principal repayments are estimated assuming a constant average time to maturity.

Financial liberalisation and innovation have facilitated a structural increase in the DSR over time. Interest rates have declined steadily over the past 20 years, increasing firms' and households' capacity to borrow. However with lending rates now at 30-year lows, a higher debt burden makes the economy more vulnerable to a rise in interest rates and rising servicing requirements. To take account of long-term trends in the structure of the financial system, the DSR is calculated using deviations from a 15-year moving average.

⁹ For more information, see box B of the November 2013 *Financial Stability Report*.

Box A

The credit-to-GDP gap – technical discussion

BIS researchers have recommended the use of the credit-to-GDP gap as an early warning indicator of periods of financial stress. In cross-country empirical studies, the gap measure was found to increase substantially three to five years before a financial stress event. When combined with other indicators such as the debt servicing ratio and asset price information (discussed in the main text), it has been found to predict many episodes of impending financial stress. Few such stress events occurred without a preceding signal from the credit-to-GDP gap, but not all signals from the credit-to-GDP gap have been followed by an episode of serious financial stress in the country concerned. Changes in the credit-to-GDP gap can be particularly useful because they allow policymakers time to consider policy responses to growing financial imbalances while looking for corroborating information from other indicators.

The credit-to-GDP gap suggests credit growth can be considered 'excessive' when the ratio rises significantly above its long-term trend, creating a large positive 'gap'. The long-term trend is calculated using a smoothing technique that removes the cyclical component from the data – a Hodrick-Prescott (HP) filter, with a lambda of 400,000. The trend is calculated in real-time, using only information available up until that point in time.¹⁰ This choice of lambda implies the credit cycle is longer than the business cycle, consistent with significant financial contractions occurring about every 20 to 25 years. This shows what policymakers at the time were seeing when making decisions, without these being revised as the end-point changes.

Thresholds are used to indicate when a positive gap might prompt policymakers to consider macro-prudential intervention. The BIS suggests the use of a range rather than point thresholds for policy purposes –

2-10 percent for the gap, depending on the country and policymaker's preference (Borio and Drehman, 2009b). For an economy that is already highly indebted on a credit-to-GDP basis, a threshold closer to 2 percent is recommended.

In the New Zealand context the credit-to-GDP gap would have provided a reasonable signal of growing financial imbalances leading into the GFC (Hunt, 2013). Had a macro-prudential framework been in place prior to the GFC, the elevated gap measure (figure A2) would have prompted policymakers to seriously consider the deployment of macro-prudential policy measures during 2004/05 to address the increase in systemic risk.

Figure A1
Private sector credit-to-GDP

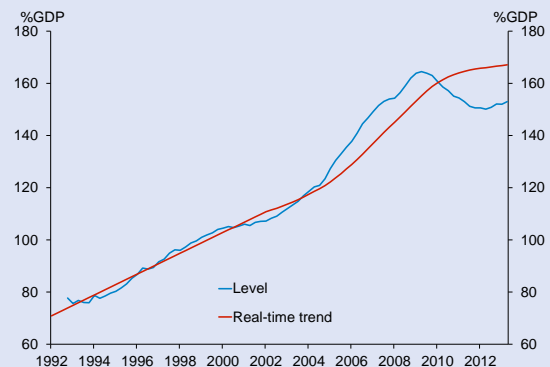
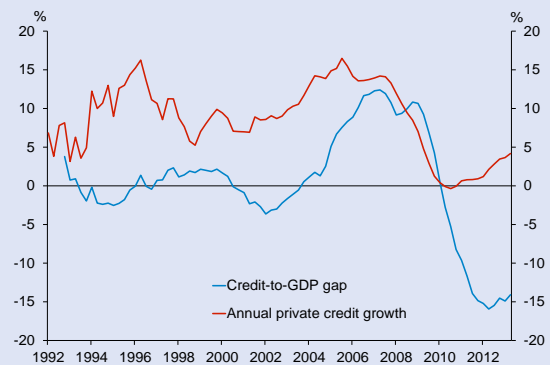


Figure A2
Private sector credit gap and growth



¹⁰ For a critique of the BIS approach based on problems calculating credit gaps in 'real time', see Edge and Meisenzahl (2011). For the BIS rejoinder see Drehmann *et al* (2011).

The credit-to-GDP gap can be less useful in the aftermath of a large credit boom, such as the one New Zealand experienced during 2002-2007. Following such periods, the statistical estimate of the trend credit-to-GDP will typically continue to increase. This implicitly assumes that the risks from the previous credit boom dissipate rapidly, so that a further period of very elevated credit growth is required to generate another early warning signal. This assumption is particularly questionable in the current environment, where, for example, the level of indebtedness is historically high, house prices remain overvalued, and where there has been no recent

structural change, such as a financial liberalisation or an acceleration in underlying productivity growth, that could rationalise further trend increases in indebtedness. As a result, our judgement has been that a credit-to-GDP gap indicator does not adequately capture the increase in systemic risk currently associated with rapid house price growth and the recovery in housing-related credit. This underscores that it is necessary to examine a range of indicators, avoiding any sort of mechanical approach, when assessing a build-up of systemic risk.

International research has suggested that the DSR is best suited to providing a warning around one year in advance of a period of financial stress.¹¹ Consequently, the DSR can be a useful indicator of the rising probability of future periods of financial system stress, if used to corroborate information from the credit-to-GDP gap and other credit measures. In line with the international research, the aggregate DSR for New Zealand issued warnings later than the credit-to-GDP gap in the run-up to the 2008 financial crisis (figure 8).

Inflated asset prices

Credit growth often supports asset price inflation, which in turn can support further credit growth by easing 'collateral constraints' on borrowers. This amplification process works in reverse in a downturn. For that reason, deviations of asset prices from long-term trends have proved useful in helping to predict periods of financial system stress (Borio and Drehman, 2009b). In particular, property prices tend to show exceptionally strong growth ahead of a financial stress event. Property prices can also fall rapidly in a period of financial stress, as borrowers' ability to repay declines, collateral constraints become binding and a 'fire sale' dynamic sets in.

The Reserve Bank monitors asset price developments in the residential, commercial, and agricultural sectors (figure 10, overleaf). Property prices for these sectors are compared to a proxy for sectoral income to guide the level of 'over' or 'undervaluation'. The use of asset price-to-income 'gaps' helps to corroborate the information coming from credit-based MPIs in assessing the scope for financial system stress.¹²

Deteriorating lending standards

During the upswing in the credit cycle, lending standards within the financial system often relax in response to a fall in formal measures of risk, helping to support overall credit growth. Conversely, lending standards can tighten significantly during a period of stress as measures of risk rise, making it difficult for otherwise creditworthy borrowers to obtain credit. Consequently lending standards can amplify the financial cycle, both in the price and non-price terms at which banks are willing to provide credit to borrowers.

¹¹ A DSR above six percent (relative to its 15-year moving average) provides this one-year ahead signal of future financial stress (see Drehmann and Juselius, 2012 and 2013).

¹² These asset price gaps are only as good as the underlying asset price series. A commercial property 'gap' is not shown in figure 10 due to the absence of a reliable commercial property price series that covers a long time span. This is unfortunate, as exposure to commercial property assets has been an important factor in many previous financial stress events, including recent finance company failures and the financial crisis in the late 1980s.

Figure 10
Asset prices

Figure 10a
House price-to-disposable income

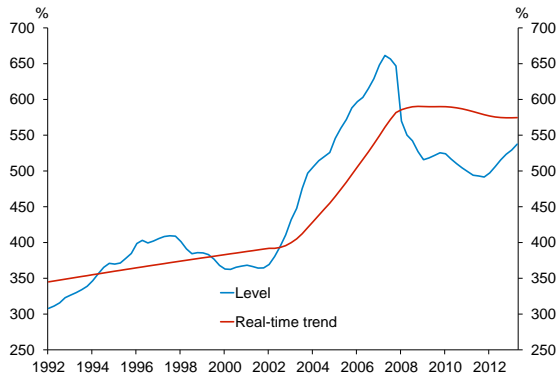


Figure 10b
House price gap and inflation

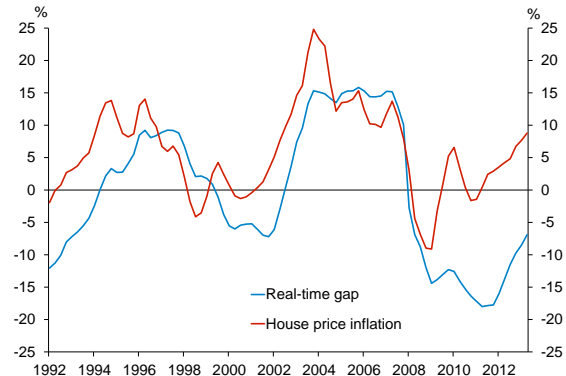


Figure 10c
Farm prices-to-agricultural GDP

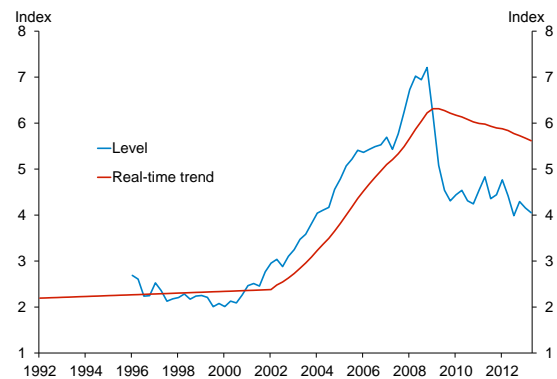
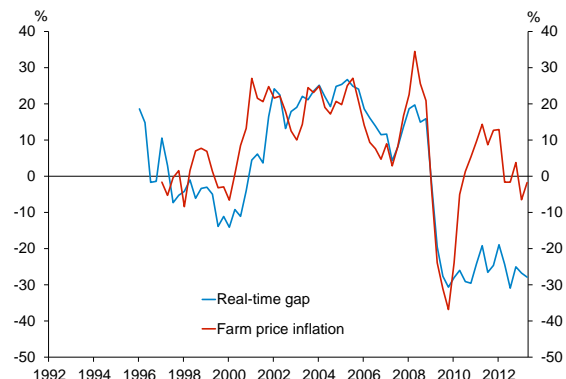


Figure 10d
Farm price gap and inflation



Note: See appendix for an explanation of each indicator.

During the late stages of a credit boom overall lending standards may become excessively loose for two reasons. First, banks may extend lending to less creditworthy borrowers – for example borrowers with very little equity. Second, the shadow banking system, which typically lends to riskier projects – for example commercial property development – may expand significantly.

The Reserve Bank monitors a range of lending standard indicators. These measures include residential mortgage LVRs, and bank net interest margins. Twice a year the Reserve Bank surveys bank lending standards, both in terms of price and non-price lending intentions. A judgement as to whether lending standards are becoming

too loose (for lending as a whole, or for specific sectors) and contributing to excessive risk-taking, can help inform whether macro-prudential intervention should be considered.

4.2 Signalling financial system stress

Financial market stress

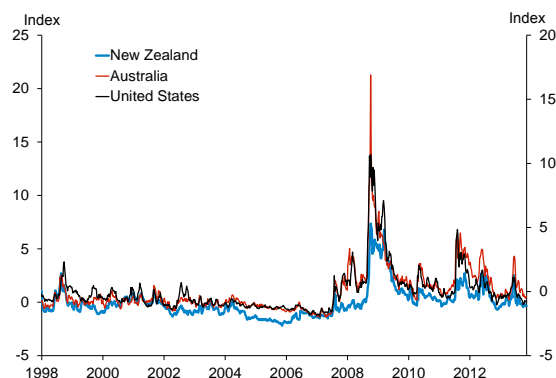
Market indicators can be useful 'near coincident' indicators of financial system stress or crises. While early warning indicators measure the build-up of systemic risk, market indicators show that this stress is materialising.

The market price of risk tends to increase sharply during periods of financial stress. Typical indicators

include the risk premia on riskier assets such as corporate debt relative to safer assets such as government debt (although as the GFC demonstrated, not all government debt is safe). Volatility-based measures of risk typically escalate during times of market stress. 'Stress indices' can be used to aggregate across a number of financial market variables (figure 11).

The paradox of financial stability is that financial market conditions can look at their most benign just before a period of stress materialises. So while financial market MPIs are not early warning indicators per se, they can be valuable as contrarian measures of risk-taking. If financial market volatility, or the pricing of traditionally risky assets, is very low by historical standards, the market may be under-pricing risk.

Figure 11
Domestic and international stress indices



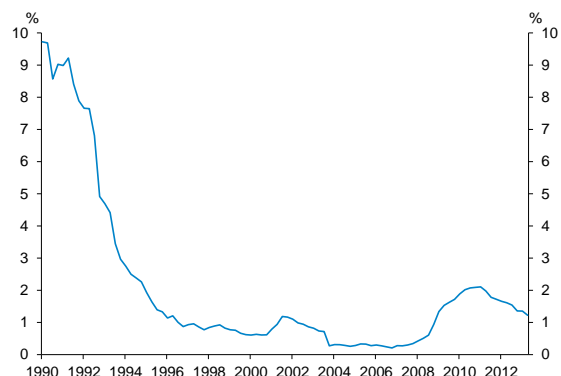
Source: Bloomberg, RBNZ calculations.
Note: The stress index for each country is calculated using principal components. This captures the covariance from a set of financial market series and attributes this simultaneous movement as 'stress' within financial markets (see appendix for further information).

Deteriorating asset quality

Asset quality indicators typically lag the financial cycle. Asset quality is measured across the key lending portfolios of banks and in aggregate (figure 12), and include non-performing loans (NPLs) and bank 'watch list' loans. During the upswing in the cycle these indicators typically look healthy as borrowers easily meet repayments. However, as the economic cycle goes into decline, NPLs increase, potentially eroding banks' capital.

In severe events, a financial institution's solvency could be threatened. Watch list loans – loans banks expect will become impaired – can be a leading indicator of NPLs.

Figure 12
Banking system non-performing loans
(percent of lending)



Source: Registered bank *Disclosure Statements*.

Asset quality MPIs are most useful in assessing the removal of macro-prudential policy (see section 5). Depending on the macro-prudential instrument, a sharp increase in NPLs might suggest removal of a policy instrument, such as a counter-cyclical capital buffer (CCB), while a more modest deterioration in asset quality could prompt a gradual and more considered release.

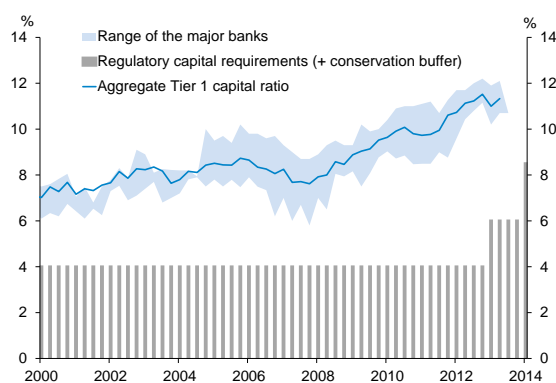
4.3 The banking system's capacity to absorb risk

The banking system should have appropriate buffers to weather difficult conditions in a crisis. If buffers are low, or being run down during the upswing of the credit cycle, then the ability of a bank to carry on its normal functions may be impaired during a subsequent period of stress. In an extreme case, the solvency of the bank could be threatened.

The two main buffers that the Reserve Bank can influence are the regulatory requirements associated with capital and liquidity. Regulatory capital requirements enable banks to absorb losses in a downturn without threatening their underlying solvency. Capital requirements are set at a specific permanent level through the cycle,

defined as a minimum level of capital relative to risk-weighted assets, and a capital conservation buffer.¹³ The Reserve Bank may also impose an additional regulatory capital requirement – the CCB – which can be built up in good times and drawn down in times of stress.

Figure 13
Tier 1 capital
(percent of risk-weighted assets)



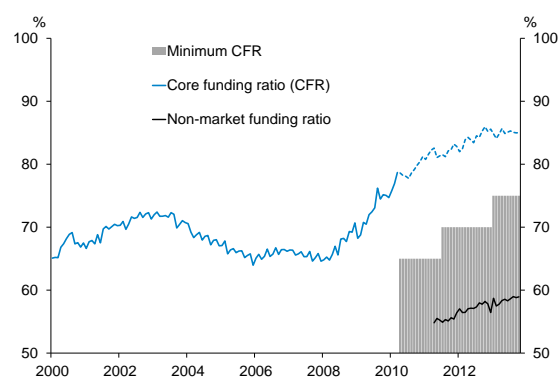
Source: Registered bank *Disclosure Statements*.

When systemic risk is rising, the Reserve Bank will assess the level of banking system capital against potential needs and determine whether a CCB should be introduced to improve banking system resilience. Additional indicators, such as banking system profitability and net interest margins, are used to supplement the use of capital ratios as indicators of banking system resilience. Profits are the first line of defence against losses, and the use of retained earnings can help build capital buffers. A healthy margin between the cost of banks' funding and the return on its interest-earning assets helps profits to be made without excessive risk-taking.

As part of the prudential liquidity requirements introduced in 2010, the CFR protects against the problems that might arise if banks' access to funding markets is disrupted. Banks must hold a minimum level of stable or core funding – currently 75 percent of lending – at all

times. The Reserve Bank may also implement a time-varying overlay to this minimum requirement as part of the macro-prudential policy framework. The Reserve Bank will examine the level of banks' core funding in the context of overall funding conditions, and assess whether imposition of a CFR overlay is necessary. Helping to inform this assessment of funding conditions will be a number of financial market MPIs (see section 4.2).

Figure 14
Banking system core and non-market funding
(percent of loans and advances)



Source: RBNZ SSR, RBNZ liquidity statistics.

Note: The solid section of the CFR is an approximation based on SSR data. The non-market funding ratio shows the contribution of non-market funding (mainly retail deposits) to core funding.

¹³ Regulatory capital is defined in relation to total capital, Tier-1 capital, and common equity Tier 1 capital. Minimum capital requirements have been increased following the GFC as part of the new global Basel III regulatory regime. The capital conservation buffer is a new feature of the Basel standards and will be introduced 1 January 2014 in New Zealand. For further details see: http://www.rbnz.govt.nz/regulation_and_supervision/banks/prudential_requirements.

Box B

MPIs and the decision to implement LVR restrictions

On 1 October 2013, the Reserve Bank introduced restrictions on banks' residential mortgage lending above an 80 percent LVR. The decision is a good example of how a range of measures need to be assessed by policymakers to form a view on whether systemic risk is increasing and a policy response is required.

In early 2013, the credit measures discussed in section 4.1 showed a mixed picture. The level of household debt-to-disposable income was high by historical standards despite this metric moderating somewhat since 2008, suggesting that households had a limited capacity to absorb risk should a financial shock occur. The rate of credit growth was rising but was still relatively low compared to the mid-2000s. The credit-to-GDP gap was negative but as discussed in box A, this measure is less reliable as an early warning indicator in the immediate aftermath of a substantial increase in credit, of the sort that occurred during the past financial cycle.

At the same time measures of banking system resilience appeared robust. Banks have strengthened both their capital and liquidity buffers since the GFC, and reduced their reliance on offshore funding.

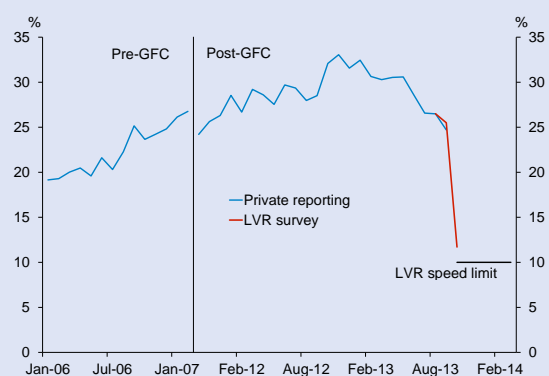
However, rising asset prices were a source of concern, given that house prices relative to fundamental measures such as income or rents were already considered 'overvalued' (figure 10a). House prices were rising at an annual rate of 9 percent nationwide, and 17 percent in Auckland.

Of additional concern was evidence of easier credit and aggressive lending to borrowers who are

typically higher risk and associated with higher loan losses. In early 2013 bank lending to home borrowers who had less than 20 percent equity reached around one third of total new housing lending (figure B1).

Taken as a whole, the Reserve Bank considered that the increase in riskier lending, and the possibility of a sharp correction in house prices, was creating an unwarranted increase in overall financial sector risk. Therefore the decision was taken to slow lending to low-equity mortgage borrowers by introducing 'speed limits' on new high-LVR lending. Other macro-prudential instruments were considered, but these were determined to have less effect on the demand for housing-related credit growth and house price inflation.

Figure B1
High-LVR residential mortgage lending
(new origination flows, percent of mortgage lending)



Source: RBNZ private reporting, RBNZ Loan to Valuation Ratio Survey.

5 Removing macro-prudential instruments

Decisions on the release or removal of macro-prudential instruments will typically be based on a different set of indicators than those used to guide the implementation of the instrument. The range of indicators used to guide removal will also be influenced by how financial system stress materialises. The following three scenarios indicate the considerations that would be involved in the withdrawal of a policy measure.

In the first scenario, an increase in systemic risk does not result in any obvious negative impact on the financial system or the economy. Financial imbalances unwind in a benign and orderly fashion, perhaps in part due to the macro-prudential instrument in place. The Reserve Bank would look at indicators of financial imbalances to guide removal. In the current context where LVR restrictions have been implemented, the Reserve Bank would expect to see house price and housing credit growth moderating, and more prudent bank lending practices – all of which would be necessary to return household indebtedness and house prices towards historic norms.

In the second scenario, an increase in systemic risk results in a mild stress event, perhaps typical of 'normal recessions' or slowdowns in economic activity. Financial imbalances accumulated during the upswing are unwound in a more or less orderly fashion, but some degree of deleveraging by borrowers and financial intermediaries contributes to a slowdown in economic activity. The Reserve Bank would examine coincident and lagged indicators of financial stress to gauge the speed and magnitude of the slowdown, and how this was flowing through to bank balance sheets. Some macro-prudential tools, such as temporary capital and liquidity buffers, could be removed gradually in this scenario.

In a third scenario, an increase in systemic risk during a credit upswing materialises in a financial crisis (perhaps precipitated by an international shock), forcing the economy to contract sharply and imbalances to correct in a painful or disorderly fashion. Again, coincident MPIs would help to guide removal of the macro-prudential instrument, which would be likely to more timely than in either of the other two scenarios.

The current *MPI Report* contains a number of indicators that will help guide the release of macro-prudential policy. The Reserve Bank will be looking to further develop the indicators.

6 Conclusion

This article has provided an overview of the indicators currently used to guide macro-prudential policy. Macro-prudential policy is still in its infancy and the Reserve Bank will continue to develop all aspects of the framework. For example, the calibration of macro-prudential policy settings will evolve as experience is gained with specific tools. The Reserve Bank will also continue to refine the set of indicators used to help guide the macro-prudential decision-making process, including both the deployment of tools and their eventual release.

The Reserve Bank expects that an understanding of the 'best' indicator (or set of indicators) will develop over time, and the knowledge of the thresholds at which the indicators point to a stress event will become more accurate. Nonetheless, because of the complex nature of systemic risk and periods of financial system stress, there will always be considerable scope for policymaker judgement in the macro-prudential decision-making process.

Appendix New Zealand MPIs

MPI	Definition	What it is useful for?	Source
Early warning indicators			
(i) Credit measures			
Private sector credit-to-GDP level	Ratio of intermediated credit (bank and non-bank lending), to annual nominal GDP	Indicator of vulnerability, may be influenced by trend changes such as changes in neutral interest rates or financial liberalisation	Statistics New Zealand, RBNZ <i>Standard Statistical Return (SSR)</i>
Real-time credit-to-GDP trend	Trend is calculated using a one-sided Hodrick-Prescott (HP) filter, with a lambda of 400,000. Each data point for the trend is estimated using the data that would have been available to policymakers at that time	Used in calculating the 'gap' measure	Statistics New Zealand, RBNZ SSR, RBNZ calculations
Credit-to-GDP real time gap	Difference between credit-to-GDP level and trend	Three-year ahead signal of financial stress. Indicates a sustained period (over a number of years) of strong growth in the credit-to-GDP ratio	Statistics New Zealand, RBNZ SSR, RBNZ calculations
Total credit growth	Annual percent change of bank and non-bank intermediated credit	Simple, transparent indicator measuring the increase in imbalances over a given time frame. Can be a leading indicator of the credit gap	RBNZ SSR
Private sector credit cross-country	Private sector credit divided by nominal GDP	Compare the stock of outstanding intermediated credit on an international basis	Statistics New Zealand, RBNZ, Haver
Household credit-to-disposable income (level, trend, gap, credit growth)	Replicates credit-to-GDP methodology	Identifies sectoral specific vulnerabilities and risks	See above
Business credit-to-gross operating surplus (level, trend, gap, credit growth)	Replicates credit-to-GDP methodology	Identifies sectoral specific vulnerabilities and risks	See above
Agricultural credit-to-agricultural GDP (level, trend, gap, credit growth)	Replicates credit-to-GDP methodology	Identifies sectoral specific vulnerabilities and risks	See above
Share of non-bank lending	Non-bank lending divided by total financial system lending	Measure of structural change and 'leakage' into the non-bank sector (as a result of policy)	RBNZ SSR
Public debt cross-country	General gross government debt as a share of GDP	Compare the level of public debt on an international basis	The Treasury, Statistics New Zealand, Haver
Public and private debt ratios	Total private debt (including corporate bonds) and public debt as a share of nominal GDP	Measures change in composition of total financial system debt over time	The Treasury, RBNZ, Statistics New Zealand
Net foreign liabilities	Foreign assets less liabilities divided by nominal GDP	Measure of net external indebtedness. Can be broken down by sectors (banks, government)	Statistics New Zealand

(continued)

MPI	Definition	What is it useful for?	Source
(ii) Asset price measures			
House price-to-disposable income level	Ratio of average house prices to average disposable income	Measure of overvaluation	Property IQ, Statistics New Zealand
Real-time house price to disposable income trend	Long-term trend of the house price-to-income. Same procedure as for credit-to-GDP trend	Used in calculating the 'gap' measure	Property IQ, Statistics New Zealand, RBNZ calculations
House price to disposable income gap	Percentage difference between the house price-to-income level and trend	Additional early warning indicator supplementing the credit gap. A positive gap indicates that asset price growth has outstripped incomes for a sustained period	Property IQ, Statistics New Zealand, RBNZ calculations
House price inflation	Annual percentage change in house prices	Simple, transparent indicator of asset price exuberance over the past year	Property IQ, REINZ
Commercial property prices to gross operating surplus (level, trend, gap, asset price growth rate)	Replicates house price-to-income methodology	See above	IPD, Statistics New Zealand
Farm prices to agricultural GDP: (level, trend, gap, growth rate)	Replicates house price-to-income methodology	See above	Statistics New Zealand, REINZ, RBNZ calculations
(iii) Capacity to service debt			
Debt servicing ratio	Principal and interest servicing costs divided by income. Principal costs assume average time-to-debt maturity is 15 years	One-year ahead signal of financial stress. Captures balance sheet stretch of the economy	RBNZ SSR, Statistics New Zealand, RBNZ calculations
Debt servicing ratio gap	Difference between debt servicing ratio level, and the 15-year moving average of the series	Measuring whether the increase in DSR has been excessive, rather than picking up long term trends	RBNZ SSR, Statistics New Zealand, RBNZ calculations
Analysis replicated for the household and business/agricultural sector (level, gap)	See above	See above. Highlights sectoral vulnerabilities	RBNZ SSR, Statistics New Zealand, RBNZ calculations
(iv) Lending standards			
Bank lending standards for retail borrowers	Change in price and non-price lending standards (net percentage)	Indicates how lending standards have changed over the previous 6-months, and how they are expected to change in the coming 6-months	Private reporting from 13 registered banks
Bank loan-to-value ratio (LVR) monthly flow	High LVR lending (>80%) as a share of total mortgage lending	Indicates change in proportion of bank lending to higher-risk borrowers	RBNZ Loan-to-value ratio survey
Net interest margins	Bank net interest income as a percentage of average interest earning assets	Highlights the level of competition within the banking system. Low margins can indicate that banks are competing aggressively on price	Registered banks' Disclosure statements

(continued)

MPI	Definition	What is it useful for?	Source
Indicators of banking system's capacity to absorb risk			
Tier-1 capital ratio	Tier-1 capital as a share of risk-weighted assets	Shows level of buffer against potential losses in the banking system	<i>Disclosure statements</i>
Core funding ratio	Retail funding, long-term wholesale funding, and equity as a share of total loans and advances	Measure of core or stable funding	RBNZ liquidity statistics
Bank wholesale funding profile	Proportion of wholesale funding at different maturities	Profile highlights stress points if funding markets closed	RBNZ
Indicators of financial system stress			
(i) Coincident stress measures			
Financial stress index (comparable indices constructed for New Zealand, Australia, and United States)	Principal component analysis is used to extract covariance between 5 financial market series (FX market volatility, equity market volatility, bond volatility, bank bill – OIS spread, and bond spreads). Each series is also reported individually	Measures onset of stress within financial markets. Individual series can highlight pockets of stress or market dysfunction	Bloomberg
Basis swap spreads	Cost of swapping overseas borrowing back to NZD	Shows the hedging costs for banks on overseas wholesale funding deals. Dysfunction in this market could result in increased funding costs for banks or reduced ability to hedge exchange rate risk	Bloomberg
Australian bank CDS spreads	Credit default swap (CDS) spreads for Australian banks	Proxy for wholesale funding costs of the parents of the big-4 banks in New Zealand	Bloomberg
(ii) Asset quality			
Non-performing loans	Impaired and 90-day past due assets divided by total lending	Lagged response to a period of financial stress, as borrowers struggle to repay debt	<i>Disclosure statements</i>
Sectoral non-performing loans	Impaired and 90-day past due assets divided by total lending for each sector	Identify specific sectors that have been affected by a period of financial stress	Private reporting from 13 registered banks
Sectoral watchlist loans	Watchlist loans divided by sectoral lending	Precursor to a loan becoming non-performing. Useful as a leading indicator of asset quality	Private reporting data from 13 registered banks
Impaired asset expense	Impaired asset expense divided by total lending	Shows impact of provisioning for a deterioration in asset quality on profitability	<i>Disclosure statements</i>

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Foreign exchange turnover: trends in New Zealand and abroad

Lauren Rosborough and Raiko Shareef

This article examines recent trends in global and local foreign exchange (FX) markets, using the 2013 Bank for International Settlements Triennial Survey and the Reserve Bank's foreign exchange turnover data. Global FX turnover continued to increase in 2013, with the US dollar remaining the most-traded currency and the United Kingdom the favoured trading hub. The New Zealand dollar was the tenth most traded currency, with the large majority of these transactions occurring outside New Zealand. FX and cross-currency swaps together accounted for more than half of FX turnover in the New Zealand domestic market, reflecting their use by New Zealand's major financial institutions for hedging and liquidity management purposes.

1 Introduction¹

Foreign exchange is the transaction of one country's money for that of another. It facilitates trade in goods and services and in financial instruments, and saving and investment across borders. In other words, in today's highly globalised and interdependent markets, foreign exchange is the oil that keeps the machinery humming.

Foreign exchange transactions largely occur directly between two parties (typically one of these parties is a bank) without passing through a centralised exchange. As a result, the vast majority of foreign exchange flows is only observable to a limited number of parties.

In an attempt to understand trends in foreign exchange, the Bank for International Settlements (BIS) coordinates a comprehensive global survey, formally known as the BIS Triennial Central Bank Survey of Foreign Exchange and Derivatives Market Activity. The BIS survey has been conducted every three years since 1989, taking a snapshot of activity during the April month of the reporting year.² In the 2013 survey, 1,300 financial institutions in 53 jurisdictions submitted turnover data. In New Zealand, five financial institutions were asked to take part: ANZ, ASB, BNZ, Deutsche Bank, and Westpac.

Complementing the BIS survey, the Reserve Bank of New Zealand (RBNZ) collects foreign exchange turnover data on a daily basis. These data are a subset of those collected for the New Zealand submission to the BIS survey, but provide more timely information about the trends in New Zealand's onshore foreign exchange market.³

This article discusses the results of the 2013 survey and recent trends in the foreign exchange market, based on both data sources, with a focus on the New Zealand dollar.

2 Global trends in foreign exchange and the New Zealand dollar in a global context

Global foreign exchange (FX) turnover increased by 35 percent between the 2010 and 2013 BIS surveys, to US\$5.3 trillion worth of transactions on average per working day. This rate of growth is high but not exceptional: rapid growth in turnover has been evident since the 2001 survey, with an average three-yearly growth rate of 38 percent.⁴ Higher FX turnover since 2010 is a by-product of

¹ The authors would like to thank Michael Reddell, Jeremy Richardson, and other colleagues at the Reserve Bank of New Zealand for their comments on earlier drafts.

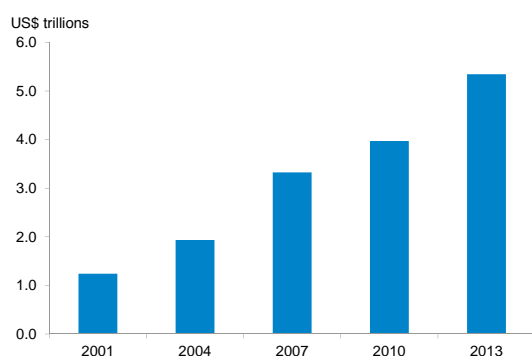
² The BIS survey has evolved over time, in both methodology and coverage (for instance to include the euro). To compare like with like, we discuss the latest survey results in relation to surveys from 2001 onwards.

³ The RBNZ survey is based on the foreign exchange section of the BIS survey. Banks reporting to the RBNZ survey are required to report transactions that involve the three following currencies: the New Zealand dollar, the US dollar and the euro. Transactions in these three currencies amount to 99.91 percent of the New Zealand turnover captured in the 2013 BIS survey.

⁴ This trend is slightly lower (35 percent) when exchange rates are held constant at 2013 levels.

international investors increasingly diversifying into riskier assets, such as international equities and emerging-market bonds (Rime and Schrimpf, 2013). Recovering risk appetite in a post-global financial crisis world may also have encouraged higher turnover and the world economy has continued to recover (albeit haltingly) from a period of weak growth, contributing to a rise in FX transactions.

Figure 1
Daily average global FX turnover



NB At prevailing exchange rates in survey years. Net-net basis (adjusted for local and cross-border inter-dealer double counting).

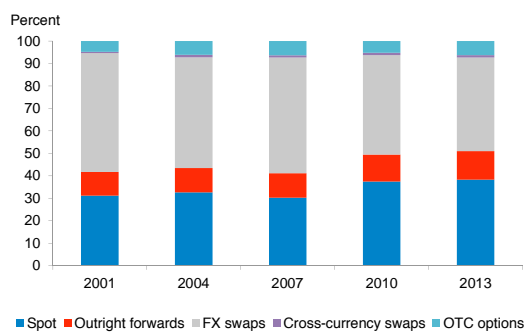
Source: BIS.

Turnover in developed markets is 34 percent higher than in 2010, but a notable feature of the global results is the pace at which turnover in emerging-market currencies has increased, up 72 percent since 2010. Since 2001, emerging-market currency turnover has grown by a factor of 9, in contrast with turnover in developed-market currencies which has quadrupled. That said, emerging-market currencies make up a small proportion of total FX turnover, accounting for just 19 percent out of a possible 200 percent in 2013.⁵

The share of FX turnover by instrument type was little changed between 2010 and 2013. FX swaps remained the most traded instrument, accounting for 42 percent of all FX turnover in April 2013. This was down

three percentage points from 2010, while spot, outright forward, and option transactions each gained roughly one percentage point.

Figure 2
Breakdown of FX turnover worldwide



Source: BIS

FX trading continued to be concentrated in a small number of countries (table 1 opposite). The United Kingdom has held a central place in global financial markets for some time, and that dominance increased over recent history. Between 2001 and 2013, the United Kingdom's share of global FX turnover rose from 32 percent to 41 percent. In April 2013, FX turnover in the United Kingdom was larger than the next six countries combined. The United States' share of turnover also increased since 2001 but to a smaller extent – from 16 percent to 19 percent. In the 2013 survey, Singapore's share of global FX trading outstripped Japan's for the first time, making it the third-largest trading centre in the world.

The US dollar maintained its position as the world's most traded currency, reflecting its role as the numeraire for a range of prices and financial contracts. The US dollar's share of FX turnover increased by over two percentage points to 87 percent, although this is down from its 2001 high of 90 percent (table 2). As a proportion of cross-currency turnover, emerging-market currencies transact more frequently against the US dollar than developed-market currencies do (figure 3). For countries closely integrated with the euro area (such as Sweden, Norway, and Poland), a significant proportion of local currency transactions is against the euro.

⁵ As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200 percent. The discussion here is based on Rime and Schrimpf's classification, where HKD and SGD are treated as emerging market currencies. Elsewhere in this commentary we classify these two currencies as developed market currencies, in line with the MSCI definitions.

Box 1

FX instrument definitions

Spot: A spot foreign exchange transaction is the outright purchase of one currency in exchange for another. The price (i.e. exchange rate) is agreed today, with market convention dictating that settlement occurs within two business days.

Outright forwards: An outright forward transaction is similar to a spot transaction, with a settlement date that occurs more than two days hence.

FX swaps: A foreign exchange swap is an agreement to exchange one currency for another on one date and to reverse the transaction at a future agreed date. The exchange of two currencies at the outset is based on the prevailing spot exchange rate while the reverse payment, also agreed at the outset, is based on

the currency's forward rate.

Cross-currency swaps: A cross-currency swap is a foreign exchange swap that also involves the exchange of streams of interest payments in different currencies for an agreed period of time. The principal amount exchanged is based on the spot rate, at both the outset and contract expiry. A cross-currency swap is also often known as a currency swap or a basis swap.*

OTC options: A currency option gives the holder the right, but not the obligation, to buy or sell a given amount of one currency against another at a specified exchange rate over a specified period or at a specified future date.

* See Hawkesby (1999) for more details.

Table 1

Geographical distribution of global foreign exchange market turnover (% of total)

	2001	2004	2007	2010	2013
United Kingdom	31.8	32.0	34.6	36.8	40.9
United States	16.0	19.1	17.4	17.9	18.9
Singapore	6.1	5.1	5.6	5.3	5.7
Japan	9.0	8.0	5.8	6.2	5.6
Hong Kong SAR	4.0	4.1	4.2	4.7	4.1
Switzerland	4.5	3.3	5.9	4.9	3.2
France	2.9	2.6	3.0	3.0	2.8
Australia	3.2	4.1	4.1	3.8	2.7
Netherlands	1.8	2.0	0.6	0.4	1.7
Germany	5.4	4.6	2.4	2.2	1.7

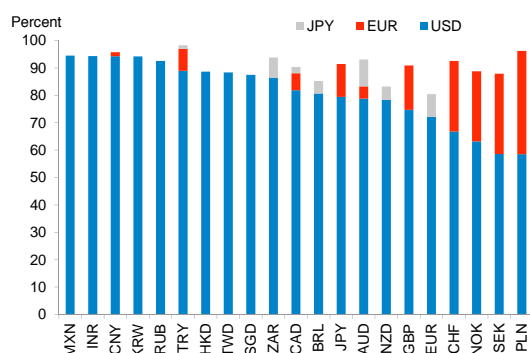
NB: Net-gross basis (adjusted for local inter-dealer double counting).
Source: BIS.

Table 2
Global turnover and rank by currency,*
selected years

	2013	Rank	2010	Rank	2007	Rank	2004	Rank
USD	87.0	1	84.9	1	85.6	1	88.0	1
EUR	33.4	2	39.1	2	37.0	2	37.4	2
JPY	23.0	3	19.0	3	17.2	3	20.8	3
GBP	11.8	4	12.9	4	14.9	4	16.5	4
AUD	8.6	5	7.6	5	6.6	6	6.0	6
CHF	5.2	6	6.3	6	6.8	5	6.0	5
CAD	4.6	7	5.3	7	4.3	7	4.2	7
MXN	2.5	8	1.3	14	1.3	12	1.1	12
CNY	2.2	9	0.9	17	0.5	20	0.1	29
NZD	2.0	10	1.6	10	1.9	11	1.1	13

NB: As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200 percent.
* Currency acronyms are explained in the Appendix. Net-net basis.
Source: BIS.

Figure 3
Share of total global turnover against major
currencies in April 2013



NB: Net-net basis.
Source: BIS.

The euro's share of global turnover declined sharply from 2010, while the Japanese yen's share of global turnover rose four percentage points, probably due to the Bank of Japan's open-ended monetary easing programme introduced in early April 2013. Turnover may have increased due to a diversity of views surrounding the range of expected future outcomes of this policy shift.

In the 2013 survey, the New Zealand dollar remained the tenth-most traded currency in the world. Its share of global FX turnover rose slightly, from 1.6 percent in 2010 to 2.0 percent in 2013. On average, the New Zealand dollar was involved in US\$105 billion of transactions per day in April 2013.

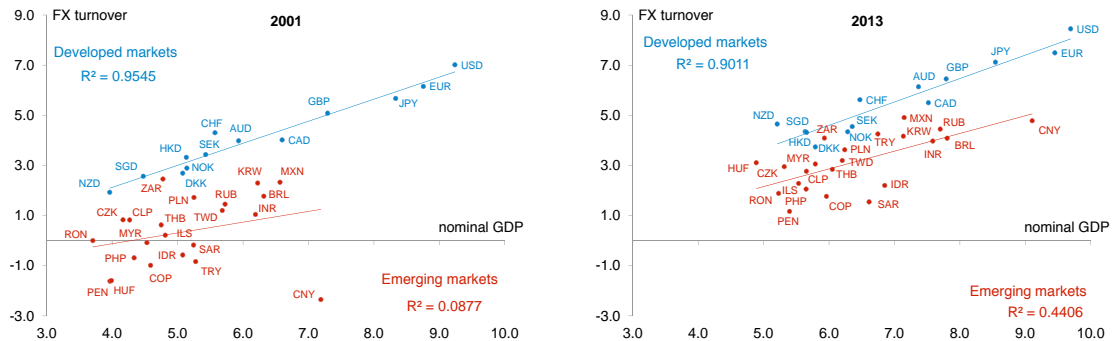
3 Foreign exchange turnover and GDP

Among developed markets, there has long been a log-linear relationship between FX turnover in a given currency and the size of a country's economy. Such a relationship was not apparent among emerging-market currencies at the turn of the century, but appears to be forming now.

BIS research argues that, in the early stages of a country's development, FX turnover increases in line with trade-related transactions.⁶ But as the country develops, FX turnover increases at a faster rate than GDP growth due to the greater depth, complexity, and openness of the country's financial markets. Those factors allow the

⁶ McCauley and Scatinga (2011).

Figure 4
 Currency FX turnover versus the associated
 country's nominal GDP



Horizontal axis: natural logarithm of nominal GDP (US\$ billions); vertical axis: natural logarithm of daily FX turnover (US\$ billions).
 NB: The 2013 GDP figures are estimates from the IMF World Economic Outlook.
 Sources: BIS, IMF (2013).

home currency to become more internationally traded, thereby generating greater FX turnover. Factors common to developed markets, such as open financial markets and free capital account convertibility, place the cluster of developed-market points higher than the equivalent in emerging markets (figure 4). In other words, for developed economies, FX turnover is higher on average for any given level of GDP.

Among emerging market economies, the increase in turnover in the Chinese yuan is particularly evident. In 2001, the CNY was an outlier compared to other emerging market economies, as its trading volume was unusually small compared to the size of China's economy (figure 4, left-hand panel). Over the past decade, transactions in CNY have increased more rapidly than the Chinese economy has grown (figure 4, right-hand panel). The rise in turnover reflects the Chinese Government's efforts to internationalise the yuan (see box 2). Recent developments include allowing Singapore-, Hong-Kong-, and UK-based investors to buy yuan-denominated securities, and allowing the yuan to be transacted in offshore trading centres such as Hong Kong and Singapore.

New Zealand has had a high FX turnover to GDP ratio throughout history. Spencer (2009) attributes this to the ability of non-residents to freely trade directly in the currency as well as in New Zealand dollar-denominated

instruments for more than 20 years. Internationalisation has many benefits, such as lower transaction costs and diversification gains for borrowers, a greater ability to issue debt in the local currency, and an increased ability to hedge or manage exchange rate risk (Bini Smaghi, 2008).

There is mixed empirical evidence on the relationship between turnover and short-term currency volatility,⁷ and the causal relationship between turnover and daily volatility is unclear. Galati (2000) finds evidence of a positive correlation between daily volume and currency volatility in emerging market currencies. In the case of New Zealand on the other hand, the exchange rate is more stable when FX volumes are high (Rosborough, 2001). A reason for this is that as turnover increases, liquidity also improves, in the sense that there are more buyers and sellers at every price point, and less currency movement for every given trade (black line in figure 5). By comparison, low volume periods in the New Zealand market are related to a material rise in NZD/USD volatility (red line in figure 6), possibly reflecting a lack of liquidity and unwillingness of market participants to transact.

⁷ This definition of volatility differs from that expressed in Chetwin, Ng, and Steenkamp (2013).

Box 2

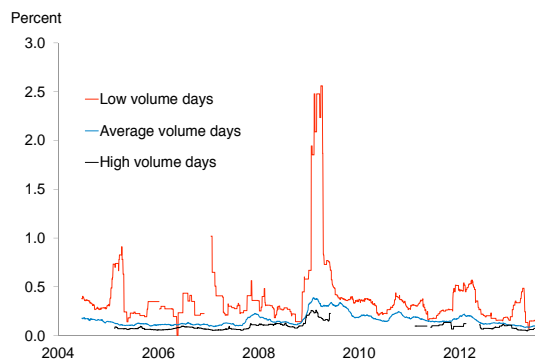
Currency internationalisation*

As characterised by Kenen (2009), to qualify as internationalised, a currency must meet most of the following conditions (in order of descending importance):

1. Any foreign or domestic party must be able to buy or sell that currency in the spot or forward market without any restrictions.
2. Domestic and foreign firms can invoice some, if not all, of their exports in that country's currency.
3. Foreign entities can hold that country's currency (and financial instruments denominated in that currency) in amounts that they deem useful and prudent.
4. Foreign and domestic entities can issue marketable instruments (such as debt securities)
5. International financial institutions (such as the World Bank) can issue marketable securities in that country's domestic market, as well as use its currency in their operations.
6. The currency may be included in currency baskets of other countries (where a currency basket for a given country is a weighted portfolio of selected foreign currencies, against which the value of the country's domestic currency is compared).

* This material draws heavily from a BIS conference on the topic (BIS 2009).

Figure 5
NZD/USD daily volatility per NZ\$1bn
transacted in the New Zealand market



NB: High/low volume days are defined as volume +/- 1 standard deviation compared to its historical average. Series are a 60 working day moving average. Breaks in the series reflect a lack of high/low volume trading within the 60 working day window.

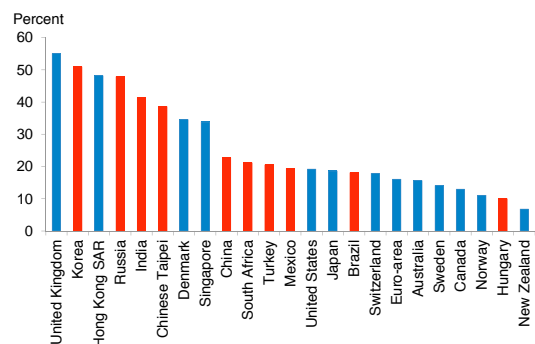
Sources: Bloomberg, RBNZ.

4 Onshore versus offshore trading

On average, 20 percent of the home currency's turnover occurs onshore in developed market countries (this excludes the UK, which is an outlier at 55 percent, because of its position as the world's main trading hub for FX). The proportion of onshore turnover in the New Zealand dollar is similar to (although slightly smaller than)

that in currencies the New Zealand dollar is often grouped with, such as the Australian and Canadian dollars, the Swedish krona, and the Norwegian krone (see figure 6).

Figure 6
Proportion of home currency trading taking place in home country



Blue: developed-market currencies; red: emerging-market currencies

NB: Net-gross basis

Source: BIS.

One reason for the lower proportion of onshore trading of the New Zealand dollar relative to developed-market peers may be New Zealand's long-term savings-investment imbalance. A reliance on foreign savings

to fund domestic investment means that debt has to be raised offshore, either in New Zealand dollars or in foreign currency subsequently converted into New Zealand dollars (see next section). A corollary to New Zealand's savings-investment imbalance is relatively high interest rates. The small proportion of onshore trading may simply reflect the fact that, even though the underlying (e.g. corporate) domestic foreign exchange activity might be similar as a share of GDP in two countries, there is often greater international investor interest in currencies with typically higher interest rates (such as New Zealand) than those with typically lower interest rates (such as Sweden).

In addition, two particular events may have contributed to greater turnover of the New Zealand dollar in the month of April 2013. Firstly, the New Zealand dollar was seen as one potential destination for Japanese funds after the Bank of Japan's announcement of unprecedented monetary easing. The Australian dollar and the Mexican peso were other beneficiaries cited in analyst reports and the financial news media, and these currencies also experienced increased turnover in the 2013 survey results.⁸ Secondly, the New Zealand dollar traded at exceptionally high levels in April, with the New Zealand trade-weighted index reaching 79.67 on 11 April 2013, its highest level since the New Zealand dollar was floated in 1985.⁹ The unusually high level of the New Zealand dollar may have polarised opinions among market participants about the direction of the currency, thereby generating greater-than-usual FX turnover (as participants executed trades reflecting their opinions).

5 Trends in New Zealand's FX market

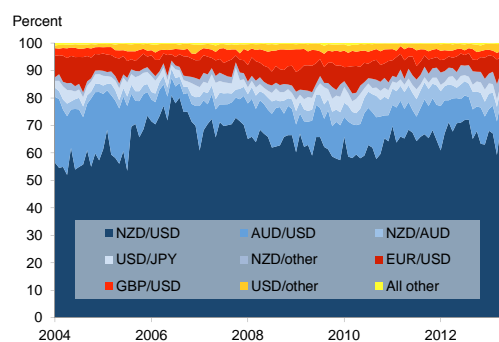
Total turnover in New Zealand's onshore FX market, in New Zealand dollar terms, rose 10.3 percent between 2010 and 2013, with average daily turnover in April 2013 of NZ\$14.6bn.

⁸ This reflects a strategy known as the carry trade, where the 'carry' is the positive return from borrowing in a low-yield currency and investing in a high-yielding currency.

⁹ The New Zealand trade-weighted index is a measure of the value of the New Zealand dollar relative to the currencies of New Zealand's major trading partners. See <http://www.rbznz.govt.nz/statistics/twi/> for more details.

In 2013, NZD/USD transactions equated to 69 percent of all FX deals struck in the New Zealand market (figure 7), while trades in Asia-Pacific currencies (which include NZD/USD, NZD/AUD, AUD/USD and USD/JPY) accounted for 86 percent of all local turnover. The dominance of these currencies within the New Zealand dollar market reflects New Zealand's geographical position and trading partner linkages. Spot FX trades were skewed towards NZD/USD trades, with 84 percent involving that currency pair.

Figure 7
Currency pairs traded in New Zealand onshore market

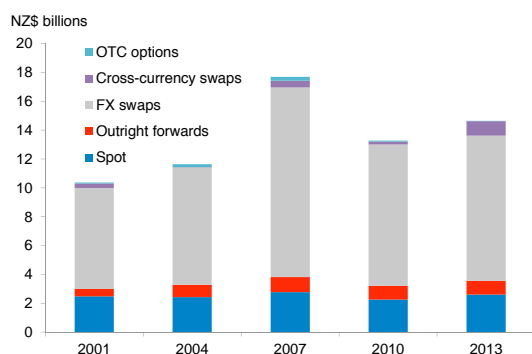


Source: RBNZ FX turnover survey

FX swaps continue to dominate turnover in the onshore market (figure 8), accounting for 69 percent of the total in 2013. This is consistent with previous BIS surveys, which have shown FX swaps contributing about 70 percent of onshore turnover since 2001. Financial intermediaries, such as domestic banks, are major participants in FX swap markets. The reasons they use FX swaps include: to manage daily funding requirements; to offset risk taken on in providing services to end-users (such as exporters); and to position for expected future changes in relative interest rates and exchange rates. Furthermore, an offshore investor looking to hold New Zealand dollar assets may undertake an FX swap with a local bank, rather than placing a term deposit with the bank or buying a New Zealand government bond, because the FX swap market is relatively deep and liquid. There has been an increase in assets invested in New Zealand managed

funds since the 2010 survey, and some large overseas investment, insurance, or pension funds may manage a portfolio of swaps in many different currencies, which in turn match the assets and liabilities on the institution's balance sheet. Some of these users may transact in New Zealand dollar swaps with New Zealand financial institutions, contributing to the sizeable share of FX swaps in New Zealand turnover.

Figure 8
Daily average FX turnover in New Zealand's onshore market

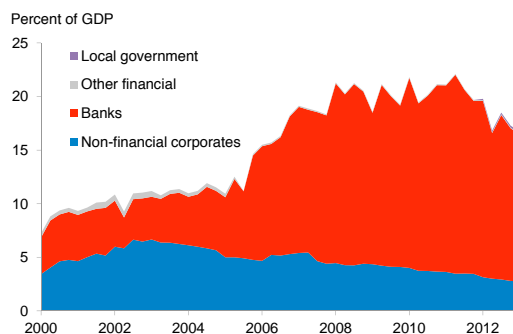


Source: BIS

The 2013 BIS survey found that the share of cross-currency swaps had increased to 6.8 percent of all FX turnover in the New Zealand market, up from 1.5 percent in 2010 and 0.2 percent in 2004. Cross-currency swaps can be used to hedge risk but can also be utilised in liquidity management transactions. For example, onshore banks with large portfolios of New Zealand residential mortgages partly fund their balance sheets by issuing bonds overseas in foreign currencies where there is a greater savings pool. These bond issues may be targeted at the European, Japanese, or the US markets, using lead managers to distribute the bonds to investors in those markets, or may be private placements with individual counterparties. Some bonds have had maturities for as long as 15 to 20 years, although durations of five to seven years tend to be more common. The banks then use cross-currency swaps to transform this long-term foreign currency funding into New Zealand dollar funding. New Zealand non-bank corporates also use cross-currency

swaps to hedge non-New Zealand dollar funding. Figure 9 provides a proxy for the scale of such issuance and its rise since 2001.

Figure 9
Outstanding non-NZD debt issued offshore by New Zealand entities

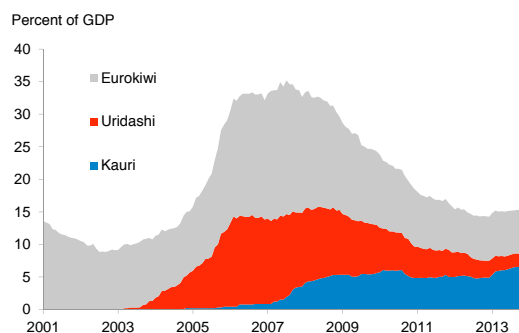


NB: Non-New Zealand dollar debt issued by the private sector is likely to be underestimated, as untraded debt securities, such as private placements, are not usually captured by Bloomberg.
Source: Bloomberg.

On the other side of a cross-currency swap is the issuance of New Zealand dollar bonds by non-residents. These are known as Kauri, Eurokiwi, and Uridashi bonds. Kauri bonds are debt securities denominated in New Zealand dollars that are issued within New Zealand by a non-New Zealand entity. Eurokiwi and Uridashi bonds are New Zealand dollar bonds issued outside New Zealand (in the case of Uridashis, in Japan) by a foreign borrower.¹⁰ Total issuance outstanding in these markets exceeded 35 percent of GDP in 2007 (figure 10). While the amounts outstanding of Eurokiwi and Uridashi bonds have fallen since then, the global market for Kauri bonds has grown since its inception in 2004 to NZ\$22bn in November 2013. Kauri, Eurokiwi, and Uridashi bond issues are typically linked to cross-currency swap transactions as the issuer switches the proceeds of the issue into foreign currency. Some of these swap transactions take place with New Zealand counterparties.

¹⁰ See Drage, Munro, and Sleeman (2005) for more details of these instruments.

Figure 10
Outstanding New Zealand dollar debt issued
by non-residents



Note: The data are an estimate, and may be under-reported due to untraded securities not captured.
Source: RBNZ

New Zealand financial institutions can use both FX swaps and cross-currency swaps to manage their day-to-day liquidity, hedging, and wholesale funding requirements. Therefore, the sum of FX and cross-currency swap transactions in New Zealand provides a more comprehensive understanding of the hedging behaviour and liquidity requirements of New Zealand's major institutions. Together, FX swaps and cross-currency swaps grew 11 percent between the 2010 and 2013 BIS surveys, and total turnover is one-and-a-half times greater than in 2001.

The rise in cross-currency swaps as a proportion of total turnover since 2010 is consistent with domestic banks moving towards funding for longer durations in a post-global financial crisis world, partly in order to meet the RBNZ's new prudential liquidity requirements (implemented in 2010). Longer-dated funding provides both a more stable source and a more stable average price of funding, with less volatility and reduced roll-over risk (Wong, 2012).

6 Concluding remarks

Global FX turnover continued to increase at a substantial rate between 2010 and 2013. Although the breakdown by instrument traded was relatively unchanged, the 2013 survey did see some shifts in the share of individual currencies. While the US dollar maintained its

share of global turnover, the euro lost significant ground while the Japanese yen gained.

The New Zealand dollar saw its share of total turnover rise slightly. A large proportion of New Zealand dollar trading occurred offshore, perhaps reflecting New Zealand's long-term savings-investment imbalance and the related offshore issuance of New Zealand dollar-denominated debt.

Turnover in New Zealand's onshore market also grew, with trading in Asia-Pacific currencies accounting for 86 percent of all local FX transactions. FX swaps remained the most-utilised instrument and cross-currency swaps have increased in popularity, reflecting hedging and investing behaviour by domestic institutions and international investors.

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Appendix

Explanation of acronyms

AUD	Australian dollar
BRL	Brazilian real
CAD	Canadian dollar
CHF	Swiss franc
CLP	Chilean Peso
CNY	Chinese yuan
COP	Columbian peso
CZK	Czech koruna
DKK	Danish Krone
EUR	Euro
GBP	Pound sterling
HKD	Hong Kong dollar
HUF	Hungarian forint
IDR	Indonesian rupiah
ILS	Israeli (new) shekel
INR	Indian rupee
JPY	Japanese yen
KRW	South Korean won
MXN	Mexican dollar
MYR	Malaysian ringgit
NOK	Norwegian krone
NZD	New Zealand dollar
PEN	Peruvian Nuevo sol
PHP	Philippine peso
PLN	Polish zloty
RON	Romanian (new) lei
RUB	Russian rouble
SAR	Saudi Arabian riyal
SEK	Swedish krona
SGD	Singapore dollars
THB	Thai baht
TRY	Turkish (new) lira
TWD	Taiwanese dollar
USD	United States dollar
ZAR	South African rand

DISCUSSION PAPERS

DP2013/02

A tractable framework for zero lower bound Gaussian term structure models

Krippner, Leo

When nominal interest rates are near their zero lower bound (ZLB), as in many developed economies at the time of writing, it is theoretically untenable to apply the popular class of Gaussian affine term structure models (GATSMs) given their inherent material probabilities of negative interest rates. Hence, I propose a new and tractable modification for GATSMs that enforces the ZLB, and which approximates the fully arbitrage-free but much less tractable framework proposed in Black (1995). I apply my framework to United States yield curve data, with robust estimation via the iterated extended Kalman filter, and first show that the two-factor results are very similar to those from a comparable Black model. I then estimate two- and three-factor models with longer-maturity data sets to illustrate that my ZLB framework can readily be applied in circumstances that would be computationally burdensome or infeasible within the Black framework.

DP2013/03

Deep habits, price rigidities and the consumption response to Government spending

Jacob, Punnoose

This paper presents the novel implications of introducing price rigidities into a model of good-specific habit formation, for the response of private consumption following a positive government spending shock. With 'deep' habits in demand, the price elasticity of demand rises after the fiscal expansion and it is optimal for the firm to lower the mark-up while increasing production. This in turn raises the demand for labour and the real wage rises. Consequently, agents raise consumption at the expense of leisure and overcome the negative wealth effect of the fiscal shock. We show that increasing price stickiness in a model with deep habits hinders the crowding-in of consumption. If the degree of price stickiness is high enough, consumption is crowded out by government spending. These dynamics are in stark contrast to those

in traditional models where price rigidities are known to weaken the crowding-out of consumption.

DP2013/04

Dissecting the dynamics of the US trade balance in an estimated equilibrium model

Jacob, Punnoose; Peersman, Gert

In an estimated two-country DSGE model, we find that shocks to the marginal efficiency of investment account for more than half of the forecast variance of cyclical fluctuations in the US trade balance. Both domestic and foreign marginal efficiency shocks generate a strong effect on the variability of the imbalance, through shifts in international relative absorption. On the other hand, shocks to uncovered interest parity and foreign export prices, which transmit mainly via the terms of trade and exchange rate, have a strong influence at short forecast horizons, before the investment disturbances begin their dominance.

DP2013/05

What happens when the Kiwi flies? Sectoral effects of the exchange rate shocks

Karagedikli, Özer; Ryan, Michael; Steenkamp, Daan; Vehbi, Tugrul

We estimate a Factor Augmented Vector autoregression (FAVAR) to identify idiosyncratic exchange rate shocks and examine the effects of these shocks on different sectors of the economy. We find that an unexpected shock to the exchange rate has significant effects on the tradable sector of the economy. While this is expected, the non-tradable sectors of the economy are also influenced by shocks to exchange rate. We argue that one important channel for this influence is the endogenous/cyclical nature of the population dynamics due to permanent and long term migration.

DP2013/06

Financial exposure and the international transmission of financial shocks

Kamber, Gunes; Thoenissen, Christoph

This paper analyzes the transmission mechanism of banking sector shocks in an international real business cycle model with heterogeneous bank sizes. We examine to what extent the financial exposure of the banking sector affects the transmission of foreign banking sector shocks. In our model, the more exposed domestic banks are to the foreign economy via lending to foreign firms, the greater

are the spillovers from foreign financial shocks to the home economy. The model highlights the role of openness to trade and the dynamics of the terms of trade in the international transmission mechanism of banking sector shocks. Spillovers from foreign banking sector shocks are greater the more open the home economy is to trade and the less the terms of trade respond to foreign shocks.

ANALYTICAL NOTES

AN2013/05

Estimating the impacts of restrictions on high LVR lending

Bloor, Chris; McDonald, Chris

The Reserve Bank recently imposed a loan-to-value ratio limit governing bank lending on residential mortgages. This note outlines the analysis undertaken to estimate the likely impact of this limit on several macro-economically significant variables.

the concept of a neutral interest rate and provides some simple empirical illustrations of the trend decline in neutral rates, here and abroad, over the last couple of decades.

AN2013/08

What in the world moves New Zealand bond yields?

Lewis, Michelle; Rosborough, Lauren

We use statistical techniques to identify the co-movement among the bond yields of 12 advanced countries, and thus estimate two-year and 10-year World Interest Rates. Daily and monthly changes in the estimated World Interest Rates explain a lot of the variation in New Zealand bond yields.

AN2013/06

Some revisions to the sectoral factor model of core inflation

Price, Gael

The sectoral core factor model of inflation is one of many series that the Reserve Bank uses to help interpret inflation developments. This Analytical Note explains the model and outlines some modifications that have led to revisions to the published historical series.

AN2013/09

Fresh perspectives on unobservable variables: Data decomposition of the Kalman smoother

Sander, Nicholas

Macroeconomics makes extensive use of concepts for which there are no observed data. Empirical estimates of such unobservable variables - core inflation is one example - have to be estimated from observed data. The data decomposition tool helps identify the contribution of each piece of observed data to the estimate of the unobservable variable.

AN2013/07

Neutral interest rates in the post-crisis period

Chetwin, Willy; Wood, Amy

Estimates of neutral interest rates play a useful role in thinking about monetary policy. This note explores

NEWS RELEASES

Reserve Bank *Bulletin* released

26 September 2013

The Reserve Bank today released the September 2013 edition of the Reserve Bank *Bulletin*.

The *Bulletin's* first article looks at why inflation in New Zealand has been surprisingly low for the past 18 months, even though GDP growth has been much as expected. The article concludes that the unexpected strength in the exchange rate, reinforcing strong competitive pressures, has played a key role. Encouraging declines in inflation expectations and low wage inflation have also contributed.

The *Bulletin's* second article outlines the Reserve Bank's new macro-prudential policy framework and the governance arrangements surrounding it. The article provides background to the development of macro-prudential policy, explains the objectives, and describes the four macro-prudential tools that the Reserve Bank can use. The article notes that the macro-prudential approach is still in its early stage and there is scope to refine it in light of domestic and international experience.

The *Bulletin's* third article outlines some of the approaches used to help reach a position on how much capital the Reserve Bank needs to underpin its financial operations. Recent changes in methodology improve the robustness of estimated capital needs and increase the transparency of the framework.

Reserve Bank responds to economic challenges

27 September 2013

The Reserve Bank's latest *Annual Report* demonstrates the Bank's commitment to meeting the challenges facing the New Zealand economy and financial system, Governor Graeme Wheeler said today.

Mr Wheeler said that the 2012-13 *Annual Report* reported a positive outlook for the New Zealand economy, which was currently growing faster than nearly all of the advanced economies, but was being buffeted by a range of domestic and international factors.

"Just as firms and households develop strategies to adjust to the wide range of forces that hit our economy,

the Reserve Bank also needs to respond to them in meeting its goals of price stability and financial stability."

Mr Wheeler said the Bank kept its strategies, policies and tools under constant review and, in the last year, it adopted several strategic priorities to enhance the Bank's capacity to handle the current challenging environment.

"These priorities, announced in the Bank's Statement of Intent in June and emphasised in the *Annual Report*, build on the Bank's achievements in the last year," Mr Wheeler said. "They are designed to continue to strengthen the Bank's performance; develop a more integrated approach to the Bank's monetary and financial stability policies; and improve infrastructure and reduce enterprise risk."

The *Annual Report* shows that in the financial year 2012-13 the Bank undertook substantial research on the economic and financial environment following the global financial crisis and Canterbury earthquakes. This work had fed into the Bank's regular *Monetary Policy Statements*, *Financial Stability Reports*, speeches and research publications.

The Bank signed a Memorandum of Understanding with the Minister of Finance on macro-prudential policy and operating guidelines. Work progressed on the implementation of loan-to-value restrictions – coming into force from 1 October 2013 – to reduce financial stability risks arising from excessive house price and credit growth.

Measures undertaken during the year to reduce risk in the banking system included the implementation of revised capital adequacy requirements for registered banks; and a requirement for large banks to have pre-positioned their systems to enable the operation of the Open Bank Resolution policy.

Financial results show the Bank spent a net \$48.3 million on activities covered by its Funding Agreement, and a dividend of \$175 million was paid to the Crown.

Why NZ's neutral interest rates have fallen

2 October 2013

New Zealand's 'neutral' interest rate appears to

have fallen, and this will have a bearing on the interest rates households and businesses will face over time, Reserve Bank Assistant Governor John McDermott said today.

The neutral interest rate is the rate that neither stimulates nor restricts the economy when it is growing with no under- or over-utilised resources in aggregate (often referred to as a zero output gap), and inflation is close to the midpoint of the 1 to 3 percent target band.

Speaking to the New Zealand Institute of Chartered Accountants CFO and Financial Controllers Special Interest Group in Auckland, Dr McDermott noted that factors that can affect the neutral interest rate include world conditions, domestic productivity growth, population growth, and preferences for savings and investment. The drop in the Reserve Bank's estimates of New Zealand's neutral interest rates is largely due to weaker productivity growth in recent years.

He noted that the Bank's latest forecasts project the output gap to be near zero and inflation to be close to the 2 percent midpoint in March 2016. Consequently, the appropriate monetary policy setting at that time should be very close to neutral.

The Bank's projections suggest the level of the nominal 90-day interest rate that achieves this is about 4½ percent, with a confidence band of perhaps ½ percentage point each side of the central estimate.

"Lower neutral interest rates imply that the interest rates faced by household and businesses over the longer haul are likely to be lower than in the past. But interest rates will still need to be adjusted in response to the state of the economy," Dr McDermott said.

Dr McDermott said that the Reserve Bank over recent years lowered its assumption of neutral 90-day rates within its forecasting framework in line with its lower estimates of the neutral rate.

View the speech: ['Shifting gear: why have neutral interest rates fallen?'](#)

Why Loan-to-Value Ratios were introduced

3 October 2013

Graeme Wheeler, Governor, Reserve Bank of New Zealand

Many New Zealanders consider purchasing a house to be a rock solid investment, and assume that house prices will continue to rise steadily, having never seen a bear market or experienced rapid rises in mortgage rates.

Over the past 25 years, however, many wealthy countries have experienced periods of substantial decline in house prices.

Falling house prices erode homeowners' equity, while mortgage lenders experience losses on their loan portfolios. The resulting stress in the financial system can have long lasting adverse effects on the economy. For borrowers, it can mean years of spending cut-backs to rebuild savings. The greatest impact is on borrowers, often first-home buyers, who recently entered the market with the least equity. In the United States, real net household wealth for the median household fell 39 percent from 2007 to 2010, and a quarter of America's mortgage holders owed more on their houses than what their houses were worth.

Our concern is that excessive increases in house prices in parts of the country, if unchecked, pose increasing risk for the financial system and the broader economy. High and rising house prices increase the risk and potential impact of a major correction in house prices, and consequential loss to lenders. In a severe downturn, such losses would be expected to significantly reduce banks' willingness to lend. Similar views about the risks from our overvalued housing market are expressed by the IMF, OECD, and the major international credit rating agencies.

New Zealand's house prices are expensive, based on international comparisons of house prices relative to rents and to levels of household income. And our household debt levels relative to disposable income – having doubled over the past two decades – are also very high.

Could New Zealand experience a sharp fall in house prices? While not anticipated, our economy is not immune to such risks. The world economy still faces major challenges and, if global growth slows markedly, or if China's financial system experiences major difficulties, it would quickly feed into the New Zealand economy and housing market.

House prices are rising rapidly in Auckland and Christchurch for two reasons: housing shortages and easy credit. It is critical that issues around land availability, zoning restrictions and high building costs are resolved and that the housing targets in the Auckland Accord are achieved. It is also important that credit expansion is restrained to be more in line with housing supply. Restricting lending to borrowers with low deposits can help reduce the upward pressure on house prices, especially as banks have been competing aggressively for borrowers with low deposits – with this borrowing accounting for 30 percent of new mortgage lending.

Some suggest that loan-to-value restrictions should be applied regionally, especially around Auckland, or that we should exempt buyers of lower-priced houses. We considered both options. However, regional restrictions would be hard to administer and would shift housing pressures outside wherever the boundary is drawn. Exempting low-priced housing would be a recipe for rapid increases in the cost of such housing. Broad exemptions to other groups such as first home buyers would substantially undermine the effectiveness of the restrictions in reducing house price inflation.

While new for New Zealand, such restrictions have been introduced in 25 countries, and are currently being deployed in Canada, Israel, Korea, Norway, Singapore, and Sweden. Most countries adopting such restrictions prohibit high loan-to-value lending. We have opted for a more flexible approach, which still allows banks to do some high loan-to-value lending. Nor should such moves be seen as permanent. Restrictions will be removed when there is a better balance in the housing market and less risk that their removal will reignite high house price inflation.

While the Reserve Bank's mandate is to promote

financial stability, there are clear implications here for housing affordability. Over the next two years interest rates are likely to rise in order to restrain an expected increase in broader inflation pressures. We currently expect that the official cash rate could increase by 2 percent from 2014 to the beginning of 2016. This could result in interest rates on first mortgages of 7-8 percent. If the loan-to-value speed limit is unable to slow house price inflation, larger increases in the official cash rate would be required.

We are keen to see house price inflation moderate significantly and, in doing so, reduce the risks to the financial sector and the broader economy. Speed limits on low deposit lending are designed to help achieve this. Loan-to-value restrictions are expected to give the Reserve Bank more flexibility as to when and how quickly we have to raise interest rates, but the more fundamental solution to reducing pressure in the housing market lies in addressing the issues around housing supply.

RBNZ warns against phone scam

9 October 2013

The Reserve Bank has issued a warning against fraudsters who are using the Reserve Bank's name in an effort to make their scam appear genuine.

The scammers typically tell their victims that they need to pay to process or release a tax refund, or a one-off bonus from the Government, or to receive some unclaimed money. The scammers often ask their victim for immediate payment via a website, which sends the money to the Philippines or India.

The scammers sometimes claim to work for the Reserve Bank, or the Inland Revenue Department, or Prime Minister John Key. They try to reassure their victims by claiming that the Reserve Bank can provide a "receipt number" or other proof that the "release payment" has been made.

The Reserve Bank's name is used in an effort to reassure their victims that the scam is genuine.

"These scammers are just trying to steal money. They're not genuine; they're fraudsters," a Reserve Bank spokesperson said.

"The Reserve Bank is not involved in tax refunds

or tax collection. Tax refunds are managed by the Inland Revenue Department, which doesn't ask for payments in order to process refunds. You don't need to pay the Inland Revenue Department or any other government agency to receive a tax refund, bonus payment or receive unclaimed money."

The Reserve Bank strongly advises people to not answer questions from these scammers, not transfer money to them, and simply hang up the phone if they call.

Housing market needs supply boost and demand restraint

15 October 2013

Current imbalances in the New Zealand housing market present risks for both financial stability and price stability, Reserve Bank Deputy Governor Grant Spencer said today.

To reduce those risks will require more responsive supply, as well as restraint on demand, Mr Spencer said in a speech to the Property Council in Auckland.

"The underlying issue in the New Zealand housing market is a shortage of supply. In Christchurch this is a direct result of the earthquakes. In Auckland, the shortage has been growing over a much longer period, with weak rates of house building since 2005."

"But house price inflation has accelerated only over the past two years, coinciding with low interest rates, easier bank credit and a growing trend amongst renters to become first-home buyers. The recent turnaround in inward migration is also adding to the excess of demand over supply."

Mr Spencer said that moves to increase the housing supply are well underway and residential building consents are trending upwards.

"A more responsive supply side is key and will require: a responsive and innovative building sector; an adequate supply of labour, some of which will need to be imported; and a responsive planning and consenting process. The accord between Government and the Auckland Council is a positive step in this direction.

"However, the combined three-year targets of Christchurch and Auckland are very ambitious and it will

require a major effort to get near them.

"Given the relatively slow response of housing supply, it does not make sense to let credit-based housing demand get too far out in front."

Mr Spencer said that the loan-to-value (LVR) restrictions on bank mortgage lending, introduced on 1 October, are aimed at moderating house price inflation by reducing the effective demand for housing. While they should help to reduce house price inflation, New Zealand house prices are likely to remain high on most metrics. In this sense it is hard to see how LVR restrictions will materially reduce the existing incentives to develop new residential property.

"The impact of LVR restrictions will not be uniform across the country. Market segments with a higher proportion of high-LVR borrowers are likely to see larger effects, as will areas where house prices and borrower incomes exceed the criteria for Welcome Home Loans, which are exempt."

"The LVR restrictions are intended to reduce the build-up of systematic risk in the New Zealand financial system. They will also potentially reduce the extent of interest rate increases, and hence exchange rate pressure, that may be needed in the coming cycle. The LVR restrictions are also expected to reduce risk in the banks' balance sheets."

OCR unchanged at 2.5 percent

31 October 2013

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

Reserve Bank Governor Graeme Wheeler said: "The recovery in the United States and other major advanced economies remains patchy. Nevertheless, world prices for New Zealand's export commodities are very high.

"Global long-term interest rates are still very low, but have been volatile recently. This volatility has largely been due to uncertainty as to when the Federal Reserve will exit from quantitative easing.

"The New Zealand economy is estimated to have grown by more than 3 percent in the year to September.

Household spending is rising, and reconstruction in Canterbury is being reinforced by a broader rise in construction in Auckland and across the country more generally. This will support economic activity and start to ease the housing shortage.

"In the meantime high house price inflation persists, especially in Auckland. As has been noted for some time, the Reserve Bank does not want continued high house price inflation to compromise financial or price stability. Recently introduced restrictions on high loan-to-value mortgage lending are expected to help slow house price inflation and the Bank will continue to monitor the situation closely.

"The exchange rate remains high and is a headwind to the traded goods sector. Sustained strength in the exchange rate that leads to lower inflationary pressure would provide the Bank with greater flexibility as to the timing and magnitude of future increases in the OCR. Fiscal consolidation is also expected to continue weighing on demand over the next few years.

"Annual CPI inflation increased to 1.4 percent in the September quarter. As domestic demand pressure picks up, headline inflation is likely to rise towards the 2 percent target midpoint. The Bank is aiming to keep inflation and inflation expectations close to 2 percent over the medium term.

"Although we expect to keep the OCR unchanged in 2013, OCR increases will likely be required next year. The extent and timing of the rise in the policy rate 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."

Reserve Bank focuses on maintaining sound financial system

13 November 2013

New Zealand's financial system remains sound, Reserve Bank Governor Graeme Wheeler said today, when releasing the Bank's November 2013 Financial Stability Report. "Banks are well capitalised and have strengthened their funding base, while non-performing loans continue to decline.

"Nevertheless, there are risks to the financial system and the Reserve Bank has taken steps to address these," Mr Wheeler said.

"The main threat to the financial system is the risk associated with imbalances in the housing market. The previously announced loan-to-value ratio (LVR) measures, starting from 1 October, are intended to reduce systemic risk by slowing housing credit and house price inflation, and by reducing risk on bank balance sheets.

"The household sector has high and rising levels of debt relative to both historical and international norms. Both households and banks are highly exposed to the housing market. Further, we have a situation where house prices are rising from already-overvalued levels, particularly in Auckland and Christchurch. This is increasing the risk of a future house price correction that could result in significant financial system stress.

Mr Wheeler said that several factors are contributing to the strength in house prices, including supply side constraints, a pick-up in net inward migration, relatively low interest rates, and relaxed credit conditions. "Dealing with the supply side issues is of primary importance. However, it is also important to avoid a prolonged build-up of excess demand while the supply issues are being addressed."

Mr Wheeler said that the Bank is closely watching the impact of the LVR policy. "The early evidence shows that banks have significantly reduced high LVR lending approvals, while increasing the cost of high LVR loans. However, it is too early to assess the impact of the measures on house price inflation."

Deputy Governor Grant Spencer said that other risks to financial stability were high levels of debt in the dairy sector, and New Zealand's high level of external indebtedness overall.

"While the dairy sector is currently enjoying record export prices, its high level of indebtedness makes it vulnerable to a fall in commodity prices or an increase in interest rates. A continuation of farmers' cautious approach of recent years will help to mitigate this risk," Mr Spencer said.

"New Zealand's high external debt levels reflect

persistent balance of payments deficits over many years. While the post-GFC improvement in private savings has reduced the external deficit in recent years, this trend is likely to reverse as new investment expands. It is therefore important that the private savings improvement be maintained, and that the public sector deficit continues to reduce.

“New Zealand’s external debt is mainly intermediated through the banking system, which is exposed to the volatility of world markets. Strong growth in retail deposits has allowed banks to reduce their reliance on offshore funding in recent years. Any sustained worsening of New Zealand’s external position will cause the banks to become more reliant on the international markets, thereby increasing their exposure to funding risk.”

Mr Spencer said that over the last six months the Reserve Bank has continued to enhance the prudential framework so as to further strengthen the financial system.

The Bank’s review of non-bank deposit takers was completed in September 2013 and several enhancements have been proposed. A review of the oversight regime for payment and settlement systems is in progress with the expectation that this regime will be strengthened. The licensing of insurance companies was completed on 9 September 2013. This has been a major effort by the industry with 99 companies now under licence.

CBC New Zealand Limited registered as a bank

19 November 2013

The Reserve Bank of New Zealand today announced that ICBC New Zealand Limited has been registered as a bank in New Zealand.

ICBC New Zealand Limited is a fully-owned subsidiary of Industrial and Commercial Bank of China Limited.

There are now 23 [registered banks in New Zealand](#), which are listed on the Reserve Bank website.

Understanding the New Zealand exchange rate

22 November 2013

Addressing underlying imbalances in the New Zealand economy is the key to addressing New Zealand’s overvalued exchange rate, Reserve Bank Assistant Governor and Head of Economics Dr John McDermott said today.

In a speech to Federated Farmers Meat and Fibre Council in Wellington, Dr McDermott said that policies to encourage private sector savings, and to increase flexibility in the economy are the way to sustainably lower New Zealand’s real interest rates and take pressure off the exchange rate.

“The nominal exchange rate is currently at historically high levels against nearly all of our trading partners. The real exchange rate – which takes into account relative inflation rates and so is a better measure of overall competitiveness – is also at historically high levels.”

Dr McDermott said that much of the New Zealand dollar’s current strength can be explained by factors such as New Zealand’s current high terms of trade, especially dairy prices, and relatively strong economic performance.

“However, the Reserve Bank believes that, from a long-term perspective, the exchange rate is overvalued. The high exchange rate is contributing to economic imbalances and the Reserve Bank would like to see it lower in order to promote more sustainable economic growth.

“Whether the exchange rate is overvalued from a long-term perspective relates to the effects it has on real economic outcomes. For instance, an overvalued exchange rate will affect the tradable sector’s profitability and its decisions about investment, employment, and market strategy.”

Dr McDermott said that commentators have provided a range of suggestions to correct the overvaluation problem, including: keeping interest rates low; currency intervention; quantitative easing; capping the exchange rate; and changing the focus of monetary policy to target the exchange rate.

"Many of these suggestions are unlikely to have a significant lasting effect on competitiveness, or would have unpalatable trade-offs such as much higher inflation, or are simply not feasible," he said."

Evidence in New Zealand and elsewhere suggests foreign currency intervention is unlikely to have a sustained impact in lowering the exchange rate.

"Saying there is little monetary policy can do about the exchange rate, however, is not the same as saying there is little that can be done."

Dr McDermott said that a lack of flexibility in other parts of the economy means that the exchange rate can overshoot where it should be in the long run.

"For instance, microeconomic policies can promote greater competition and remove roadblocks to the reallocation of resources in response to market signals. Such policies would reduce the need for the exchange rate to carry the burden of absorbing economic shocks. An example here could be increasing the responsiveness of the building industry to housing demand.

"Likewise, reducing the magnitude of domestic demand cycles would reduce the pressures that monetary policy needs to lean against. This includes avoiding pro-cyclical changes in fiscal policy such as tax cuts or increasing public spending when resources are already stretched, or deterring banks from excessively relaxing credit standards when demand for financing is strong. Such actions will ease cyclical exchange rate pressures."

However, for a sustained reduction in the exchange rate, it is necessary to alter the level and pattern of saving and investment, in particular New Zealand's reliance on foreign savings to finance our consumption and investment, Dr McDermott said.

New statistics show fall in high-LVR lending

28 November 2013

High loan-to-value ratio (LVR) mortgage lending – otherwise known as low-deposit lending – fell during October, according to new statistics published by the Reserve Bank today.

High-LVR speed limits took effect on 1 October

and require banks to reduce lending at LVRs above 80 percent to no more than 10 percent of their total new mortgage lending. The 10 percent limit is exclusive of any high LVR loans made under Housing New Zealand's Welcome Home Loans scheme, the refinancing of existing high-LVR loans, bridging finance or the transfer of existing high-LVR loans between properties.

High-LVR lending excluding exemptions fell to 11.7 percent of total new mortgage lending in October, with exempted lending accounting for an additional 1.1 percent of total new lending. The high-LVR lending share was down from 25.5 percent in September and had been around 30 percent earlier in the year.

Deputy Governor Grant Spencer said the October result showed that banks were adjusting to the new policy and were well placed to meet the speed limit, which will initially be measured as a proportion of total new residential mortgage lending over the six-month period from October 2013 to March 2014.

"The reduction in high-LVR lending will help to reduce the risks of a sharp correction in house prices in an already overvalued housing market. Such a correction could be damaging for the financial sector and broader economy," Mr Spencer said.

"The banks are having to manage a pipeline of loans that were pre-approved prior to the LVR restrictions taking effect. The share of high-LVR lending is expected to fall further over the coming months as these pre-approvals run down.

"While there has been a significant reduction in high-LVR lending already, it is too early to assess what impact this is having on aggregate housing market activity and credit growth."

The new statistics are from a survey of banks implemented earlier in the year to collect better quality data on lending by LVR. While the survey may be expanded in the future, LVRs broken down by region or by type of borrower are not currently available.

Aggregate data from the new bank LVR survey will be published on a monthly basis, from late December, with data for the August-October 2013 period released today.

The first three columns of the table show banks'

	1 Total new commitments	2 LVR 80% or below	3 LVR above 80%	4 Exempt	5 High-LVR share before exemptions	6 High-LVR share after exemptions
Aug	\$4,298m	\$3,160m	\$1,137m	N/A	26.5%	N/A
Sep	\$4,705m	\$3,507m	\$1,198m	N/A	25.5%	N/A
Oct	\$4,470m	\$3,899m	\$571m	\$53m	12.8%	11.7%

mortgage commitments, which are finalised offers to customers to provide mortgage loans or to increase the loan value of an existing mortgage loan, as evidenced by the loan documents provided to the borrower.

The high LVR share (after exemptions) is calculated by excluding exemptions from LVRs above 80 percent (column 3 minus column 4) and dividing by total new commitments less exemptions (column 1 minus column 4).

The Reserve Bank has prepared a short video called Booms, busts and the way between that explains the role of macro-prudential policy, including LVR speed limits.

Reserve Bank to review its payment systems

28 November 2013

The Reserve Bank is reviewing the NZClear and ESAS high value settlement systems that it owns and operates, in anticipation of substantial upgrades in the next 2 - 4 years.

The Bank has appointed Ernst and Young to assist with the review, and to develop a strategy for the development of payment and settlement services.

"The last significant upgrade to the application software for ESAS and NZClear was six years ago, and technology has changed markedly since then," Reserve Bank Chief Financial Officer Mike Wolyncewicz said today.

The Bank will assess market requirements, consider alternatives for service delivery, and seek input from users. It will then develop a strategy to ensure that settlement systems remain fit for purpose.

"Through Ernst and Young, the Bank will be consulting with ESAS account holders, NZClear members and industry bodies, early in 2014."

The scope of the review will include an assessment

of industry trends and requirements, international trends, the range of payments and settlement services the Bank provides and will need to provide in the future, and how those services are best delivered.

Background information:

[Payments system oversight](#)

[ESAS](#)

[NZ Clear](#)

RBNZ notes Broadlands Finance sentencing

3 December 2013

The Reserve Bank has welcomed a High Court decision to uphold the conviction and sentencing of Broadlands Finance Limited in relation to a breach of the Reserve Bank of New Zealand Act 1989.

Broadlands Finance pleaded guilty in the Auckland District Court to a breach of section 157L of the Reserve Bank Act, after failing to maintain the required number of independent directors on its board.

The company was convicted and fined \$12,000 in August and subsequently appealed the sentence and the failure of the District Court to direct that the company be discharged without conviction. The High Court dismissed the appeal and upheld the District Court decisions on both matters.

New laws create stronger regulations for covered bonds and non-bank deposit takers

4 December 2013

Parliament has passed one law to strengthen the regulatory regime for non-bank deposit takers and another to regulate covered bonds issued by banks.

The Non-bank Deposit Takers Act 2013 introduces a licensing regime for Non-bank Deposit Takers (NBDTs) –

which include finance companies, building societies, and credit unions. The Act also gives the Reserve Bank new powers to detect and intervene should an NBDT become distressed or fail.

The Act substantially retains the existing prudential requirements covering credit ratings, governance, risk management, capital, related party exposures, and liquidity requirements. However, it introduces a licensing requirement for NBDTs, which includes the requirement for an NBDT to have suitable directors and senior officers.

The Act does not eliminate the risk of a NBDT failing. Rather, it aims to reduce this risk, and to prevent significant damage to the financial system if a failure occurs. It will come into force by Order in Council, and the date for this is expected to be 1 May 2014. Existing NBDTs will then have 12 months to comply with licensing requirements.

The Reserve Bank of New Zealand (Covered Bonds) Amendment Act 2013 provides greater certainty and transparency for covered bonds issued by banks. The ability for banks to issue covered bonds helps improve financial stability by broadening banks' funding base.

The Act provides for covered bond programmes to be registered and monitored by the Reserve Bank. It also provides legal certainty that if a bank fails, the covered bond holders will have access to the cover pool assets.

Covered bonds are a type of debt security where bondholders have a secured interest over a specific pool of assets set aside by the issuing bank, known as the cover pool. To protect the interests of other creditors, including depositors, the total size of the cover pool will be limited to 10 percent of a bank's assets. The legislation received the Royal assent earlier this week and will come into effect on 10 December 2013.

Reserve Bank committed to effective communication

6 December 2013

The Reserve Bank is deeply committed to transparency and sees clear communication as vital to making its actions more effective, Deputy Governor Geoff Bascand said today.

"We are working to enhance the openness and effectiveness of our communications," Mr Bascand said in a speech to the Admirals' Breakfast Club in Auckland.

Central banks' communication strategies and their ability to communicate effectively have been challenged enormously by the events and consequences of the Global Financial Crisis, the introduction of macro-prudential policy, the emergence of new technology and social media, and in New Zealand's case by expanded regulatory responsibilities for insurance and the non-bank deposit-taking sector.

"Complexity has increased, audiences have expanded, and the immediacy and saturation of news coverage has turned the volume control on full," Mr Bascand observed.

The Reserve Bank has adapted its communications to recognise significant interest shown in the Bank's policy settings, policy objectives, tools, and governance.

In addition to usual press conferences and Select Committee briefings following *Monetary Policy Statements* and *Financial Stability Reports*, the Bank has expanded its on-the-record speaking, is expanding its business sector engagement, refreshed its website, and is communicating more via social media, including producing videos that explain its policies. In addition, the Bank will commission a regular stakeholder survey that will help us understand the clarity and reach of our communications through various channels.

Mr Bascand said the Bank communicates in order to promote understanding and to demonstrate accountability, supported by transparency. It also uses communication as a monetary policy tool.

"Our communications support monetary policy by informing and shaping expectations about future monetary policy settings. Widespread understanding of the Reserve Bank's policy approach makes it easier for the Bank to achieve its objectives, for example in achieving price stability, by better anchoring low inflation expectations. This, in turn, means that we are able to respond to economic shocks by adjusting interest rates less than would otherwise be the case," he said.

A recent study reported that the Reserve Bank of

New Zealand is the second most transparent central bank in the world, just behind the Swedish central bank.

“As a financial regulator, accountability is a key reason for transparency around our regulatory conduct, with public engagement a cornerstone of our approach to prudential policy development. Transparency also gives economic benefits from enhancing the operation of financial markets and improving the public’s understanding of financial risk.

“A key message here is that the Reserve Bank’s regulatory and supervisory oversight does not represent a ‘no failure’ regime. Accordingly, investors need to carefully assess risk against expected returns. The Bank’s increased regulatory and supervisory responsibilities will demand new communication channels, new audiences and new messages,” Mr Bascand said.

Reserve Bank exempts lending for new construction

10 December 2013

New residential construction loans will now be exempt from the loan-to-value (LVR) restrictions introduced from 1 October, Reserve Bank Deputy Governor Grant Spencer said today.

“The Reserve Bank has recently consulted with the building industry and banks on the impact of LVR restrictions on residential construction activity,” Mr Spencer said. “While high LVR construction lending is only around 1 percent of total residential lending, it finances around 12 percent of residential building activity.

“This exemption means that low deposit lending will fall outside the 10 percent speed limit if it is financing the construction of a new house or apartment.”

“However, any new low deposit construction loans will still need to meet the internal risk requirements of the lending banks.”

Mr Spencer said that the new exemption will apply to all qualifying construction loans from 1 October 2013.

“This exemption will help to support the supply of new housing and, in doing so, reduce some of the pressure arising from excess demand in the New Zealand housing market.

“The Reserve Bank will communicate with banks to clarify which loans will qualify for the exemption.”

See these questions and answers about the construction lending exemption from LVR restrictions.

OCR unchanged at 2.5 percent

12 December 2013

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

Reserve Bank Governor Graeme Wheeler said: “Growth remains moderate but mixed for New Zealand’s main trading partners. Nevertheless, export prices for New Zealand’s main commodities, and especially dairy produce, have continued to increase.

“New Zealand’s GDP is estimated to have grown at over 3 percent in the year to the September quarter and the expansion in the economy has considerable momentum. New Zealand’s terms of trade are at a 40-year high, household spending is rising and construction activity is being lifted by the Canterbury rebuild and the response to the housing shortage in Auckland.

“Continued fiscal consolidation and the high exchange rate will partly offset the strength in domestic demand. The high exchange rate is a particular headwind for the tradables sector and the Bank does not believe it is sustainable in the long run.

“House price inflation is high in Auckland and other regions due to the housing shortage, and demand pressures associated with low interest rates and rising net inward migration. Restrictions on high loan-to-value mortgage lending, introduced in October, should help slow house price inflation. Data to date are limited on the effects of these restrictions. We will continue to monitor outcomes in the housing market closely.

“Annual CPI inflation increased to 1.4 percent in the September quarter and inflation pressures are projected to increase. The extent and timing of such pressures will depend largely on movements in the exchange rate, changes in commodity prices, and the degree to which momentum in the housing market and construction activity

spills over into broader cost and price pressures.

“The Bank will increase the OCR as needed in order to keep future average inflation near the 2 percent target midpoint”.

View the *Monetary Policy Statement* at

http://www.rbnz.govt.nz/monetary_policy/monetary_policy_statement/

PUBLICATIONS

Regular publications

<i>Annual Report</i>	Published in October each year.
<i>Financial Stability Report</i>	Published six-monthly. A statement from the Reserve Bank on the stability of the financial system.
<i>Monetary Policy Statement</i>	Published quarterly. A statement from the Reserve Bank on the conduct of monetary policy.
<i>Reserve Bank of New Zealand Statement of Intent, 2013-2016</i>	

Recent Reserve Bank Discussion Papers

2013

DP2013/01	Export performance, invoice currency, and heterogeneous exchange rate pass-through <i>Fabling, Richard and Sanderson, Lynda</i>
DP2013/02	A tractable framework for zero lower bound Gaussian term structure models <i>Krippner, Leo</i>
DP2013/03	Deep habits, price rigidities and the consumption response to Government spending <i>Jacob, Punnoose</i>
DP2013/04	Dissecting the dynamics of the US trade balance in an estimated equilibrium model <i>Jacob, Punnoose; Peersman, Gert</i>
DP2013/05	What happens when the Kiwi flies? Sectoral effects of the exchange rate shocks <i>Karagedikli, Özer; Ryan, Michael; Steenkamp, Daan; Vehbi, Tugrul</i>
DP2013/06	Financial exposure and the international transmission of financial shocks <i>Kamber, Gunes; Thoenissen, Christoph</i>

Analytical Notes

2013

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

AN2013/05	Estimating the impacts of restrictions on high LVR lending <i>Bloor, Chris; McDonald, Chris</i>
AN2013/06	Some revisions to the sectoral factor model of core inflation <i>Price, Gael</i>
AN2013/07	Neutral interest rates in the post-crisis period <i>Chetwin, Willy; Wood, Amy</i>
AN2013/08	What in the world moves New Zealand bond yields? <i>Lewis, Michelle; Rosborough, Lauren</i>
AN2013/09	Fresh perspectives on unobservable variables: Data decomposition of the Kalman smoother <i>Sander, Nicholas</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, or contact:

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

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 htis leave us, and where to from here?

Updating the Reserve Bank Museum

Vol. 76, No. 3, September 2013

Why has inflation in New Zealand been low?

A new approach to macro-prudential policy for New Zealand

The Reserve Bank's capital adequacy framework