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Themed issue: Money and credit
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Erratum

When the *Bulletin* was originally published, Graph 3 on page 18 incorrectly listed average note values as “\$M”. This substitute PDF provides the correct graph axis label.

Editor's note

In this edition of the Reserve Bank *Bulletin*, we focus on the theme of money and credit. The Reserve Bank uses money and credit measures for analysing economic and financial developments, produces money and credit in the form of currency and settlement balances in the interbank payment system, collects and disseminates statistics on money and credit, and depends on money and credit creation by the financial system for the transmission of OCR decisions through to the economy. Money and credit are thus not only a vital part of the economy; they are also essential to the performance of the Reserve Bank's duties.

In the first of our four articles on this theme, Chris Bloor, Chris Hunt, Hamish Pepper and I look at how the use of money and credit measures in monetary policy formulation has evolved over recent decades. There is growing emphasis on the interaction between monetary policy and financial stability, and the financial system is becoming increasingly sophisticated and internationally interconnected. Arguably, these factors make developments in credit worthy of increased attention from policymakers. Indeed, in the current circumstances of uncertainty and friction in credit markets across the globe – from which New Zealand has not escaped – the need for increased understanding of credit dynamics is all the more urgent.

The second article focuses on the most tangible of the Reserve Bank's products, banknotes and coins – physical money. Alan Boaden discusses trends and developments in the use of notes and coins in New Zealand, and reviews our efforts to ensure the quality and integrity of the nation's currency. He looks in detail at the Reserve Bank's new machine for banknote processing, and at the demand for the new 10, 20 and 50 cent coins after their introduction in July 2006 – as well as what happened to the old ones.

Like other central banks, the Reserve Bank has produced money and credit statistics for decades. We also produce a range of other financial and economic statistics. In our third article, Rochelle Barrow discusses our activities as a producer of statistics. As Rochelle observes, there is a broad range of users of the Reserve Bank's statistics, whose diverse needs we strive to understand and to meet. With this in mind, she discusses some of the trade-offs and challenges we face

in producing statistics, and some future directions for our activities in this area.

Our fourth article provides an overview of money and credit creation in the financial system. Gillian Lawrence describes how the Reserve Bank's provision of money to the economy is used by the financial system to create its own money and credit, and the role that this process plays in the economy and in monetary policy. The article briefly looks at the nature of money, the interbank payment system, and the Reserve Bank's operations in the money markets to implement monetary policy.

In this edition, we also provide a short article by Bob Buckle and Aaron Drew summarising the proceedings of a conference held in December 2007 hosted by The Treasury and the Reserve Bank, on the theme of the business cycle, housing and the role of policy. This conference followed up on research themes identified at an earlier conference in 2006, which brought together international macroeconomic policy experts to share views on New Zealand's macroeconomic policy issues.

Finally, we present an update of the Chronology, listing key economic and financial events that shaped the conduct of the Reserve Bank's business over 2007.

I hope you enjoy the range of articles in this edition.

Tim Ng

Editor



**RESERVE
BANK**
MUSEUM

The Reserve Bank Museum celebrates and records New Zealand's economic and banking heritage.

Displays range from timelines and interactive exhibits to comprehensive display panels outlining both the Reserve Bank's history and role, and how the New Zealand economic system has developed.

Artefacts include the only working example in New Zealand of the MONIAC hydro-mechanical econometric computer developed by New Zealand economist and inventor Bill Phillips in the late 1940s.

In early 2008, the museum received its 10,000th visitor.

The museum is open 9.30 a.m.–4.00 p.m. weekdays. It is closed weekends, public holidays, and for special events. Please call to confirm opening hours.

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<http://www.rbnz.govt.nz/about/museum/2766074.html>



Photography by Stephen A'Court.

ARTICLES

The use of money and credit measures in contemporary monetary policy

Chris Bloor, Chris Hunt, Tim Ng and Hamish Pepper

The changing interaction between economic and financial developments around the world is prompting lively debate in the academic and central banking community about the use of money and credit measures in contemporary monetary policy formulation. Currently, money and credit measures generally have a fairly low, but arguably increasing, profile in the panoply of models and economic indicators used in central banks' assessments of the economic outlook. Some prominent academics and central banks advocate increased emphasis on money and credit measures. In this view, credit developments in particular can materially enrich our understanding of the economic outlook when financial asset markets and the price of credit risk are moving substantially. At the same time, there are prominent sceptics on the specific value of money in understanding and predicting inflation. In New Zealand monetary policy formulation, we tend to focus on disaggregated credit measures, and mostly to provide corroborating information about particular developments in the various sectors of the economy. Increasing international financial integration and a greater emphasis on the interaction between financial stability assessment and monetary policy may see increased use and profile of credit measures in the future.

1 Introduction

There is a large and long-running literature, going back hundreds of years, on the role of money in the inflation process and in monetary policy.¹ In modern central banking practice, the role of money has shifted markedly in recent decades. In the late 1960s and 1970s, the 'monetarist' approaches widely adopted around the world placed the supply of money at the centre of monetary policy implementation. The mainstream of monetary policy practice then shifted to use of a short-term interest rate as the instrument, with money measures taking more of a background indicator role, along with credit, in assessments of inflation pressure and economic prospects. Today, some central bankers and researchers argue for renewed attention to money and credit as essential elements of economic dynamics. There is no suggestion that there should be a return to the targeting of money supply as the centrepiece of monetary policy, but there is an assertion that money and credit behaviour is becoming a more important driver of economic cycles, and has been unduly neglected in macroeconomic analysis.

This article looks at the arguments for raising the profile of money and credit measures in economic analysis, and places them in the context of the trends in modern monetary policy conduct. The article proceeds as follows. Section 2 briefly reviews the relevant literature and several decades of monetary policy practice concerning money and credit measures, including the New Zealand case. Section 3 summarises the arguments for giving greater profile to money and, particularly, credit articulated by a prominent researcher and former central banker, Charles Goodhart. We also summarise a sceptical view on the usefulness of looking at money (specifically) provided by another prominent researcher and adviser to central banks, Michael Woodford. Section 4 takes a quick look at the basic facts in the New Zealand money and credit data, and the degree to which Goodhart's and Woodford's arguments are supported by the evidence here. Section 5 summarises and notes some directions for further work and research.

2 Money and credit in modern central banking practice

'Monetarism'

Milton Friedman has generally been given the intellectual credit for the emergence of money into the limelight

¹ This literature includes a remarkably insightful but little-known contribution by Nicholas Copernicus in the sixteenth century, 200 years before the classical economist David Hume's formal exposition of the Quantity Theory of Money (Taylor, 1955).

of monetary policy, during the late 1960s and 1970s.² Policymaking in the previous three decades had been dominated by the 'Keynesian' emphasis on government spending, rather than monetary policy, as the primary means by which macroeconomic activity should be regulated. Keynesian policy was unable to cope with the persistent and sustained rise in both unemployment and inflation ('stagflation') worldwide in the early 1970s, paving the way for the spread of 'monetarism' and its focus on the supply of money as the primary macroeconomic stabilisation instrument.³

Monetarist monetary policy was built conceptually around the much older Quantity Theory of Money, which is an identity noting that the stock of money (M) times its velocity of circulation (V) equals the level of the economy's nominal output (ie, the price level (P) times real output (Y)): $MV=PY$. Expressed in growth rate terms, the Quantity Theory implies (with rearrangement of the terms) that inflation is equal to money growth plus the change in velocity minus real growth.

Using this relation, among other things, monetarists typically cited Friedman's assertion that inflation was "always and everywhere a monetary phenomenon"⁴ in support of policies that would hold money growth close to the real growth rate – on the expectation that, if velocity was roughly constant, then inflation would remain close to zero. For example, if real GDP is growing at 4 percent, velocity is constant and money is made to grow at 6 percent, then inflation should be 2 percent.

Policymakers adopted monetarist ideas partly because of the deficiencies of the Keynesian framework in stagflationary circumstances as noted above, and partly because a new way of anchoring prices in the economy was needed following the widespread move to floating exchange rates after the collapse in the early 1970s of the Bretton Woods framework of fixed exchange rates between the major economies. Under monetarism and floating exchange rates, the supply of money became each economy's 'nominal

anchor'. Policymakers' intent was to control the rate of inflation through controlling the rate of money supply within narrow ranges.⁵

In terms of inflation outcomes, the success of money targeting based on the Quantity Theory required that velocity of circulation (V) be predictable, and remain so in the face of policymakers attempting to manipulate the money supply (eg, by 'targeting' it). In the 1980s, financial deregulation and innovation destabilised velocity to the point where money targeting generally became unviable. The succession of research findings⁶ on the dynamics of money measures in New Zealand led to broadly the same conclusions as those reached elsewhere at around the same time. Most central banks abandoned money targeting during the 1980s. The replacement framework was typically the use of a short-term interest rate as the operating instrument, which would be adjusted in response to developments in the variables of ultimate interest, growth and inflation.

By this time, the importance of inflation expectations in the dynamics of growth and inflation (asserted by Friedman also, 1968, and independently by Phelps, 1967) had been accepted by policymakers. Though monetarism's policy prescription of targeting money was abandoned, the broader intellectual framework around it remains a lasting legacy. This framework includes the generally accepted principles that the primary role of monetary policy is to control inflation, that inflation expectations matter, and that a central bank can and should be held accountable for inflation outcomes. Monetarist monetary policy helped focus attention on the importance of a verifiable commitment by the central bank to anchor inflation expectations. Money targeting was a fairly transparent and simple example of this kind of commitment rule (Woodford, 2007a).

² For example, Friedman (1956), Friedman (1960), Friedman (1963) and Friedman and Schwartz (1963).

³ See Johnson (1971) for a useful discussion.

⁴ Friedman (1968), cited in Hetzel (2007, p 5)

⁵ For example, in the early 1970s the US Federal Reserve operated 'tolerance ranges' for the M1 (narrow money) and M2 (slightly broader) measures (Poole, 2000; also see Bernanke, 2006). In 1979, this approach was strengthened by a directive from the US Congress that the Fed should "maintain long run growth of money and credit... so as to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates" (Bernanke, 2006, p 2).

⁶ See, for example, Spencer (1980), Coleman and Cruse (1989), Greville (1989), Tait (1989), Grimes and Wong (1992), Eckhold (1994), Siklos (1995), Siklos and Eckhold (1997), and Razzak (2001).

Current monetary policy practice

Today, despite money's relegation to the background of monetary policy, most developed-country central banks continue to include measures of money and credit in the range of economic indicators used to assess the economic outlook.

The Reserve Bank of New Zealand's view, for example, is well-expressed by Collins *et al.* (1999, p 8): "interpreted judiciously, money and credit aggregates may be useful economic indicators, and hence a useful addition to the central banker's analytical toolkit". Nowadays, the Reserve Bank gives money measures fairly limited attention from the point of view of formal modelling and forecasting, but credit market developments are monitored and contribute to the shaping of the economic outlook.

Recent editions of the Reserve Bank's *Monetary Policy Statement* contain more discussion of credit market developments than usual, reflecting the unusual circumstances in global credit markets currently. In earlier editions of the *Statement* (eg, December 2004), the Reserve Bank has discussed the implications for monetary policy conduct of, for example, competitive conditions in the mortgage lending market and shrinkage of mortgage interest rate margins. The Governor has also discussed the implications of sustained house price inflation and associated strong growth of credit and leverage (Bollard, 2004).

Over time, the Reserve Bank has shifted its attention away from the very broad system-wide aggregates such as private sector credit (PSC), and towards various credit measures disaggregated by borrowing sector (household, rural, business, etc.) or type of financial institution (bank, non-bank, etc.). This shift reflects partly that the disaggregates have only recently become acceptably reliable, partly that predictive ability is better at the sectoral level, and partly because of the increased attention to financial stability issues. The Reserve Bank's research on the use of very large sets of data to forecast major macro variables such as GDP and inflation (eg, Matheson, 2007) suggests that when tested as part of a set of data containing a large range of available economic indicators, money and credit measures appear

to add little additional predictive information for the major macro variables, even allowing for speed of publication.

Money and credit measures disaggregated by sector, on the other hand, are in fairly active analytical use. Money and credit measured at the household level and across different types of financial institution are used to shed light on trends in household investment, deposit and housing transaction behaviour.⁷ The housing credit measures supplement information from building consents and house sales data in the formation of the Reserve Bank's view about housing market developments, and farm and business credit are used similarly in respect of their respective sectors. Also, the Reserve Bank has begun sourcing and analysing housing loan approvals data from banks, and this information also supplements our assessments of housing market prospects (Barrow, 2008). Though the predictive content of the disaggregates is mostly quite limited from a statistical point of view, they do enrich our assessments.

Generally speaking, other central banks appear to take a similar approach to ours of using money and credit measures as corroborating information about demand pressures. For the US Fed, "[a]ttention to money growth is ... sensible as part of [our] eclectic modelling and forecasting framework" (Bernanke, 2006, p 3). The level of attention to money and credit tends to vary depending on the economic circumstances at the time (see, for example, Longworth, 2003, on the Bank of Canada's approach). For most central banks, in general, the treatment of money and credit is fairly low-key compared to the attention given to direct indicators of activity and inflation such as GDP, retail sales, investment, the CPI, etc. The Bank of England gives a little more prominence to money and credit by devoting chapter 1 of its *Quarterly Inflation Report* to 'Money and asset prices'. Discussion there centres on the reasons for any changes in various monetary aggregates, and the potential implications for the inflation outlook (Hauser and Brigden, 2002).

⁷ See, for example, Smith's (2006) discussion of housing equity withdrawal.

The case of the European Central Bank

The European Central Bank (ECB) is worth some detailed discussion, as the major central bank that has given its analysis of money and credit most prominence. Its approach to monetary policy formulation has two 'pillars' – 'monetary analysis' and 'economic analysis'. The 'economic analysis' pillar is an approach to assessing the relevance of current economic and financial developments for the inflation outlook similar to that employed by other central banks (ECB, 2004). The 'monetary analysis' pillar is a framework with, on the surface at least, a distinctly monetarist flavour. In this pillar, M3 growth is compared with an explicit 'reference value' – currently 4½ percent p.a., set in December 1998 – which is based on an assumption about potential output growth (2 to 2½ percent), the trend in the velocity of circulation (-½ to -1 percent) and the ECB's inflation target (below 2 percent) (ECB, 2004).

The monetary analysis process "constantly reminds the central bank of the fundamental principle that, while responding to economic developments, it must never lose sight of the fact that, over sufficiently extended horizons, the role of money growth must be consistent with the price stability objective" (ECB, 2004, p 62). The ECB views monetary analysis as a 'cross-checking' device, helping it to see beyond the transient impact of various shocks hitting the economy, thereby helping to avoid setting monetary policy on a potentially destabilising course (Stark, 2006). The ECB has not found a solution to the problems of instability in velocity, and the monetary analysis framework has had to evolve over time to cope with these difficulties (Fischer *et al.*, 2006) – though this is of course true of almost any economic framework.

Though the ECB's two-pillar approach may place more rhetorical emphasis on money than other central banks, the approach may not be that different in substance (OECD, 2007). ECB (2000) notes that its approach "does not imply a partition of the information used for the analysis under the two pillars... analysis under both pillars aims at examining the available information in the best possible manner" (p 40). The ECB also states that deviations of money growth from the reference value would trigger further analysis,

rather than any particularly mechanistic response (eg, Stark, 2006).

This is not to say necessarily that rhetoric is not important. Issing (2006) places the adoption of the two-pillar approach in the context of the need to enhance the credibility of the new ECB upon the creation of the euro. He observes that the new central bank was created in a context of great uncertainty about prospects for the new currency zone and how it would perform, and about the behaviour of the new central bank. The two-pillar approach also provided some degree of conceptual continuity with the Bundesbank's strategy of money targeting prior to the creation of the euro, in the hope that the new currency might inherit some of the established credibility of the deutschemark.

The case of the Bank of Japan

The Bank of Japan offers another interesting, more recent, approach. In the 1990s, Japan had to contend with a very long-lasting case of financial sector dysfunction, that strongly influenced macroeconomic analysis and policy. Dealing with this event led the Bank of Japan to adopt the Quantitative Easing Policy (QEP) in 2001, which involved targeting of the level of banks' current account balances at the Bank of Japan (Maeda *et al.*, 2005). At the time that the QEP was adopted, the official interest rate had already been set as low as possible, yet the economy was not responding adequately.

The QEP ended in 2006, with a return to an approach of setting an official interest rate. At this time, the Bank of Japan announced a new framework for the conduct of monetary policy. The new framework includes a "Two Perspective Strategy", which is stated to bear "some resemblance to the Two-Pillar Strategy at the European Central Bank" but "has a broader scope" (Nishimura, 2006, p 4). The first perspective is essentially an economic analysis framework similar to that of other central banks. The second perspective refers to "longer term" risks to the sustainability of price stability, and has been clearly influenced by Japan's financial system and financial stability issues of the 1990s. It is not clear, though, if money and credit measures are playing any particularly different role in the Bank of Japan's monetary

policy formulation approach under the new framework, compared to their role in other central banks' approaches.

Money and credit in central bank economic modelling

Though few, if any, central banks would suggest that they do not look at money and credit measures at all in their assessments of the economic outlook, the typical macroeconomic models in regular use for forecasting and monetary policy analysis generally incorporate little role for money or credit (Mishkin, 2007). This is despite quite rapid growth in the theoretical literature on incorporating credit market effects (the 'financial accelerator') more richly into dynamic macroeconomic models (eg Bernanke *et al.*, 1999), and an extensive literature on the role of banks and credit behaviour in transmitting changes in the official interest rate to the financial prices faced by households, firms and financial institutions (Nelson, 2003; Bernanke, 2007). Some of this literature looks specifically at the stock of money (controlling for the effects of the interest rate) within this process (eg Leeper and Roush, 2003; Reynard, 2007; Nelson, 2007).

The Reserve Bank's current central forecasting model, the Forecasting and Policy System (FPS), is not an exception in this respect. FPS includes no role for money or credit in influencing the dynamics of the other economic variables in the model. The next-generation "DSGE" model⁸ we are currently developing as a potential replacement in our forecasting process goes a little further in that there is a credit supply effect, wherein the household's cost of borrowing (and hence its spending) is influenced by the loan-to-value ratio on its borrowing secured by housing. This effect can be interpreted as reflecting a collateral constraint on the quantity of external funding available to the household.

⁸ DSGE stands for "dynamic stochastic general equilibrium". See Karagedikli *et al.* (2007) for an overview of DSGE modelling research.

3 An argument for increased attention to money and credit measures

Though, as noted above, the majority of developed-country central banks tend to be fairly low key in their use of money and credit measures in monetary policy formulation, some central bankers and researchers are re-examining the role and usefulness of money and credit. This re-examination is prompted in part by changes over recent years in international economic and financial system dynamics, including generalised low inflation and macroeconomic stability, a sustained expansion of money and credit stocks worldwide, financial globalisation and the emergence of financial stability as a policy concern.⁹ The current frictions in credit markets across the globe lend some contemporary relevance to this thinking.

An eminent expert on monetary policy and central banking, Charles Goodhart, succinctly presents some arguments for renewed attention to money and credit in a recent (2007) paper. He focuses in particular on credit, and argues that credit behaviour may provide useful information about the economic outlook if:

- changes in the financial system's propensity or ability to supply credit (due to, for example, changes in banks' risk preferences) are economically significant and large compared to shocks to borrowers' demand for credit; or
- movements in money and credit indicate changing perceptions of the future path of wealth or income that will affect spending; or
- inflation and demand are not measured with perfect accuracy, so that the pragmatic approach would be to look at everything available.

Goodhart presents a number of reasons to believe that these conditions are satisfied in practice. The current volatility of credit markets worldwide, induced by a degree of uncertainty about the health of financial institutions in the large developed economies, would be a prime example

⁹ See, for example, Borio (2006), BIS (2007), and Mishkin (2007). The literature in this area is very large, and this article is intended to offer an introduction only.

of the kind of credit supply shock Goodhart might have in mind.

Goodhart argues that central banks should pay more attention to developments in money and (particularly) credit in the process of monetary policy formulation. Among other things, he asserts that monitoring money and credit may help policymakers interpret asset market developments and draw implications from them for the economic and financial outlook (eg, whether strong asset price movements are more likely to be due to 'fundamentals' or due to 'bubble' behaviour).¹⁰ This would reduce the risk that an inflation-targeting strategy focused on the outlook for CPI inflation fails to take due account of signals from the asset markets, given that asset prices do not typically feature with much, if any, weight in CPI measures of inflation.

On the other hand, another eminent expert on monetary policy, Michael Woodford, has written strong defences of the low-key approach to money (specifically) in monetary policy. Woodford (2007a) is a good example.¹¹ Essentially, Woodford argues that the risks for inflation of not paying enough attention to money are overstated. He builds his argument using the current 'workhorse' approach to the inflation control problem commonly employed in central bank models in regular use for forecasting, and in theoretical macroeconomics. The workhorse involves three core equations:

- (1) economic activity as a function of the short-term interest rate;
- (2) inflation as a function of economic activity and inflation expectations (ie the 'expectations-augmented Phillips Curve'); and
- (3) interest rates as a function of future inflation relative to the central bank's inflation target and economic activity (which captures the behaviour of monetary policy).

¹⁰ Along these lines, Borio and Lowe (2004) set out an approach for combining assessments of credit market conditions and asset market conditions into indicators of banking system stress.

¹¹ Woodford (1998) is also useful. A sympathetic view is offered by McCallum (2001). Woodford (2007b) looks critically at the ECB's two-pillar approach in particular.

The workhorse approach does not include an explicit role for money. Woodford's (2007) view is that it is largely sufficient for the understanding of inflation. In this view, money is seen as mostly incidental to economic activity, fluctuating passively according to the funding needs of the economy. Monetary policy can be adequately conducted and inflation controlled without worrying much about money and credit – even if there is a stable long-run relationship between money and prices, as predicted by the Quantity Theory.

4 An updated look at the New Zealand data

An updated look at the basic facts in the New Zealand data relating to money and credit, and their indicator value for other economic variables of interest, suggests support overall both for Charles Goodhart's advocacy of paying more attention to measures of credit, and for Michael Woodford's scepticism about the information value in money measures, in New Zealand.

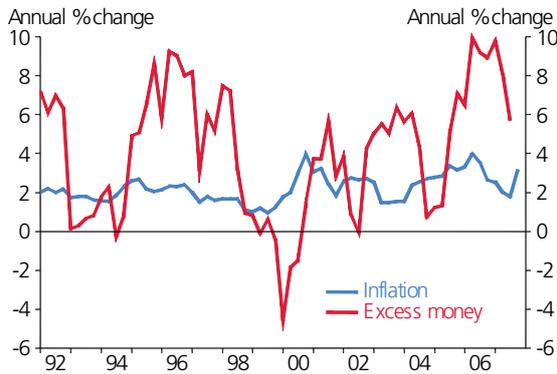
'Excess money' and inflation

Taking Woodford's arguments first, and thinking along 'monetarist' lines: if the Quantity Theory is correct and velocity is constant, there should be at least a long-run relationship between 'excess money growth' – defined as the growth of the ratio of money to real GDP – and inflation. There is little evidence of such a relationship between inflation and 'excess' growth in M1, M2, total M3 or resident M3. This contrasts with several recent studies of the euro area (eg Nicoletti Altimari, 2001; Gerlach and Svensson, 2003).

Figure 1 shows excess growth in resident M3, the excess money growth measure that in our investigations correlated best with headline CPI inflation. It is evident that not only is the correlation weak and the ratio of the growth rates rather different to the Quantity Theory's prediction of one, but the lead-lag relationship is unclear. In some periods, inflation appears to lead excess money. On their face, the New Zealand money data would appear not to offer much predictive value for inflation, even in the long run.

Figure 1

Excess money growth and inflation¹²

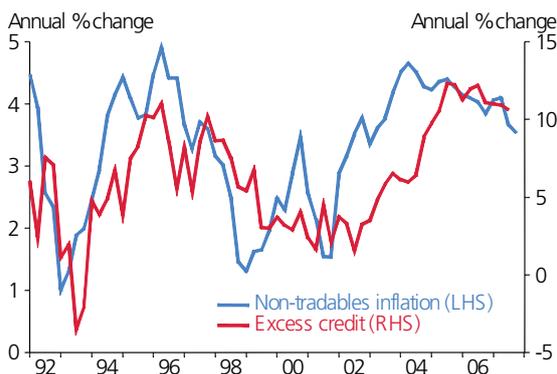


Sources: Statistics NZ, RBNZ.

Figure 2 replaces 'excess money' with 'excess credit'. Goodhart argues that system-wide credit measures should better capture the stock of funding available to the economy when, as in New Zealand, banks have a diverse range of funding sources other than New Zealand dollar deposits. In figure 2, we also replace headline inflation with non-tradables inflation, as non-tradables inflation should smooth out 'non-monetary' factors such as oil price shocks and short-term exchange rate volatility. Statistically, excess credit and

Figure 2

Excess credit growth and non-tradables inflation¹³



Sources: Statistics NZ, RBNZ.

¹² Excess money growth is defined as the annual percent change in the ratio of resident M3 to real production GDP, which is an exact rearrangement of the Quantity Theory in growth-rate terms. The growth rate of money minus the growth of real production GDP is an approximation to this measure.

¹³ The credit measure is private sector credit excluding repurchase agreements between banks - ie a measure of the credit available to the 'real' economy, as opposed to the financial sector.

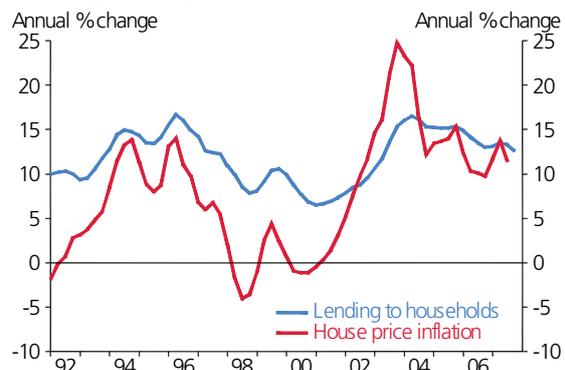
non-tradables inflation appear to correlate more closely than excess money and headline inflation, and a common cycle across the two series is evident. In this figure, in contrast with figure 1, we have plotted the series on different axes, to show the relationship in the best light – and it still cannot be said that the relationship is especially tight or consistent.

Money and credit measures as leading indicators

Figure 3 shows one of the better-performing near-term leading-indicator relationships we use, that between housing credit and house prices. Again, the relationship is not particularly tight. Generally, housing credit growth has been more stable than house price inflation. Also, it is evident that the mean level of house price inflation rose substantially around 2000, whereas the growth rate of housing credit stayed roughly the same. The turning points in the respective cycles are roughly coincident, but the earlier release of the housing credit data provides an effective lead of a few weeks for forecasting purposes.

Figure 3

Housing credit growth and house price inflation



Sources: Statistics NZ, Quotable Value NZ.

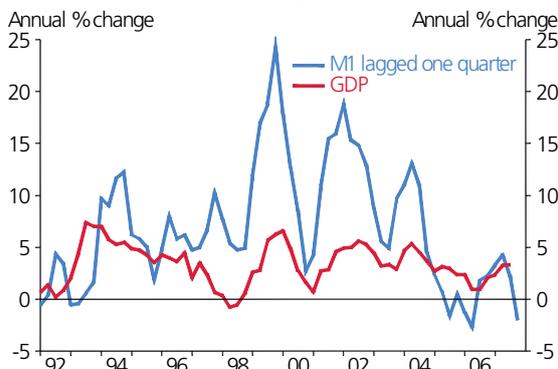
We also tested a range of other candidates for leading indicator relationships, with varying degrees of success. Razzak's (2001) result of a weak leading relationship between growth in M1 and real GDP growth was confirmed (Figure 4).¹⁴ However, the tightness of this relationship falls well short of the accuracy we are able to achieve with our

¹⁴ The Quantity Theory would suggest that nominal GDP growth should be better explained by M1 than real GDP growth, but our testing found the opposite.

current approach of looking at a wide range of indicators for near-term GDP forecasting.

Figure 4

M1 growth and real GDP growth



Sources: Statistics NZ, RBNZ.

Though the system-wide aggregates might not be as useful as other data for quantitative forecasting, this does not necessarily mean that they provide no information at all. As suggested in the M1 and excess credit graphs, there appears to be some correspondence between the broad swings and low-frequency turning points in the aggregates and the broad macro variables. Research in other countries on characterising these low-frequency correlations continues, but shows mixed results. Most US studies find that M1 is not very useful for predicting future GDP growth, but several studies of the euro area countries have been more positive (eg Brand *et al.*, 2003). These other studies employ more sophisticated equation specifications than those in the results reported here, including the inclusion of interest rate terms.

4 Future directions for research on the use of money and credit measures

The Reserve Bank continues to look at how the scope and coverage of the Reserve Bank’s money and credit statistics might be improved. Rochelle Barrow’s article in this edition of the *Bulletin*, “Future directions for the Reserve Bank’s financial statistics”, discusses this topic in the context of our broader financial statistics collection activities.

Our analytical development and exploration of the use of money and credit measures is focused on the indicator properties of the credit statistics in particular. Also, the role of credit market frictions, financial imbalances and balance sheets in business cycle dynamics continues to feature on our research programme, like that of others (eg, Borio and Lowe, 2004; Borio, 2006). This reflects the growing interest in the central banking community in better characterising the relationship between financial stability objectives and price stability objectives, including the role of policy. This research programme too is focused mostly on credit dynamics and measures.

The broad idea traced by Charles Goodhart, the ECB and the Bank of Japan is that money and credit analysis may enable central banks to assess longer-term risks to price stability, including emerging financial imbalances, large asset price cycles, or other threats to financial stability. If this idea has merit, an issue would be how to formalise this analysis and integrate it systematically into central banks’ modelling and forecasting strategies. In other words, what would be the best way to expand the ‘workhorse’ macro framework to include money and credit dynamics? Issing (2006) suggests that the ECB’s ‘monetary analysis’ pillar is not an unreasonable approach, but as discussed above, this view is not uncontested.

As noted above, the theoretical literature on this topic is growing. The thought process regarding the information value in money and credit measures in upswings may not be identical to that in downswings. During upswings, if asset prices are rising rapidly, money and credit developments might shed light on the role of unanchored price expectations in explaining asset price movements, relative to the role of measurable fundamentals. During downswings, the risk of financial system disruption such as financial institution failures or sharp changes in portfolio preferences will be more relevant.

Though the New Zealand data does not show an evident lead in the turning points from money and credit to growth and inflation, this does not mean that there is no ‘financial accelerator’ in practice. Nor does it mean that money and credit supply do not play an important role in propagating or amplifying economic disturbances. The observed lead

from activity and inflation to money and credit may indicate simply that 'real' sector shocks tend to be larger or more frequent than financial sector disturbances as a source of macroeconomic fluctuations.

This tendency need not hold all the time, as current circumstances suggest. Credit market frictions are clearly a pertinent feature of the economic outlook around the world right now, and present a challenging monetary policy problem. At the very least, there are communication issues in explaining how a relatively distant inflation threat related to credit or asset market developments might be influencing monetary policy, when medium-term inflation pressure appears to be either broadly consistent with price stability, or indeed possibly pushing in the opposite direction.¹⁵ New Zealand's present circumstances, with a rising domestic cost of credit reflecting the largely offshore credit market problems, also show that a generally solvent, well-developed and competitive financial system such as ours does not always insulate the economy from material credit supply dynamics.

5 Conclusions

Ongoing financial globalisation and liberalisation may mean that distant threats to price stability from money and credit market behaviour may be becoming a more frequent and immediate policy concern. The arguments of Charles Goodhart in favour of paying more attention to credit measures, and those of Michael Woodford against looking too much at money, in the conduct of monetary policy are generally supported, or at least not refuted, by the New Zealand data. To a large extent, the Reserve Bank's current practices in using money and credit measures is consistent with both the Goodhart and the Woodford positions. More work is needed on understanding money and credit dynamics and how they interact with asset markets, and the real economy.

¹⁵ Borio (2006) and Reynard (2007) discuss in general terms the communication issues associated with near-term vs. distant inflation threats.

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Recent trends and developments in currency

Alan Boaden¹

This article will be the first in an annual series that reviews recent trends in the use of notes and coins in New Zealand, and that reports on developments of particular interest. The article describes:

- the continuing growth in the value of currency in circulation, despite the popularity of electronic forms of payment;
- the Reserve Bank's new note processing machine and its operations;
- some major changes in the pattern of demand for coins after the introduction of the new 10, 20 and 50 cent coins in July 2006; and
- the recovery of the old 'silver coins' after they were 'demonetised' (declared no longer legal tender) in November 2006.

Introduction

The Reserve Bank has the sole right to issue currency – bank notes and coin – in New Zealand. Maintaining the supply, quality and integrity of the currency is one of the Reserve Bank's core functions. To fulfil this function, the Reserve Bank closely monitors trends in the demand for notes and coins, and undertakes bank note processing operations to maintain the quality, and to check the authenticity, of notes in circulation.

This article reports on:

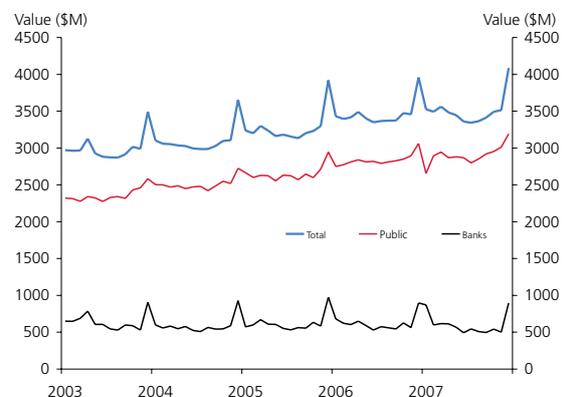
- the continuing growth in the value of currency in circulation, despite the increasing popularity of electronic forms of payment;
- the Reserve Bank's new note processing machine and its operations;
- some major changes in the pattern of demand for coins after the introduction of the new 10, 20 and 50 cent coins in July 2006; and
- the recovery of the old 'silver coins' after they were 'demonetised' (declared no longer legal tender) in November 2006.

Currency in circulation

Currency in circulation comprises notes and coins held by the general public, ie, businesses and households, and that held by banks and some other deposit-taking institutions. Figure 1 below shows that currency in circulation has continued to grow over the last several years despite the increased popularity of electronic forms of payment.²

The figure also illustrates the marked peak at Christmas each year when banks order additional cash from the Reserve Bank to meet their customers' needs. It is interesting to note that the spike for banks is typically greater than that for the general public. This suggests that they choose to hold rather

Figure 1
Currency in circulation



Source: RBNZ.

¹ The author would like to thank Reserve Bank colleagues for helpful suggestions and comments, particularly Sam Goddard for his research support.

² New Zealand Bankers' Association statistics show that debit and credit card transactions made through EFTPOS machines rose by 39 percent between 2003 and 2006.

Table 1

Composition and growth of currency in circulation (\$m)

	General Public	Banks	Total	Annual Growth
Dec 2002	2,451	941	3,391	-
Dec 2003	2,597	908	3,505	3.4%
Dec 2004	2,737	930	3,666	4.6%
Dec 2005	2,946	974	3,920	6.9%
Dec 2006	3,061	896	3,958	1.0%
Dec 2007	3,190	896	4,087	3.3%
5-year growth	30.2%	(-4.8%)	20.5%	-

Source: RBNZ.

more than their customers will need in order to be confident they will have sufficient to meet demand.

Table 1 shows that over the last five years the value of currency in circulation has risen from \$3.4 billion to \$4.1 billion, or by just over 20 percent. Cash held by the general public has risen by 30 percent while that held by banks has declined by about 5 percent.

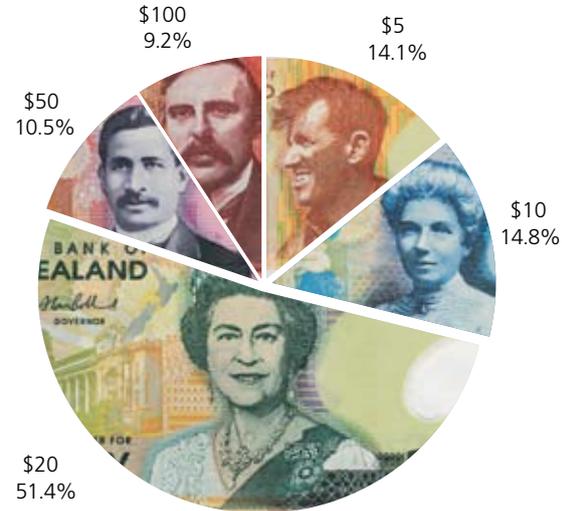
At the end of 2007, there were 142 million bank notes with a value of \$3.8 billion in circulation in New Zealand. By comparison, the value of coin in circulation is about \$300 million.

Table 2 and figure 2 show that \$20 notes make up over half the bank notes in circulation by number. However, the number of \$50 notes in circulation increased significantly during 2007, while there was little change in the numbers of other denominations. This rise in \$50 notes can be attributed to their increasing use in ATMs by some banks.

Figure 3 shows how the value of the average bank note in circulation (the red line) has increased over time. This can be expected if the value of transactions rises as prices rise.

Figure 2

Number of bank notes in circulation at December 2007 as a proportion of total



Source: RBNZ.

However, the value of the average note rose rather more slowly than the rate of inflation. This is shown by the blue line in the chart, which indicates how much the value of the average note would have increased since 2002 if it had kept pace with growth in the Consumers Price Index.

Table 2

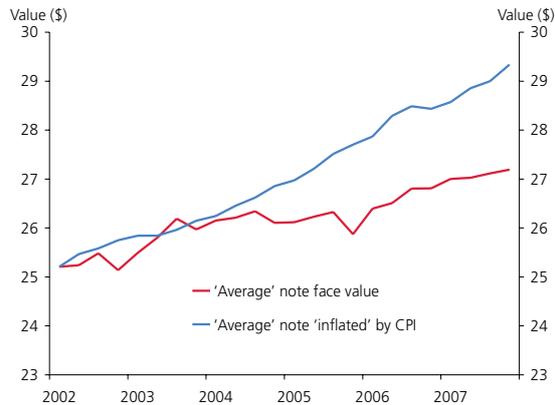
Bank notes in circulation as at 31 December 2007

Bank notes	Number (000)	Value (\$000)	Annual Growth in value over 2007
\$5	19,988	99,939	1.5%
\$10	21,100	211,003	(-0.4%)
\$20	73,001	1,460,025	0.4%
\$50	14,977	748,848	11.5%
\$100	13,088	1,308,808	1.2%
Total	142,154	3,828,622	2.7%

Source: RBNZ.

Figure 3

Average value of bank notes in circulation³

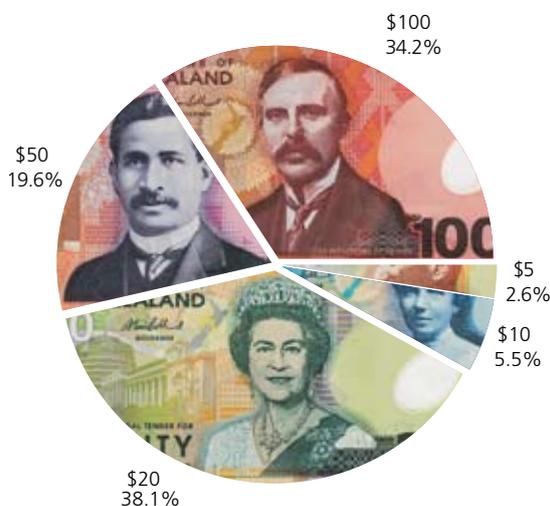


Source: RBNZ, Statistics New Zealand.

Figure 4 shows that although \$20 notes make up over half the bank notes in circulation by number, the value of \$100 notes in circulation was almost as large as that of \$20 notes.

Figure 4

Value of bank notes in circulation as at December 2007 as a proportion of the total



Source: RBNZ.

Bank note processing

A key function of the Reserve Bank's currency operations is to maintain the quality and integrity of New Zealand bank notes. The principal method for doing this is by machine processing of notes returned by banks. Notes are counted and checked for quality and authenticity.

Banks and 'Cash in Transit' (CIT) companies⁴ return notes that are surplus to the requirements of banks and other businesses to the Reserve Bank, particularly after Easter and Christmas. They also return notes that bank staff or machines operated by banks and CIT companies have identified as damaged or heavily worn.

In 2006, the Reserve Bank purchased a new note processing machine. The new machine was purchased for three main reasons:

- It has more advanced detectors that allow it to better identify counterfeit notes. This would be particularly important if the Bank were to introduce new security features on bank notes at some point in the future.
- The detectors also allow the machine to distinguish good notes from damaged or heavily worn notes much more effectively. This generates significant annual savings in currency expenses, as more good notes that would have been destroyed by older machines can be identified and reissued.
- The detectors also maintain the quality of notes in circulation better by ensuring that damaged and worn notes are withdrawn from circulation as promptly as possible.

The Reserve Bank machine processes about 35 million bank notes each year. The new machine can process up to 90,000 notes per hour if the notes are in good condition, though the rate for older notes can be much lower.

The volume of note processing at the Reserve Bank has steadily increased in recent years. This has been partly due to the growth in the numbers of notes in circulation.

³ The CPI-adjusted note (blue) line shows the value that the average note would have had if it had increased at the rate of inflation from March 2002 onwards.

Erratum

When the *Bulletin* was originally published, Graph 3 above incorrectly listed average note values as "\$M". This substitute PDF provides the correct graph axis label.

⁴ 'CIT' companies transport cash between the Reserve Bank, trading banks, retailers and other cash-handling businesses. The two main CIT companies in New Zealand are ADT (formerly called ArmourGuard) and Chubb.



Note processing machine
(Reserve Bank of New Zealand; photography, Stephen A'Court).

However, the number of worn notes processed in particular has also been rising.

The main reason for the increased inflow of worn notes is that the average age of the polymer notes is increasing. Polymer notes were first issued in New Zealand in 1999. For a number of years, most notes were quite new. Most of the unfit notes returned to the Bank were those that had suffered damage in some way. Now, however, the Bank is receiving more notes that, through regular handling, have suffered some form of gradual 'wear and tear'. It is normal, when a country issues a new series of notes, for them to have a 'honeymoon period' when attrition rates are very low. But, at some point, numbers of damaged or worn notes rise to a higher plateau. It is very likely that New Zealand is experiencing that transition now. Though the number of unfit notes has been rising, it must be noted that polymer notes have significantly longer lives than the cotton-based paper notes that they replaced.



Processed bank notes.
(Reserve Bank of New Zealand, photography, Stephen A'Court).

Sir Edmund Hillary

The recent death of Sir Edmund Hillary makes it timely to record the background to the decision to include his image on the New Zealand 5 dollar bank note.

In 1990, the Reserve Bank decided to completely revamp the appearance and features of New Zealand's bank notes. This was the first complete redesign since the introduction of decimal currency 23 years earlier. The result, after the Reserve Bank had consulted widely with the public, was a new series of notes with distinctly New Zealand designs.

The Reserve Bank decided to retain the Queen on the \$20 note and to include images of famous New Zealanders on the other four notes. These would be people who "were born, brought up and educated in New Zealand and performed noteworthy deeds in New Zealand, or elsewhere, as well as those who were born and brought up overseas and performed noteworthy deeds in New Zealand". It was initially agreed that people still alive would be excluded, due to the convention recognised internationally not to include the portraits of live persons apart from reigning monarchs or heads of state. This convention arose from the risk that a living person could 'blot their copybook' and create an awkward situation.

In May 1991, the Governor of the Reserve Bank, Dr Donald Brash, announced the Reserve Bank's intention to redesign the notes, drawing specific attention to the possible inclusion of images of New Zealanders, and invited public comments. Notwithstanding the Governor's reference

to the intended exclusion of living New Zealanders, Sir Edmund Hillary was the most favoured candidate by a large margin. This result was not altogether surprising. Sir Edmund's achievements, particularly the ascent of Mount Everest with Tenzing Norgay, his work building schools and hospitals for the Sherpa people of Nepal, his role as New Zealand Ambassador to India, and his personal qualities all earned him great respect in New Zealand and widely around the world.

Sir Edmund's popularity prompted the Reserve Bank to override the international convention regarding living people. The Reserve Bank concluded that Sir Edmund's achievements clearly warranted his inclusion on a bank note and that this outweighed any small risks associated with the choice of a person who was still alive. The Governor's decision, though, was subject to Sir Edmund's agreement. Sir Edmund was out of the country at the time but the Governor contacted him by telephone. He explained that the Reserve Bank would like to incorporate his image on a bank note and requested his agreement. Sir Edmund accepted the offer.

The first 5 dollar notes with Sir Edmund's image were issued on 10 July 1992. In 1999, the design was slightly changed when the Bank issued a new series of bank notes printed on polymer plastic. There are currently about 19 million 'Sir Edmund Hillary' 5 dollar notes in circulation.



Coins

The pattern of demand for new coins of all denominations has changed markedly since the introduction of new 10, 20 and 50 cent coins in July 2006. The section below examines this change in depth, with the benefit of over a year of data since the new coins were first issued. The next section reports on the Reserve Bank's recovery and export of a considerable quantity of the old cupronickel coins.

Demand for new coins

The demand for the new 10, 20 and 50 cent coins has been much higher than for the earlier cupronickel coins. This was expected in the short period between July and November 2006, when the Reserve Bank effectively replaced the existing working balances of businesses and households. However, strong issuance of the new coins continued all through 2007, well after the active balances of the community had been replaced.

Table 3 shows that the demand for each of the 10, 20 and 50 cent coins has been four to seven times higher than prior to the start of the process for replacing the old coins.

The change in the demand for the 20 cent coin is illustrated in figure 5.

The main reason why demand has risen so much appears to be that many households emptied large hoards of cupronickel coins in 2006 and these emptied stores are now being refilled. Also, the new coins are much lighter than the old coins. People appear to carry more around and leave them in jars and other places without quite realising how many they have.

Table 3

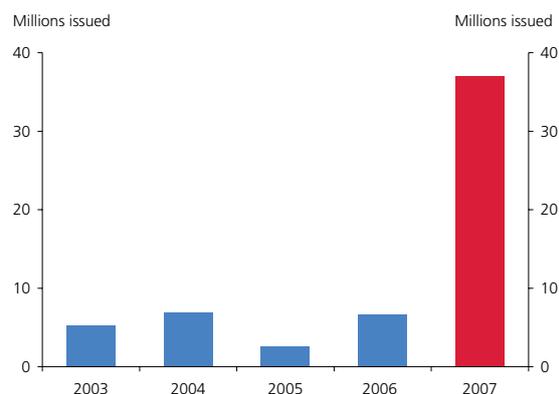
Annual net issues of 'silver' coins (000)

	Average 2003-2005	2007	Ratio (2007/2003-5)
(5 cent coin)	(16,608)	n/a	n/a
10 cent coin	7,495	33,314	4.44
20 cent coin	4,975	37,012	7.44
50 cent coin	2,689	13,895	5.17
Total	15,159*	84,221	5.56*

* Excluding five cent coins, which were withdrawn in 2006
Source: RBNZ.

Figure 5

Annual net issues of 20 cent coins*



* The figure for 2006 has been adjusted to remove coin issued between July and October 2006. These represented the replacement of working stocks of old coins, rather than net additions to coins in circulation which are shown for other years.

Source: RBNZ.

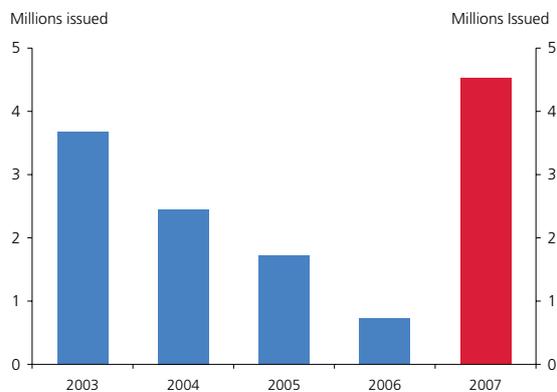
Research conducted by ACNielsen in 2005 showed that the average New Zealander carried about eight 'silver' coins with them each day for transaction purposes. However, the average household had almost 200 'silver' coins in stores of various kinds at home. The current high rate of issues could continue for some years before stores are replenished to their 2005 levels.

It is possible, though, that some underlying change in the way New Zealanders use coins has also been taking place over the last few years. This might have been disguised by changes generated by the coin changeover. This idea is supported by the fact that demand for the one dollar coins has also been very volatile as shown in figure 6 opposite. Demand for the one dollar coin was declining prior to the 'silver' coin change over, which was announced in March 2005. This decline was reinforced by the return of some

stores of dollar coins together with cupronickel coins. However, in 2007 demand bounced back so strongly that some other underlying factor might also be involved.

It is possible that many New Zealanders still often use bank notes for small transactions and receive coins as change. However, they may be using these coins less often in subsequent transactions. This is a trend that has been observed in some overseas countries. The net effect is for more coins to end up in household hoards and for issues of coin to be higher than are needed for transaction purposes.

Figure 6
Net issues of 1 dollar coins



Source: RBNZ.

Coin demonetisation and recoveries

The old cupronickel coins were demonetised, ie, declared no longer legal tender, with effect from 1 November 2006. This meant that shops and other businesses no longer needed to accept them as payment for goods and services. Demonetisation is a normal procedure following a currency change. In the past, the Reserve Bank had demonetised one and two cent coins and one and two dollar notes. However, the Reserve Bank will always pay the face value for any demonetised notes or coins that are returned by members of the public.

It was important that the old coins be demonetised and withdrawn from circulation for several reasons:

- Banks, shops and other large cash-handlers would face considerable staff costs in handling and sorting two sets of coins on an indefinite basis.
- Many bulk coin-handling and sorting machines would not be able to process an increased number of coin sizes.

Coin weighing machines would be rendered ineffective unless new and old coins were separated.

- Businesses operating vending machines, including parking meters, wanted to see a fast changeover so that they could quickly convert their machines to accept the new coins.
- Many members of the public would probably find it confusing and annoying having coins of two different sizes for some denominations.

It was important to estimate the amount of coin likely to be recovered for budgeting and for planning logistical arrangements. Initial estimates were based on information on the recovery of some 'legacy' currencies after the introduction of the euro. More reliable estimates were later prepared based on:

- data collected by the New Zealand Bankers' Association on coin holdings of every bank branch in the country on a particular day;
- a sample survey of retailers carried out by the NZ Retailers Association; and
- a survey conducted by ACNielsen of the numbers of coin New Zealanders carry for transaction purposes and the numbers in household stores.

Based on this research, it was estimated that:

- the number of coins in circulation for day to day use was approximately 120 million; and
- the number of coins in household stores was approximately 250 million.

After the Reserve Bank announced in March 2005 that it would introduce new coins, anecdotal evidence and a sharp decline in net coin issuance indicated that some people started returning stores of coins well before July 2006. The "Fives for under Fives" coin collection campaign by the Plunket Society probably assisted this. The Plunket Society raised about \$700,000, over 90 percent of which comprised 5 cent coins; ie, about 13 million coins.

The old cupronickel coins were sold to Poongsan Corporation of Korea. They were shipped out of Auckland, Wellington and Christchurch to Korea progressively as they accumulated.

Table 4

Percentages of coins returned

Coin	1 Nov 2006	30 Nov 2006	30 June 2007
5c	22.3%	25.1%	26.2%
10c	33.1%	37.1%	39.0%
20c	43.3%	47.5%	49.5%
50c	54.1%	58.1%	60.2%
Total	29.7%	33.1%	34.6%

Source: RBNZ.

Poongsan melted down the coins and used the cupronickel to make blank coins for other countries.

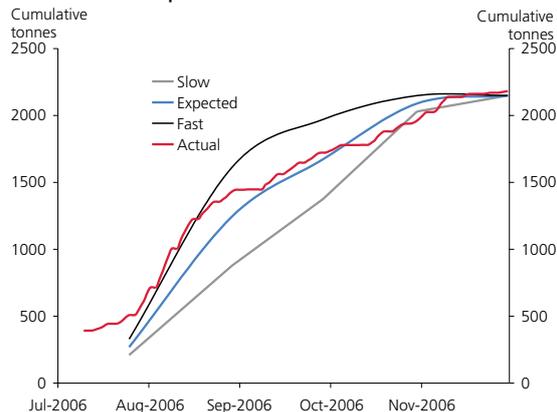
Figure 7 below illustrates the track of coin returns over time together with previously prepared fast, slow and expected recovery profiles based on the estimates described above. There were very strong inflows of old coins in August after the new coins were issued. The rate of inflow slowed in September and much of October, but there was a strong surge around the time the old coins were demonetised on 1 November.

The amount of coin recovered was close to or within the forecast range throughout the transition period. By 30 November, the Reserve Bank had recovered 2,183 tonnes of old coins, slightly exceeding the expected amount at that date.

Table 4 shows the percentages of coins of each denomination recovered as at:

- 1 November 2006 (when the coins were demonetised);
 - 30 November 2006 (after truck collection runs stopped);
- and

Figure 7
Cumulative cupronickel coin recoveries



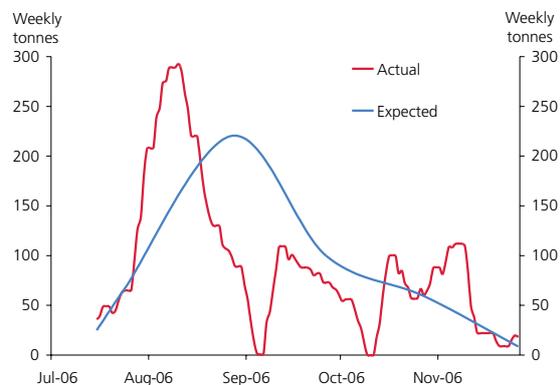
Source: RBNZ.

- 30 June 2007 (about a year after the new coins were issued).

For example, by 30 November 2006, the Reserve Bank had recovered 47.5 percent of 20 cent coins issued between 1967 and 2006.

Figure 8 below shows the rate at which coins were returned from mid-July to late November. It shows how coins were returned faster than expected initially, and then slowed down. There was a 'last minute' surge of people returning old coins to banks in the last week – and for a while later as banks continued to accept them after 1 November. These coins took a week or two to reach the Reserve Bank. After the end of November, the Reserve Bank continued to receive some coins (and it still does) but the large majority of coin recovered was between 31 July and 30 November. As noted above, the Reserve Bank will always pay the face value for demonetised notes and coins.

Figure 8
Weekly rate of cupro-nickel coin recoveries



Source: RBNZ

An observant reader will notice that the weekly running total in figure 8 falls to zero on two occasions in the middle of the recovery period. This is simply because the Reserve Bank had two one-week halts to truck collections from bank

branches in order to carry out checks and audits to ensure there were no missing consignments.

The income from the sale of the cupronickel coins covered the cost of producing the new coins and all project expenses. The changeover to smaller, plated steel coins and the withdrawal of the 5 cent coin have also generated significant ongoing savings. The composition of the old coins was 75 percent copper and 25 percent nickel. Since early 2004, when the change was first considered, the price of copper has risen from about USD 3,000 to USD 8,100 per tonne in mid-February 2008, while the price of nickel has increased from about USD 15,000 to USD 27,700 per tonne. The value of the metal content of the 5, 10 and 20 cent coins would now be almost as great as their face value if the Reserve Bank had not changed them – and their unit cost, after manufacturing and delivery expenses were added, would be well in excess of their face value.

The rise in metal prices substantially enhanced the long-term value of the coin changeover. If the Reserve Bank had not proceeded with the project, then cupronickel coin issue expenses would have risen substantially. Consequently, the introduction of smaller plated steel coins and the withdrawal of the 5 cent coin have led to significant savings even though numbers of coin being issued have risen.

Conclusion

The demand for currency by the New Zealand public continues to grow steadily each year despite the popularity of electronic methods of payment. There has been a gradual increase in the average value of bank notes in circulation, with a significant increase in 50 dollar notes over the last 12 months. The Reserve Bank's note processing operations play a key role in maintaining the quality and protecting the integrity of currency in circulation.

In 2006, the Reserve Bank introduced new, smaller 10, 20 and 50 cent coins, and withdrew the previous cupronickel coins. This changeover was completed in a few months, with little disruption to business activity and with the proceeds from the sale of old coins meeting all expenses. The demand for lower value 'silver' coins has risen substantially since the introduction of the new coins. It appears that New Zealanders are placing large numbers of coins in household stores rather than recirculating them.

The Reserve Bank, private sector banks and the creation of money and credit

Gillian Lawrence[†]

This article provides an overview of the functions of money, and how money and credit are created in the economy. The roles of the Reserve Bank and private sector banks are illustrated, and we explain the link between money and monetary policy.

1 Introduction

Money and credit, the products of the financial system, are important parts of our economy. The financial system enables 'real' activity – that is, the processes of production and trade of goods and services – to take place smoothly. Financial activity is thus part and parcel of economic growth and improvement in overall living standards.¹

Money itself is not a modern innovation. Records of money date back 5,000 years to the Babylonians, who distinguished legally between 'exchangeable goods' and 'non-exchangeable goods'. Exchangeable goods included precious metals as well as certain commonly used goods such as oil and wine. It is likely that these exchangeable goods were used as means of exchange. The origins of money probably go back even further than this – beyond written history, with the use of cattle around 10,000 years ago.²

Over time, money has taken different forms. It has ranged from objects of inherent value, such as precious metals (commodity money), to tokens backed by reserves of a defined object of inherent value such as gold (for which the tokens may be redeemed), to the 'fiat' money in the form of the notes and coins in circulation today.

Unlike commodity money, fiat money has no intrinsic value. Neither is it backed by something else of value. Fiat money is established as money by government or official order or decree. Its effective use as money derives from its acceptability as payment for goods or services. Items other

than fiat money can also be used in practice as money if both parties agree to a different sort of payment beforehand. Recognising this economic function of money, we consider money today as generally comprising both physical fiat money in the form of notes and coins, and electronic records of claims on financial institutions (such as banks) that are transferable to others and that are usually accepted as payment for goods and services.

Money and credit are so fundamental to our economy that we do not generally consider how money is created. This article looks at money creation in more depth. Section 2 discusses the concept of money, Section 3 describes money and credit creation in the banking system, Section 4 looks at the pricing of money in the banking system and its role in the implementation of monetary policy, and Section 5 concludes.

2 What is money?

Money is commonly described as a medium of exchange, a unit of account and a store of value. These three functions of money together are said to distinguish money from other financial assets such as shares and bonds, and goods with an 'investment' function such as art or real estate.

The *medium of exchange* function derives from the fact that money is the item that a buyer gives a seller in exchange for a good or service, with the seller typically using that money to make other purchases. The use of money in this manner overcomes the inefficiencies of the barter system, where two individuals with exactly corresponding needs have to come together to transact. Defining *liquidity* as the ease with which an asset can be converted into the economy's medium of exchange, money is the most liquid asset in the economy.

[†] I would like to thank Phil Briggs, Tim Ng, Ian Nield and other Economics Department colleagues for their helpful comments on earlier drafts of this article. All remaining errors and omissions are my own.

¹ See Reddell (2001) for a discussion.

² Refer to Morgan (1965) and Davies (1996) for further detail relating to the origins of money.

As a *unit of account*, money is used to measure the exchange value of a commodity or product. It is the yardstick that people use to price items and record debts.

Money has a *store of value* function because, unlike physical assets such as machinery that depreciate over time due to wear and tear, the face value of physical money does not change. Of course, inflation reduces the ‘real’ (or exchange) value of this form of money over time.

Once money is held in the banking system, interest-bearing accounts may be used to impart a better ‘store of value’ function to money. Take, for example, an amount of money that is invested with a bank for a period of time. If the interest earned on that sum is comparable to the rate of inflation in the economy over that period, then the purchasing power of that quantity is the same at the start and completion of the period. The real value of this money is thus unchanged.

3 The banking and payment system, and how money and credit are created

In a modern economy, money can be created either by the central bank (the Reserve Bank, in New Zealand’s case) or by private sector institutions – in practice, mostly registered banks.³ Section 25 of the Reserve Bank of New Zealand Act 1989 gives the Reserve Bank the monopoly right to issue physical money (notes and coins), which enters public circulation through the private sector institutions to which it is issued.

A private sector institution can also create money by issuing claims on itself (ie, by accepting deposits) that may be transferred between, and are generally accepted by, members of the public as a means of payment. For that matter, any institution that can maintain the public’s confidence that its liabilities will be generally accepted as means of payment, can create money. Such an institution will, in practice, also be in the business of creating credit,

³ Besides the registered banks in New Zealand, certain institutions such as building societies, credit unions and finance companies also create money in the sense discussed in this article. There is no legal restriction on the type of institution that may create money in New Zealand.

which implies the issue of a greater value of claims on the institution than the value of Reserve-Bank-issued money the institution itself holds. In practice, by far the largest share of money – 80 percent or more, depending on the measure (discussed below) – is created by private sector institutions. For simplicity, in what follows, we use “bank” to refer to any institution that creates money or credit.

We illustrate this process of money and credit creation below, by tracing through example transactions in a hypothetical banking system.

A simple economy

Let us first consider an economy without banks. The only money available would be notes and coins issued directly to the public by the central bank (*currency*). In this economy, currency is the only object that can be used easily as a medium of exchange and a store of value.

Consider now, the inclusion of one bank, Bank A, into the economy. Individuals holding currency are faced with three options. They could:

- use up all of their currency in exchange transactions;
- save some of the currency and ‘keep it under the mattress’; or
- save some of the currency and deposit it at the bank, on the expectation that the bank will repay them the currency when they want it.

If, at a point in time, two individuals, Customers X and Y, each deposit \$500 into Bank A, the balance sheet of the bank will be as follows:

Figure 1
Balance sheet of Bank A before it creates money and credit

Assets		Liabilities	
Cash at hand –	1,000	Customer X	500
fiat (‘outside’)		deposit	
money		Customer Y	500
		deposit	
Total assets	1,000	Total liabilities	1,000

In this case, Bank A has enough cash, at all times, to meet all possible withdrawals. Its assets are all in the form of fiat money issued by the central bank. This is labelled 'outside' money in the balance sheet, reflecting that this form of money is a liability of the central bank created 'outside' the economy.

If Bank A's customers make payments to each other with cheques or via EFTPOS and internet transfers, there will be a change in the balances in their accounts at Bank A, but the total amount of deposits at Bank A will remain unchanged. In this case, the bank would not need to retain the cash deposited by these customers. However, typically, a small amount of payments will be made by cash, in which case individuals will withdraw cash from the bank against their deposits to make the payments. If Customer X makes a withdrawal to pay Customer Y, it is likely that Customer Y will re-deposit most or all of the cash back with Bank A – out of concern about theft, for example, or for convenience.

If, say, 10 percent of deposits are typically withdrawn for cash payments weekly, and this amount is re-deposited with the bank, then Bank A only needs to hold \$100 in cash at hand to support likely withdrawals on its total deposits of \$1,000. (In practice, Bank A will not be certain about the 10 percent ratio, and there is a risk that there may be greater withdrawals. Bank A is therefore likely to hold a safety margin of cash at hand, in case withdrawals turn out

to be greater than expected, or re-deposits of cash turn out to be less than expected.)

Bank A can thus lend out \$900 to its customers. They can then use this \$900 as payment for goods and services. The \$900 will likely be re-deposited. This is the first step in the process of money and credit creation by Bank A. So far, it has created \$900 of money, and it has created credit to the same value.

This credit might be used by Bank A's customers to purchase capital assets, and thus contribute to growth in this economy. In producing credit, the bank performs a useful function in dedicating resources to determine potential borrowers' creditworthiness (a process that is costly), which the bank can do more efficiently than its customers could each do individually if they were to lend to each other directly.

Turning back to the money side, in our scenario, only \$90 of the \$900 in new money is likely to be withdrawn as cash, with other payments being possible through electronic transfers of account balances. Bank A thus has a further \$810 to lend out. As this process continues, the ultimate outcome is that the initial \$1,000 in deposits can be used to create new deposits (money) and credit (loans) to the value of \$9,000. This new money is generally termed 'inside' money to reflect that it has been generated by the private bank 'inside' this economy. Bank A's balance sheet has grown from \$1,000 to \$10,000. This is shown below:

Table 1
The process through which money and credit is created

	Customer deposits	10% reserved as cash at hand	Loans made
Step 1	1,000	100	900
Step 2	900	90	810
Step 3	810	81	729
Step 4	729	72.9	656.1
Step 5	656.1	.	.
etc.	.	.	.
Total	10,000	1,000	9,000

Bank A's balance sheet would then be as follows:

Figure 2
Balance sheet of Bank A after the creation of money and credit

Assets		Liabilities	
Cash at hand – fiat ('outside') money	1,000	Customer deposits – includes 'inside' money	10,000
Loans to customers	9,000		
Total assets	10,000	Total liabilities	10,000

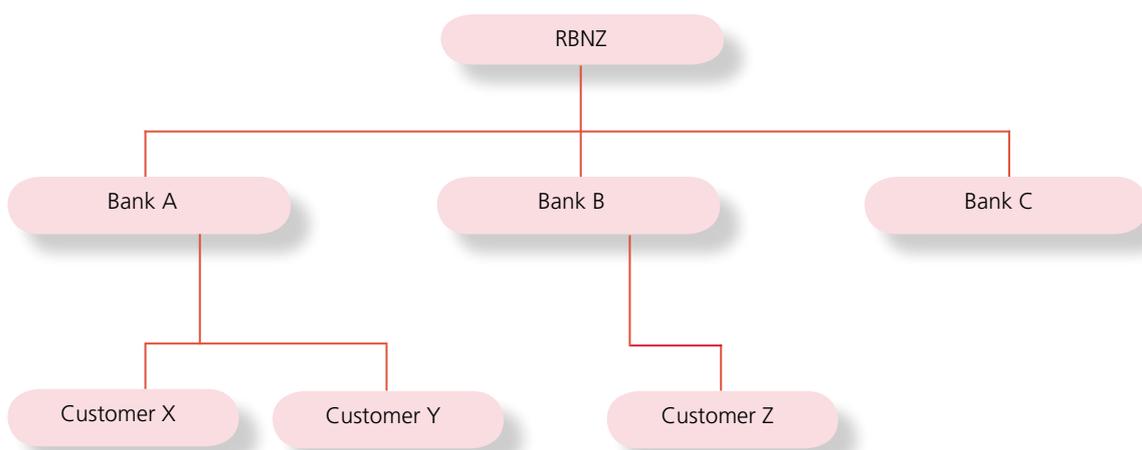
Since the depositors of the \$10,000 can spend or transfer the amount, as they could with the original \$1,000 issued by the central bank, Bank A has created money worth \$9,000 and added this amount to the supply of money in the economy. It has also created credit to this value. Because the value of inside money created is necessarily equal to the value of credit created, the net worth of the private sector remains unchanged.

Adding more banks

When more banks are added to this model economy, it is no longer the case that cash payments will necessarily be re-deposited with the same bank, though the logic of the money and credit creation process in the banking system as a whole is the same. However, in this setting, with more than one bank, there is a need for an interbank payment system to manage the payments that need to be made across banks on account of their customers' payments activities.⁴ The interbank payment system in New Zealand (which is a typical case) is built around deposit accounts the banks have at the Reserve Bank. This system can be illustrated as below:

Consider Customer X and Customer Y again, who have deposit accounts with Bank A. When Customer X pays Customer Y electronically, Customer X's deposit account is debited and Customer Y's account credited accordingly. Bank A's deposit with the Reserve Bank remains unchanged. Now consider a Customer Z who banks with Bank B. When Customer X or Y pays Customer Z electronically or using a cheque drawn on Bank A, an interbank transaction needs to take place. In this instance, besides the individual accounts of the customers at Banks A and B being affected, the deposit account of Bank A at the Reserve Bank is debited and that of Bank B is credited accordingly.

Figure 3
The banking system



⁴ A detailed description of the payment system in New Zealand can be obtained from Bollard (2005).

4 The money supply, inflation and monetary policy

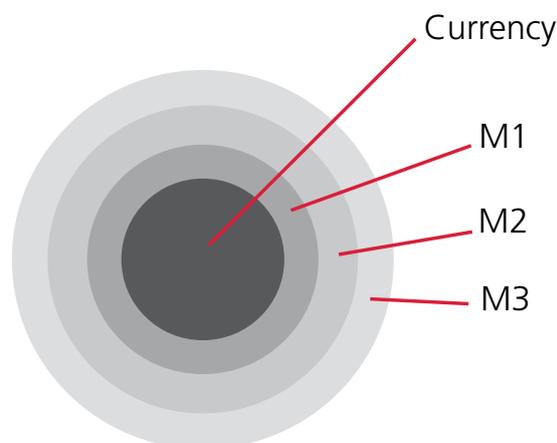
Measuring the money supply

While money can be issued by the central bank or created by private institutions, as illustrated above, in the vast majority of circumstances there is no practical difference between these two forms of money in terms of the medium of exchange function. In measuring money, the Reserve Bank constructs money aggregates based on the varying levels of liquidity of the various types of money, rather than on who has issued or created the money (see Collins *et al.* (2001) for more detail on the Reserve Bank's approach to measuring money). These aggregates are listed below.

- The stock of currency not in bank tills is the narrowest measure and refers to the notes and coins issued by the Reserve Bank that are held by the public. This measure averaged \$3 billion in 2007.
- M1, the next measure, includes notes and coins held by the public plus balances in accounts on which cheques can be written. M1 averaged \$23 billion in 2007.
- M2 is a broader measure still and encompasses M1 plus all other business or personal deposits that are available 'on demand'.⁵ All EFTPOS accessible (non-cheque) funding is included in this aggregate. M2 averaged \$70 billion in 2007.
- M3 is the broadest measure of money. It represents all New Zealand dollar funding of most registered banks and three other financial institutions.⁶ This aggregate consists of M2 plus term funding of those institutions. M3 averaged \$192 billion in 2007.⁷

Diagrammatically, the different measures of money can be represented as the concentric circles shown below, decreasing in terms of liquidity as they broaden out.

Figure 4
Monetary aggregates



The implementation of monetary policy

As shown above, the Reserve Bank's operations in supplying 'outside' money are central to the banking system's money creation processes. These operations are also central to the Reserve Bank's implementation of monetary policy in pursuit of its primary function of maintaining price stability, as required by section 8 of the Reserve Bank of New Zealand Act 1989.

Since 1999, the Reserve Bank has performed this function by adjusting the Official Cash Rate (OCR) to target inflation.⁸ The OCR tightly and directly controls the price of outside money as supplied to the banking system through the interbank payment system set out above.

At first, it may seem odd that the implementation of monetary policy is conducted through the price of money rather than the quantity of money. Indeed, the 'monetarists' of the late 1960s and 1970s applied the Quantity Theory of Money – in which the price level is determined by the balance between nominal money supply and the demand for real money balances (determined by the level of activity in the economy) – and concluded that the only way to control inflation would be to control or 'target' the money supply.

The historical experience of implementing monetary policy based on this approach was not favourable, because of rapid financial innovation. Central banks thus reverted to interest rate targeting. Modern monetary policy now assesses the

⁵ More formally, these deposits refer to call deposits, which are accounts that comprise overnight money and funding that can be accessed without break penalties.

⁶ A complete list of institutions in M3 can be obtained from the Reserve Bank website.

⁷ M3R is the 'resident' M3 aggregate and represents New Zealand dollar funding from New Zealand residents only. This aggregate is the same as M3, less funding sourced from non-residents. M3R averaged 159 billion in 2007.

⁸ Refer to Reserve Bank of New Zealand (1999) for the rationale for moving to this system of monetary policy implementation.

expected paths of inflation and output as a consequence of the control of interest rates by the central bank. There will be a resulting path for the money supply and that path may provide useful information on the state of the economy, but policy deliberation no longer focuses on trying to control the money supply. (For more discussion of the evolution of the use of money and credit measures in monetary policy over the past few decades, see the article by Bloor *et al.* (2008), “The use of money and credit measures in contemporary monetary policy” in this issue of the *Bulletin*.)

Under the current OCR operating arrangements, the deposits in the accounts that the banks hold with the Reserve Bank – represented as the pink boxes in Figure 3 – earn the OCR as interest.⁹ If Bank A or B does not have sufficient money in its Reserve Bank account to meet its interbank payment obligations, it can borrow either from other banks or from the Reserve Bank. If the bank in deficit borrows from other banks (for example Bank C), it will generally be at a rate close to the OCR. This is because the Reserve Bank itself undertakes to lend (against certain approved collateral) an unlimited quantity of money to registered banks overnight at a rate of 50 basis points higher than the OCR.¹⁰ The effect of the undertaking is thus that the Reserve Bank sets the price of money prevailing in the banking system, and enough money is provided to the system to ensure smooth settlement of interbank transactions to support customer payments.¹¹ Currently, this amount is around \$7 billion.

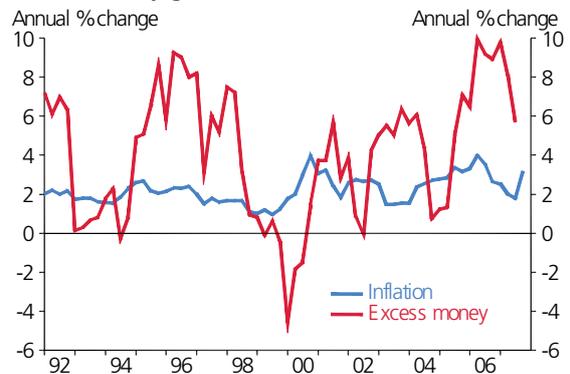
As noted above, the Reserve Bank moves the OCR to maintain price stability, raising the OCR when economic developments are tending to push inflation up, and lowering it when

inflation pressures subside or when inflation is tending to fall. Changes in the OCR modulate inflation pressure by influencing the interest rates banks charge and offer, and thus influence demand and supply in the economy. These channels are referred to as the transmission mechanism of monetary policy.¹²

For example, the Reserve Bank would tend to increase the OCR in response to an increase in inflation pressure. The rise in the OCR would tend to flow through to higher bank interest rates, which would offset the pressure by shifting preferences from consumption to saving, because the cost of borrowing has increased, and the return from savings is also higher. This translates into a lower demand for consumption and investment goods, easing the inflation pressure in the economy. When the OCR is raised, it also results in an appreciation of the New Zealand dollar because the demand for New Zealand interest-earning investments increases. As the demand for the New Zealand dollar increases, the value of the dollar appreciates. The higher dollar dampens exports and increases the demand for the relatively cheaper imports, also lowering demand and thus the inflation pressures.

As set out above, the Reserve Bank supplies money ‘on-demand’ to the banking system at the OCR. Banks may then create money and credit at a volume depending on their customers’ own demand for money and credit. In practice, the public’s demand for money fluctuates significantly, and the volatility of ‘excess’ money growth (that is, the rate of growth of the ratio of the money stock to real GDP) is considerably larger than that of inflation (see figure 5).

Figure 5
Excess money growth and inflation



Sources: Statistics NZ, RBNZ.

⁹ More information can be obtained from Nield (2006).

¹⁰ Prior to changes to the Reserve Bank’s liquidity management regime in July 2006, the Reserve Bank’s undertaking to lend was at a rate of 25 basis points higher than the OCR (rather than 50 basis points higher), but the interest rate paid on accounts banks held with the Reserve Bank was 25 basis points lower than the OCR, rather than exactly equal to the OCR as now. Nield (2006) discusses the reasons for these changes in detail. The changes had no consequence for monetary policy, but improved the functioning of the interbank payment system.

¹¹ If one bank, Bank C, tries to charge another bank, Bank B, a rate higher than that charged by the Reserve Bank, any profit earned by Bank C will be ‘arbitraged’ away by other banks offering to supply Bank B at a lower cost of borrowing than that offered by Bank C. This supply would be funded by a loan from the Reserve Bank until the profit opportunity disappears.

¹² See Drew and Sethi (2007) for a detailed explanation of this process.

5 Conclusion

In this article, we have explained the manner in which money is created by the Reserve Bank and by private sector institutions. While the Reserve Bank creates fiat money, in practice, a much larger share of money is created by registered banks and other private institutions. In the process of creating money, these private institutions also create credit, which by enabling the funding of investment, contributes to the economy's ability to grow. Payments are settled between these money-creating institutions via the interbank payment system provided by the Reserve Bank, using deposit accounts that the institutions hold with the Reserve Bank. The Reserve Bank's operations in the payment system are the means by which the Reserve Bank sets the price of money – the OCR – in its pursuit of price stability.

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Future directions for Reserve Bank financial statistics

Rochelle Barrow

“Statistics..... are to central bankers what evidence is to juries.” (The Economist, 20 April 2000)

Central banks around the world rely heavily on timely and accurate data in their decision-making processes. As such, they are both heavy users and producers of various types of statistics. This article looks at the role of the Reserve Bank of New Zealand as a producer of financial statistics, provides some detail on the production of these statistics and outlines the challenges the Bank faces in this area.

1 Introduction

As New Zealand's central bank, the Reserve Bank of New Zealand has three main functions. These functions are: (1) the management of monetary policy to maintain overall price stability; (2) the maintenance of a sound and efficient financial system; and (3) the supply of legal tender to meet the currency needs of the public. In performing these functions, the Reserve Bank relies on a wide variety of information including, importantly, statistics on the trends and latest developments in various economic, financial, and demographic indicators.

Statistics find use at the Bank in several different applications, and it is convenient to consider these in terms of their timeliness and frequency of publication, and their immediacy to the policymaking process. First, data on transactions in financial markets (such as on exchange and interest rates) is continuously monitored by Bank staff to help form a real-time gauge of market conditions, to determine market participants' interpretation of economic news and monetary policy decisions, and as a forward-looking indicator to developments that may have bearing for the stability of New Zealand's financial sector.

Second, though new data on various sectors of the New Zealand economy (such as on housing or the retail sector) is available much less frequently, it is closely assessed by Bank staff for causes and effects. This new data helps inform views on the present state of the economy, and is consequently vital both in establishing 'starting points' for the production of the Bank's forecasts and in contributing to the rationale for a decision on monetary policy.

Finally, the Bank relies on access to long time series of data collected in a robust, consistent and accurate fashion to understand the structure of the New Zealand economy and its evolution over time, and to determine the role for monetary policy as a stabilising influence. These time series are also essential input to the development and estimation of economic models used at the Bank.

Having outlined the importance of timely and accurate data to the Bank, the remainder of this article focuses on the role of the Reserve Bank as a producer of statistics and surveys a selection of the statistics produced in-house. In producing these statistics, the Reserve Bank faces a number of challenges similar to those faced by statisticians around the world. These challenges are discussed in detail below. The article concludes by noting some of the current and planned statistical developments at the Reserve Bank that help ensure that financial statistics for New Zealand remain relevant and are of good quality for use by decision makers, both inside and outside the Bank.

2 The role of the Reserve Bank as a producer of statistics

The Reserve Bank Act 1989 empowers the Bank to collect and publish relevant data from financial institutions for monetary policy or financial stability purposes. With this mandate, the Bank is the key producer of statistics on New Zealand's financial sector that inform users and assist their decision-making processes. The Bank is well placed to collect and disseminate financial statistics, as it has a need for the data itself, has access to the information through

its relationships with financial institutions, and has the expertise and credibility to interpret the statistics produced and to ensure quality.

Commensurate with its legal authority to collect statistics, and its objective of producing quality statistics, the Bank also strives to meet the responsibilities that accompany this role. The reporting burden placed on respondents is closely managed, and the data collected from individual financial institutions is protected by confidentiality provisions.

Statistics produced by the Bank are used externally by financial institutions, journalists, researchers, businesses, other central banks, and the general public. Each of these users has specific requirements that the Bank strives to understand and to meet.

3 Key statistics produced by the RBNZ¹

The Reserve Bank produces a wide variety of financial statistics that are accessible via our website. A selection of these statistics is discussed in more detail below.

Money and credit aggregates

Money and credit aggregates are derived from the aggregated balance sheets of those financial institutions in an economy whose liabilities are, in practice, 'money'.² High-level aggregate components of money and credit have been used by central banks over time for various monetary policy purposes, principally in attempting to control and forecast inflation. Central banks increasingly use the richness of data from the balance sheet surveys supporting money and credit aggregates to deliver a wider range of statistical series that

are useful not just for monetary policy implementation but also for financial stability purposes.³ The fact that money and credit statistics are usually compiled and published on a timelier and more frequent basis than many other macroeconomic statistics adds to their usefulness.

As with many statistical frameworks, a certain amount of judgement is required by statisticians when compiling money and credit statistics. Though international guidelines exist, the definitions of money and credit are largely left to the discretion of producers. Among other considerations, statisticians need to determine which instruments to include as money and whether statistics should be presented on a functional or institutional basis.

Currently in New Zealand, the formal money and credit aggregates are presented on a functional basis and include 12 institutions (nine registered banks and three non-bank financial institutions).⁴ These institutions account for approximately 90 percent of 'money'.

In 2004, the surveys used to source information for money and credit aggregates were enhanced to improve the range and quality of data collected. The new data enabled the Bank to supplement functional money and credit statistics with balance sheet and credit data on an institutional basis for registered banks and non-bank financial institutions. Last year, the Bank started to publish a finer breakdown of balance sheet components collected from non-bank financial institutions, splitting this into data from savings institutions, deposit-taking finance companies and non-deposit-taking finance companies. The Bank plans to review its money and credit aggregates in light of revised international standards, discussed further in section 5.

¹ All statistics disseminated by the Bank can be accessed via our website www.rbnz.govt.nz. An advance release calendar is published on the website that lists all of the statistical releases and their relevant release dates for the next six months. Statistics are released at 3pm each day.

² The full denominator for 'money' suggested by the IMF's Monetary and Financial Statistics Manual includes all types of bank and other financial institutions' deposits, cash management funds, and instruments like Bonus Bonds. It includes money held by residents and non-residents and is often referred to as 'broad money'.

³ For a more detailed discussion on the role and use of money and credit aggregates in contemporary central banking, see Ng (2008).

⁴ M3 institutions included in published monetary aggregates - ANZ National Bank Limited, ANZ Investment Services (New Zealand) Limited, ASB Bank Limited, Bank of New Zealand, Citibank NA, New Zealand Branch, Deutsche Bank AG, New Zealand, GE Finance and Insurance, The Hong Kong and Shanghai Banking Corporation Limited, Rabobank New Zealand Limited and Rabobank Nederland, Southland Building Society, TSB Bank Limited, Westpac Banking Corporation.

Trade-weighted exchange rate indices

A trade-weighted index (TWI) of the exchange rate is a measure of the value of the New Zealand dollar (NZD) relative to the currencies of New Zealand's major trading partners. The TWI is the Reserve Bank's preferred summary measure for capturing the medium-term effect of exchange rate changes on domestic economic activity and inflation.

From its inception in 1979 until the end of 1998, the Reserve Bank's TWI was calculated as a weighted average of New Zealand's top five trading partners' bilateral NZD exchange rates using their share of New Zealand's bilateral trade as the weights. In 1999, the Bank adopted a new weighting method to better reflect the indirect effect of exchange rate changes on the New Zealand price level, through its influence on activity. The current TWI weights the currencies partly (50 percent) on the basis of the size, measured in terms of gross domestic product (GDP), of the trading partner's economy, and partly (50 percent) on their share of bilateral trade with New Zealand. Weights are updated each year once both trade and GDP data are available.

In June 2007, two new TWI series were published for the first time. The TWI 5 and TWI 14 are analytical series that were constructed on a consistent basis (ie, by using the current TWI methodology) and backdated. The use of a consistent methodology aids economic analysis by yielding more robust estimates of the changing strength of links between the exchange rate and other macroeconomic variables over time. Similarly, the inclusion of other currencies in the TWI 14 helps paint a more complete picture of the average effective exchange rate faced by New Zealand exporters and importers in their transactions. For a fuller description of the analytical TWI series, see Kite, (2007).

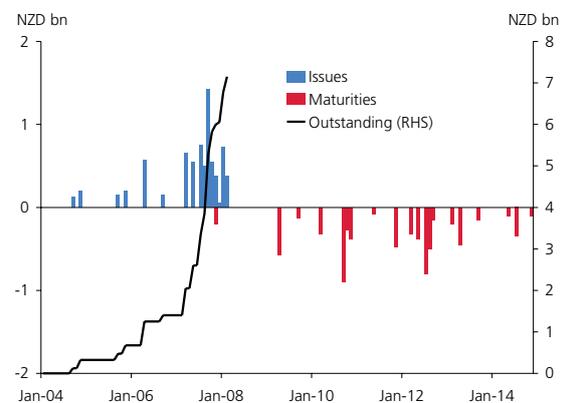
Securities statistics

The Bank publishes a wide range of securities statistics that are largely sourced from administrative systems, such as Austraclear.⁵ This data is supplemented with surveys where necessary.

⁵ Austraclear is a system operated by the Reserve Bank for clearing and settlement of high-value debt securities and equities.

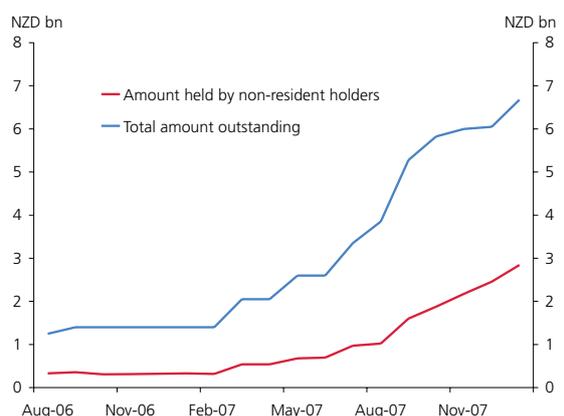
Aggregate statistics are available on the total issuance, turnover and ownership of government bonds and treasury bills. These statistics are also broken down to separately identify non-resident holdings. This year, statistics on non-resident holdings of securities were enhanced by separately identifying bonds issued in the New Zealand debt market by a non-resident issuer, known as 'Kauri Bonds'. As the graphs below illustrate, there has been a significant increase in Kauri Bond issuance over the past year.

Figure 1
Kauri Bond issuance



Source: RBNZ

Figure 2
Kauri Bonds



Source: RBNZ.

The Bank is currently contributing to international work on the development of statistical standards for securities statistics and investigating the possible development of a security-by-security database. These databases separately identify all securities on issue by issuer and issue date, and are then easily integrated with a range of survey or market information, such as the residence of bond holders, resulting in a comprehensive securities profile.

Security-by-security reporting ensures a higher degree of accuracy and consistency of data and gives users much more flexibility in using the data. A security-by-security database can significantly reduce respondents' reporting burden, as data is extracted straight from reporting systems with no classification or aggregation required. The main disadvantage of these databases lies in the considerable development costs.

Managed funds statistics

Managed funds allow investors with relatively small funds available for investment to 'pool' their resources with other investors to access investment opportunities. On behalf of these investors, a fund manager will invest in a variety of securities, the type and mix of which will depend on the fund's investment goals and the manager's mandate.

The purpose of the managed funds statistics produced by the Bank is to improve the understanding of the role of fund management in New Zealand and the savings behaviour of New Zealand households. Data is sourced from a quarterly survey of large fund managers,⁶ supplemented by an annual survey of smaller funds.

The Bank expects there to be more interest in managed funds statistics with the recent introduction of Kiwisaver and the survey is currently being enhanced to separately identify Kiwisaver funds under management (FUM). Almost all Kiwisaver funds are invested with large fund managers and from March 2008 will be included in the quarterly survey. The first Kiwisaver FUM estimates are expected to be released in the second half of this year.

Credit card statistics

The credit card statistics published by the Bank are popular with users, as they are a timely measure of consumer borrowing. Analysts use these statistics to better understand the evolving financial position of households, and as an early indicator of retail spending.

Credit card data is sourced from a monthly survey of all New Zealand credit card issuers. Statistics are published on the

spending on New Zealand-issued cards split into domestic and international spending, the spending in New Zealand on cards issued overseas, and on interest rates, outstanding balances and credit card limits.

Household financial assets and liabilities

Statistics on the financial assets and liabilities of households assist the Bank in formulating and implementing monetary policy by aiding better understanding of the workings of the financial system and the savings behaviour of New Zealand households.

The data used to compile New Zealand household financial assets and liabilities are drawn predominantly from Reserve Bank surveys and also from several other sources, forming a major part of New Zealand's aggregate financial household balance sheet. Coverage is incomplete, as significant elements of household financial net worth are not represented, such as the equity held in farms and unincorporated businesses.

The Bank plans to continue its incremental development of these statistics.

Expectations surveys

The importance of expectations in the economic and financial decisions of households and firms is now universally accepted. For monetary policy, the public's expectations of future inflation, and how they might react to policy decisions, are particularly important and need to be taken into account in the policymaking process.

The Bank has two expectations surveys, which are run on its behalf by a market research company. One is a survey of business decision makers and analysts, and collects their forward-looking expectations on a wide range of macroeconomic variables, including inflation. The second is a household survey, which collects inflation expectations from the general public.

The Bank is currently reviewing the business expectations survey and is looking to make improvements that will further enhance survey quality.

In addition to collecting the above statistics, the Bank also

⁶ Note the New Zealand Super Fund is not included.

publishes a variety of statistics produced by other statistical agencies, including key macroeconomic data from Statistics NZ and financial markets data from Reuters.

4 Challenges of producing financial statistics

In common with other central banks and statistical agencies, the Bank faces many challenges in collecting and disseminating statistics, and these are discussed in more detail below.

Ensuring relevance

One of the biggest challenges in producing statistics is in ensuring that they remain relevant to users. In the case of financial statistics, a rapidly changing financial sector that creates new products regularly can be difficult to measure. Also, the globalisation of financial markets means that traditional national boundaries and concepts like resident and non-resident are becoming more difficult to distinguish.

In order to ensure that financial statistics remain relevant, it is essential for Bank statisticians to actively monitor financial sector developments and to be proactive in meeting users' needs. For example, in coming years, the role of the Bank will expand to include the regulation of registered deposit takers. In the lead-up to taking on these new responsibilities, the Bank is working to determine its additional statistical needs. This is particularly important, as implementing new data collections and producing new statistics requires long lead times.

Ensuring quality

Traditionally, the quality of statistics was measured solely by the accuracy of those statistics; ie, by the frequency and extent of their revision after first release. However, statisticians have recently started to view quality more widely. For example, statistics that are highly accurate may yet be deemed to be of low quality if they cannot be accessed by users or if they are released too late to be useful.

In 2003, the OECD released a Quality Framework for

OECD statistics. The framework was based on findings from a variety of studies on quality conducted by statistical organisations around the world. The framework included a definition of quality that recognised that achieving quality is costly and that statistics are in fact of quality if they are fit for the purpose for which they will be used. The framework also discussed the different dimensions that can be used to measure the quality of statistics – relevance, accuracy, credibility, timeliness, accessibility, interpretability and coherence – which are discussed further in box 1.

Despite several challenges in ensuring that statistics are fit for intended use, the Bank remains committed to producing quality statistics, and works closely with respondents to improve the quality of financial statistics produced in New Zealand.

Timeliness and accuracy trade-off

As with many other endeavours, there is a natural trade-off between quality and speed in the production of statistics. Where data is sourced in a timely manner from respondents, it is often not given the scrutiny accorded to audited accounts, for example, and may contain errors. Tight processing timeframes mean that less time is available for statisticians to investigate data in detail before publication. More time to source data and to compile statistics generally enables higher accuracy to be achieved.

Decision makers usually want information as quickly as possible. If policymakers are unaware of the quality-speed trade-off, policy mistakes may be made, which can be costly for the economy. However, if there is transparency around the quality of statistics – for example, by labelling series “experimental” where quality does not reach a desired standard – policymakers are able to take this into account when making decisions. The Bank aims to be transparent, to the extent it can for confidentiality reasons, about why revisions occur.

Box 1

OECD definition and dimensions of data quality

Quality is defined as “fitness for use” in terms of user needs.

Dimensions of quality

Relevance

Relevance is a qualitative assessment of the value contributed by the statistics, characterised by the degree to which the statistics serve to address the purposes for which they are sought by users.

Accuracy

Accuracy is the degree to which the statistics correctly estimate or describe the quantities or characteristics they are designed to measure. Accuracy refers to the closeness between the values provided and the (unknown) true values.

Credibility

Credibility refers to the confidence that users place in those products, based simply on their image of the data producer; i.e., the brand image. One important aspect is trust in the objectivity of the data, which is enhanced by the independence of the producer.

Timeliness

Timeliness reflects the length of time between the availability of statistics and the event or phenomenon they

describe, but considered in the context of the time period that permits the information to be of value and still acted upon.

Accessibility

Accessibility reflects how readily the data can be located and used. It includes the suitability of the form in which the data are available, the media of dissemination, and the availability of metadata and user support services. It also includes the affordability of the data to users in relation to its value to them.

Interpretability

Interpretability reflects the ease with which users can understand and properly use the statistics. This includes, for example, the adequacy of the definitions of concepts, target populations, variables and terminology.

Coherence

Coherence reflects the degree to which statistics are logically connected and mutually consistent. It implies that the same term should not be used without explanation for different concepts.

Managing respondent burden

Statisticians are responsible for minimising the reporting burden placed on business while satisfying the statistical needs of users. In order to do so, the Bank weighs the benefits of producing or developing new statistics against the costs associated with their production. Compiling statistics is often an expensive exercise and the process may be onerous for some respondents. However, unavailability,

late provision, or insufficiently accurate statistics also impose costs, which can be difficult to quantify.

Managing the reporting burden placed on business is important to the Bank and, like many other producers of statistics, we continue to investigate administrative data sources, such as payment systems, which place no extra load on respondents to produce new statistics and to replace current data collections.

5 Future developments in financial statistics

In order to ensure that statistics remain relevant and that evolving user needs are met, the Bank devotes resources to development work. This section describes some of the statistical development work currently under way or planned for the future. The Reserve Bank welcomes any comments or suggestions on these development projects.

New mortgage approvals and drawdown series

The Bank has particular interest in the housing market and monitors developments using a variety of data produced by a range of official and private sector agencies. These data tend to measure housing transactions after the fact; for example, the number of house sales or money actually lent for house purchases can only be known after a house is sold or a mortgage is drawn down. In an attempt to get an early indicator of housing demand, the Bank approached the four main banks, representing 90 percent of housing lending in New Zealand, to collect mortgage approvals data on a weekly basis. At this stage, three of the four banks supply data to the Bank.

The data does not currently meet the Bank's usual quality standards for publication. However, the series has proved valuable by giving the Bank an early indication of developments in the housing market over the past year. Since this series has already become a useful indicator internally, we intend to start releasing weekly mortgage approvals data this year as an experimental series. Further work on developing and enhancing the series is also planned. Below is a graph of the annual percentage growth of the value of mortgage approvals for the three banks supplying data.⁷

In addition to approvals statistics, the Bank is also looking to re-release in the second half of this year previously published tables containing statistics on mortgage drawdown activity.

Figure 3

Estimated annual percentage change in value of mortgage approvals



Review of Monetary and Financial Statistics Manual

The International Monetary Fund has published new international guidelines for the presentation of monetary and financial statistics. These guidelines – set out in the *Monetary and Financial Statistics Manual (MFSM2000)* – provide a framework for identifying, classifying, and recording stocks and flows of financial assets and liabilities in an economy. The manual also identifies a set of analytically useful aggregates that can be produced. The concepts and principles set out in the *MFSM2000* are harmonised with those of the *System of National Accounts 1993 (SNA93)*, helping to promote comparability across the major sets of macroeconomic statistics within a country and across countries. This comparability enhances users' understanding of statistics and the analytical value of the statistics.

Implementation of the conceptual framework will require a long-term commitment, with priority given to the most relevant aspects. This year, the Bank will review the requirements for *MFSM2000* implementation and determine how best to proceed. While implementing the new standards could significantly increase the range and quality of financial statistics, it could also impose significant costs stemming from possible survey redevelopments and from the collection of information from a wider range of respondents.

Seasonal adjustment review

One of the objectives of analysing time series is to identify,

⁷ This series is indicative of mortgage approval activity and subject to revision.

in a timely manner, any changes in the direction and level of the series. Many time series have a recurring seasonal pattern that obscures their underlying trend. Seasonal adjustment is the process of estimating and removing these varying seasonal effects from the series in order to reveal the more important, and presumably more stable, non-seasonal features. Seasonal adjustment enables the direct comparison of consecutive and non-consecutive time periods at a higher than annual frequency (eg monthly) and makes the identification of turning points in a series easier.

It is good practice to review seasonal adjustment diagnostics at least annually to ensure that seasonal adjustment is appropriate and that the resulting series are of high quality. Poor use of seasonal adjustment can lead to multiple revisions and misinformation.

The Bank currently seasonally adjusts a limited number of credit series. The planned seasonal adjustment review has two parts: assessing the quality of published seasonally adjusted series, and producing new seasonally adjusted series.

Institutional Sector Accounts

In addition to the development work listed above, the Reserve Bank is currently working jointly with Statistics New Zealand to develop institutional sector accounts for New Zealand. Macroeconomic developments, such as growth and inflation, are driven by the actions of economic agents in the economy and institutional sector accounts enhance our ability to understand that economy by grouping agents with similar behaviour into institutional sectors (eg, households, non-financial corporations, financial corporations and government).

6 Conclusion

This article has discussed the important role the Reserve Bank has as the key producer of financial statistics in New Zealand. The Bank is well placed to perform this role, as it is a heavy user of statistics and has the expertise to assure the statistics produced for quality.

Producing statistics has its challenges, predominantly in ensuring that they remain relevant to users and are of appropriate quality for the purpose for which they will be used. In producing financial statistics, the Bank aims to satisfy the evolving needs of users both inside and outside the Bank, while minimising the burden it places on respondents. This is illustrated by the variety of development work planned over the coming years, such as the publication of a mortgage approvals series.

The article also discussed a number of statistics currently produced by the Bank. Though no longer under development, these statistics require continual investment to ensure that they remain relevant and of good quality in a rapidly changing financial sector.

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The business cycle, housing and the role of policy: summary of a recent conference held by The Treasury and the Reserve Bank of New Zealand

Robert A Buckle and Aaron Drew¹

The Treasury and the Reserve Bank of New Zealand hosted a conference during December 10-11, 2007 on the business cycle, housing and the role of policy. Research presented included investigations of recent shocks to the New Zealand business cycle, including the role of housing and the influence of fiscal policies. Research considering the monetary policy transmission mechanism and the roles that fiscal and prudential policies might play in macroeconomic stabilisation was also discussed. In this article, we summarise the themes and insights from this workshop and suggest areas for future work that will aid policy advice.

Background

Since the mild recession in 1997, New Zealand has experienced the strongest and longest economic expansion on record. This lengthy growth phase and the very high rates of employment in the economy is an excellent outcome. The growth pattern has, however, been associated with a number of economic ‘imbalances’ and strong inflationary pressure, requiring a tight monetary policy stance. Over this decade, the exchange rate has also appreciated from record lows against the US dollar to record highs.

The appreciation of the exchange rate and the associated imbalances have been a concern for many and, in particular, have led to questions over whether an alternative mix of policy and the use of additional policy instruments might result in smaller swings in the exchange rate, whilst still maintaining low and stable inflation and good growth outcomes.

The Reserve Bank of New Zealand, The Treasury and other agencies have over the past few years sought to better understand the key forces influencing this business cycle, including the roles of monetary, fiscal and other policies. In 2006, international macroeconomic policy experts

were invited to New Zealand to share their views on New Zealand’s macroeconomic situation and its macroeconomic policy framework and practice (Buckle and Drew, 2006). Although the broad macroeconomic policy frameworks were generally regarded as sound, several areas of research were suggested for follow-up, including investigating the monetary policy transmission mechanism, the influence of fiscal policies, the roles that fiscal and prudential policies might play in macroeconomic stabilisation, and investigating the influences of recent large swings in the New Zealand housing market. In December 2007, the Reserve Bank and The Treasury hosted a follow-up workshop where research in these areas was presented. In this article we summarise the themes and insights from this workshop and suggest areas for future work. Access to most of the papers from the workshop is available from the Reserve Bank’s website at www.rbnz.govt.nz.

Themes and insights

The business cycle and the roles of policies

Over the first day of the workshop, the focus was on ‘shocks’ that have shaped the recent business cycle and the role of macroeconomic and prudential policies.

The day began with a paper by Drew *et al.* (2008) that investigates the mechanism by which monetary policy is transmitted to the economy. The paper gives particular attention to how this mechanism has changed over the past decade. This has been a topic of some public debate

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in New Zealand, with some arguing that monetary policy transmission has either weakened or the lags are longer (see, for example, Grenville, 2006 and Allsopp, 2006). The key finding of Drew *et al.* (2008) is that monetary policy transmission has not obviously weakened, and in some areas has strengthened, over the past decade. This implies that the scope for the Reserve Bank of New Zealand to run an independent monetary policy remains as strong as ever. Evidence is also presented that suggests the exchange rate has become more responsive to interest rate changes over recent years. However, the impact of exchange rate changes on inflation and domestic activity has weakened somewhat.

A paper by Dungey and Fry (2008) estimates the contributions of monetary policy, fiscal policy, and other domestic and international 'shocks' to the New Zealand business cycle. Building on previous New Zealand business cycle modelling research, several interesting findings emerge from this work. First, output and inflation are found to be much more affected by demand and supply shocks, such as swings in the terms of trade, than by monetary and fiscal policies. Second, estimates suggest that fiscal policy (including both the so-called automatic stabilisers and discretionary fiscal policy shifts) tend to have significantly larger impacts on the economy than monetary policy.

The third interesting finding is that monetary policy has dampened output fluctuations and inflation over the past five years or so. Fiscal policy settings, however, are estimated to have become significantly expansionary from around early 2005, in line with Reserve Bank estimates (Reserve Bank of New Zealand, 2007a). This last finding prompted some debate at the workshop on alternative measures of fiscal policy settings and whether fiscal policy should give a larger (implicit) weight to macroeconomic stabilisation, or even have a formal explicit cyclical stabilisation role.

A paper by Barker *et al.* (2008) proposes a framework for assessing the appropriate roles of fiscal policy. The paper argues that, in terms of economic policy objectives, fiscal policy should be viewed through three lenses: fiscal sustainability (the ability to finance government policies), fiscal structure (the structure of taxation and expenditures), and fiscal stabilisation (the automatic and discretionary

fiscal stabilisation effects on the economy). These roles all contribute in different ways to growth and stability. Moreover, they are not entirely independent and there can be trade-offs between them. Hence, in weighing up whether there is a case for a more active stabilisation role for fiscal policy, consideration should be given to how that role would impact on fiscal sustainability and structure.

The paper discusses the appropriate stabilisation role of fiscal policy when monetary policy targets inflation as part of an overall macroeconomic policy regime. The authors suggest that the instruments required for effective fiscal stabilisation exist, but that those instruments should be applied within an institutional framework designed to avoid compromising the sustainability and structural roles of fiscal policy. The paper also reviews current measures of the impact of fiscal policy, and concludes that the standard fiscal impulse measures are not sufficient to assess or guide the stabilisation role of fiscal policy and that more effort is needed to go into developing robust measures of the stance and economic impact of fiscal policy. Work in this regard by Claus *et al.* (2006) illustrated the importance of identifying the impact of components of the budget when trying to understand the impact of the budget on the business cycle. The paper by Dungey and Fry (2008), which additionally takes into account the impact of public debt, is another important step in this direction.

A paper by Barker and Philip (2008) reviews the weight that fiscal frameworks in other countries place on the stabilisation role of fiscal policy and the rules and institutions that have developed to support this role. They find that it is common for fiscal frameworks to be designed to reinforce the operation of automatic fiscal stabilisers, but beyond that there is no general agreement that it should have a more active stabilisation role. The type of rules designed to enhance the role of automatic fiscal stabilisers and to additionally support fiscal sustainability included (i) balancing the operating budget on average over the economic cycle, typically backed by a public debt rule; (ii) targeting a cyclically adjusted overall budget balance; (iii) multi-year expenditure rules; (iv) stabilisation funds; and (vi) independent fiscal institutions tasked with improving macroeconomic stabilisation.

Barker and Philip (2008) also consider how some of these approaches might have been applied in New Zealand during the recent cycle and whether they would have led to significantly different outcomes. A key challenge for fiscal policy over the recent cycle has been the identification of structural and cyclical components of budget balances in 'real time'. Given this challenge and the unexpectedly high taxation revenue growth, the authors doubt that alternatives to New Zealand's current fiscal framework would have been more stabilising. For example, targeting a structural balance may have in fact resulted in even larger operating allowances in recent years (and therefore an even stronger fiscal demand impulse), while fixed expenditure rules may have led to delayed but more abrupt increases in government expenditure. This review also illustrates the importance of the point made in the paper by Barker et al. (2008) that in designing fiscal frameworks there are trade-offs between the objectives of sustainability, structure and stability. In making these trade-offs it is important that best-practice indicators of the impact of fiscal policy are available.

In a similar vein to asking whether fiscal policy could play a greater stabilisation role, a paper by Ng (2008) asks whether the regulation of bank capital could be used for cyclical-stabilisation purposes. The main conclusion is that regulation of bank capital should not be relied upon to substantially dampen the cycle, at least in upswings, as the level of regulation required to have a meaningful impact would likely lead to disintermediation of lending away from locally incorporated banks to their offshore parents. However, a case could be made for requiring banks to accumulate larger 'war chests' of capital during cyclical upswings to reduce the likelihood of financial distress and credit crunches in a downturn. Moreover, as discussed in the paper, there may be scope for other forms of prudential policy to play a greater stabilisation role, and this is a lively area of international research currently.

The business cycle and role of housing

Over the remainder of the workshop, papers focused on various New Zealand housing market issues. This focus

reflects the fact that developments in housing markets have been a key concern of policy-makers in New Zealand and other countries over the recent years. The scale of the housing boom has been the largest in New Zealand's history, whilst affordability measures have reached all-time lows. A paper by de Veirman and Dunstan (2008) re-examines the linkage between housing (and other wealth) and consumption spending. In line with previous New Zealand research, the paper finds that increases in house prices have a relatively quick and large impact on household spending in New Zealand, implying housing market developments are an important driver of the business cycle in New Zealand and an appropriate concern of monetary policy.

On the 'supply side' Grimes (2008) draws upon a range of previous research by Motu dealing with the impacts of land availability, housing supply and associated planning infrastructure on New Zealand house prices. Evidence is presented that at the local authority level, some authorities seem much better able to respond to increases in housing demand than others, and consequently, have relatively small increases in house prices compared to regions where housing supply is less responsive to changes in demand conditions.

A case study of the Auckland region suggests that housing supply responsiveness in large part reflects differences in local body regulations, such as zoning restrictions, that impact on the availability and price of residential land. As such, housing affordability may be improved if regulatory changes are made to reduce the cost of purchasing land and increase the responsiveness of housing supply. Discussion focused on the incentives that local body electives face with regard to the provision of housing supply and the 'land banking' issue, wherein developers hold back development of new housing supply. On the latter issue it was felt that authorities should be more expeditious in applying policy levers to encourage development.

On the 'demand side' Coleman and Landon-Lane (2007) examine the impact of net migration swings on housing turnover and housing prices in New Zealand. They find that swings in net migration historically and over recent years have had very large impacts on housing prices over the short-to-medium run, much larger than what is seen in the international literature. Two hypotheses are offered

to rationalise this finding. First, the bid-up in house prices might reflect an underlying third factor, such as surging income prospects and productivity growth, that tends to occur around the time of net migration increases. Second, immigrants might de-stabilise house price expectations by bidding up prices above what locals are prepared to pay. It is not possible for Coleman and Landon-Lane to distinguish between these hypotheses, but in any case, it seems clear from their work that more stable net migration flows would reduce one important source of cyclical volatility. Moreover, they find that monetary policy can affect house prices and housing demand by adjusting interest rates. To the extent that house prices are bid up unsustainably when net migration surges, this suggests policy-makers may need to be quite aggressive, even if overall CPI inflation is relatively contained, to reduce the likelihood of a housing boom-bust scenario.

Also on the demand side, Coleman (2007) uses an overlapping generations model to examine the impact of the relaxation in credit constraints and the trend declines in nominal and real interest rates that have been seen in New Zealand over the past two decades. The model focuses attention on the role of property investors in the property market, and suggests that changes in credit constraints (such as bank imposed loan-to-value ratios) mainly affect the tenure decisions of individual households, but not the aggregate level of house prices. Instead, the model suggests the secular decline in real interest rates is likely to be a more important influence on the trend rise in house prices and the decline in home ownership rates since 1990.

The final workshop paper by Hargreaves (2008) analyses the potential influence of the structure of the taxation system on the housing market, in particular its impact on the desire to hold residential property. The paper extends a simple discounted rent model to consider the impact of the present tax system on house prices and possible implications of alterations to the taxation system. The model suggests that the present tax system biases investors towards ownership of housing (and other 'real' assets) rather than debt-type instruments, and that this bias may be a significant factor behind the elevated level of house prices in New Zealand. Of the range of alternative tax treatments considered to

reduce the biases, making the inflation compensation component of nominal interest rates free from taxation is seen as the most attractive on both economic efficiency and practical implementation grounds. However, further work is seen as necessary to test the robustness of these conclusions and the wider implications for the tax system.

Priorities for macroeconomic policy research and policy

The workshop papers and discussion highlighted a number of areas for future work that warrant attention, as touched upon above. In terms of fiscal policy, there was considerable debate around the effectiveness and desirability of greater use of fiscal policy as a stabilisation instrument. However, given that judgement will always need to be made in determining the appropriate fiscal stance at any particular time, there is a limit to which rules-based approaches can be used for macroeconomic stabilisation. This underscores the importance of having best-practice indicators of the impacts of fiscal policy. Although there has been recent progress in developing alternative measures of the impact of fiscal policy, this work needs to be rapidly progressed to a point where it can be applied regularly and understood more widely, given the present pressures on fiscal policy settings.

Second, perhaps the key concern throughout the recent cycle has been the potential implications of a high and a volatile exchange rate on economic performance. The macroeconomic impact of this is mixed. In very broad terms, the tradables sector of the economy has underperformed over the past few years. However, exporters have managed the appreciation of the exchange rate better than many commentators expected, whilst there is little doubt that import-competing manufacturers have found the appreciation very difficult. To understand better the impact of the exchange rate on the economy, more work is needed on assessing impacts at the firm level, including the impacts on the propensity for firms to export, invest and improve productivity.

On the policy front, much of the basic research required to understand core influences on the housing market has been conducted. The policy challenge is to use insights from this

research to motivate changes in housing-related policies. In line with previous discussion by the Reserve Bank of New Zealand (2007a and 2007b) and Briggs (2007), policy changes on the housing supply and taxation fronts seem most likely to improve housing affordability over the longer term, and to mitigate the impact of the housing market on the New Zealand business cycle.

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Chronology

Gillian Lawrence

The Reserve Bank's annual update of the Chronology lists key economic and financial events that shaped the conduct of our business over 2007. This edition will be the last published in the *Bulletin*. We will continue to update the Chronology annually on line.

January

- 17 Statistics New Zealand figures show that the Consumer's Price Index (CPI) fell by 0.2 percent in the December 2006 quarter. This brings inflation for the year to December 2006 to 2.6 percent.
- 25 The Reserve Bank leaves the Official Cash Rate (OCR) unchanged at 7.25 percent at its interim review. The Bank notes that in the near term, the inflation outlook is relatively benign as a result of lower oil prices and a strengthening exchange rate. In the medium term, upside risks to inflation remain due to uncertainty relating to domestic demand, the housing market and fiscal policy. In the absence of clear indications of slowing demand, further policy tightening is possible.

March

- 8 The Reserve Bank raises the OCR by 25 basis points to 7.5 percent when releasing its *Monetary Policy Statement*. The Bank notes clear evidence of a pick-up in economic activity at the end of 2006 and in early 2007 with a resurgence in the housing market, an expansionary fiscal policy, net immigration, recovery in business confidence, continued expansion of mortgage credit, growth in household incomes and increasing dairy prices. While the OCR is the primary instrument of monetary policy, the Bank will work with relevant government agencies to assess alternative measures that may support the OCR.
- 29 Statistics New Zealand figures indicate a current account deficit for the year ended December 2006 of 9.0 percent of GDP.
- 30 Statistics New Zealand figures indicate an increase in GDP of 0.8 percent for the December 2006 quarter.

This brings annual growth to 1.5 percent for the year to December 2006.

April

- 1 Statutory minimum annual leave increases from three to four weeks. Minimum wage increases from \$10.25 to \$11.25 an hour.
- 18 Statistics New Zealand figures show the CPI rose 0.5 percent in the March 2007 quarter, bringing CPI inflation to 2.5 percent for the year to March 2007.
- 26 The Reserve Bank raises the OCR by 25 basis points to 7.75 percent at its interim review. The Bank notes continued expansion in domestic demand, which is fuelled by a buoyant housing market, increases in government expenditure, a rising terms of trade, ongoing net immigration, and a robust labour market. The Bank states that the exchange rate is at a level which is exceptional by historical standards and unjustified based on medium-term fundamentals.

May

- 9 The Reserve Bank releases its first *Financial Stability Report* for 2007. The report notes that while the financial system has continued to be stable, the economic imbalances that have risen from the ongoing housing boom, and the large savings deficit in the household sector funded by international borrowing, pose risks to the system. Further, the systemic risks associated with the rapid growth in the aggregate lending by banks are also highlighted.
- 17 The Minister of Finance, Dr. Michael Cullen, releases the 2007 Budget. Key features include:

- Further investment, especially in education, health, research and development, justice, and police.
- Enhancement of the KiwiSaver scheme, including tax credits for member contributions to a maximum of \$20 per week, and compulsory employer subsidy payments.
- Business tax reform, including a reduction in the company tax rate from 33 percent to 30 percent with effect from 2008-09.
- The OBERAC (Operating Balance Excluding Revaluations and Accounting Changes) excluding returns on the New Zealand Superannuation Fund is forecast to be at a surplus of around 3.1 percent of GDP over 2007, 2008 and 2009. The OBERAC in 2005/06 turned out at 5.5 percent of GDP.

29 Alan Bollard is reappointed as Reserve Bank Governor for a five-year term expiring in 2012. Finance Minister Dr. Michael Cullen and Dr. Bollard sign an unchanged Policy Target Agreement (PTA).

June

- 7 The Reserve Bank raises the OCR by 25 basis points to 8 percent when it releases its *Monetary Policy Statement*. The Reserve Bank notes continued strength in domestic demand. Though there are indications that growth may be beginning to soften, the risks to inflation are on the upside. The marked increase in dairy prices is noted as a significant development in the past six months and the exchange rate is highlighted to be at a level that is unjustified based on fundamentals.
- 11 The Reserve Bank confirms that it intervened in the foreign exchange market to sell New Zealand dollars due to the unjustifiable strength of the exchange rate based on medium-term economic fundamentals.
- 19 The Ministers of Finance and Commerce announce that the Reserve Bank of New Zealand will be the single prudential regulator for banks, non-bank deposit takers and insurers. Legislation to this effect is expected to be passed in 2008.

The Reserve Bank publishes its submission to the Commerce Select Committee on the inquiry into housing affordability in New Zealand.

- 28 Statistics New Zealand figures indicate a current account deficit of 8.5 percent of GDP for the year ended March 2007.
- 29 Statistics New Zealand figures show an increase in GDP of 1.0 percent in the March 2007 quarter, bringing annual growth to 1.7 percent for the year to March 2007.

July

- 1 KiwiSaver comes into effect.
- 2 Bridgecorp Limited and its subsidiaries are put into receivership.
- 3 The Reserve Bank releases its Statement of Intent (SOI) for 2007-2010. The Bank notes that the outcomes of the economic environment have surprised forecasters and markets. The Bank intends continued investment in upgrading forecasting and policy tools, improving the understanding of household balance sheets, and improving the quality of statistics. The Bank is also strengthening its analysis of risk in the financial sector.
- 13 The Reserve Bank announces changes to its financing and management of New Zealand's foreign currency reserves. In a move away from foreign currency assets being fully backed by foreign currency liabilities, in the future, a portion of foreign reserves will be held on an unhedged or 'open' position.
- 16 Statistics New Zealand figures show the CPI rose 1.0 percent in the June 2007 quarter. Annual CPI inflation for the year to June 2007 was 2.0 percent.
- 24 The New Zealand dollar reaches a post-float high of 0.8110 USD.
- 26 The Reserve Bank raises the OCR by 25 basis points to 8.25 percent at its interim review. The Bank states that the economy is running strongly and has sustained inflationary pressures. The Bank warns investors that the high dollar is not sustainable in the medium term.

27 The Reserve Bank releases its submission to the Finance and Expenditure Select Committee's Inquiry into the Future Monetary Policy Framework.

30 The Reserve Bank releases a separate submission made by the Bank's Board of Directors to the Finance and Expenditure Committee's Inquiry into the Future Monetary Policy Framework.

August

16 The Reserve Bank announces that it is closely following developments in the financial markets domestically and offshore, given disruptions in global credit markets. It notes that the level of cash in the domestic system is adequate and that markets continue to function satisfactorily. The Bank states that it will provide additional liquidity to the market if required.

21 Nathans Finance NZ Ltd. is put into receivership.

23 The Reserve Bank announces that it will accept New Zealand bank bills in its overnight reverse repurchase facility, to ease liquidity conditions.

The Reserve Bank also announces the introduction of the Exchange Settlement Account tiering regime, which was previously due to be introduced from 3 September 2007.

29 Property Finance Securities Ltd. is put into receivership.

30 Five Star Consumer Finance Ltd. is put into receivership.

September

4 LDC Finance Ltd. is placed in receivership.

5 Finance and Investments, a partnership that has links to LDC Finance, is placed in receivership.

12 Finance Minister Michael Cullen announces the minimum prudential requirements framework for the registration of all non-bank deposit takers, including finance companies, building societies and credit unions.

13 The Reserve Bank leaves the OCR unchanged at 8.25 percent at the release of its *Monetary Policy Statement*.

The Bank notes increased uncertainty in the outlook for economic activity and inflation due to turbulence in the global financial markets.

20 Statistics New Zealand releases Balance of Payments data for the June 2007 quarter. Reserve Bank calculations indicate a current account deficit of 8.2 percent of GDP for the year ended June 2007.

The Government announces that an emissions trading scheme is to be phased in from 2008, beginning with the forestry industry, and including all sectors over time.

28 Statistics New Zealand figures show an increase in GDP of 0.7 percent for the June 2007 quarter. Annual growth in GDP was 2.2 percent for the year to June 2007.

October

1 The Reserve Bank announces that JPMorgan Chase Bank NA has been registered as a bank in New Zealand, taking the count of registered banks in New Zealand up to 17.

4 Clegg and Co Finance Ltd. is put into receivership.

15 Statistics New Zealand figures show the CPI rose 0.5 percent in the September 2007 quarter, bringing CPI inflation for the year to September 2007 to 1.8 percent.

25 The Reserve Bank leaves the OCR unchanged at 8.25 percent at its interim review. The Bank states that while inflationary pressures persist, there are signs of a moderating housing market. Upside risks to inflation identified include the direct effects of the emissions trading scheme and rising food prices. Downside risks to key trading partners' economies from the continued turbulence in global financial markets are noted.

November

7 The Reserve Bank releases its second *Financial Stability Report* for the year. The Bank states that while the New Zealand financial system is resilient against global market

-
- volatility, New Zealand, given its large external debt, is heavily reliant on foreign capital markets, which may not be as secure or liquid as previously believed.
- 21 Crude oil prices trade at US \$99.29, the highest level in real terms since 1980.
- 29 Capital and Merchant Investment Ltd. is placed in receivership.

December

- 4 The Climate Change (Emissions Trading and Renewable Preference) Bill is introduced to Parliament.
- 6 The Reserve Bank leaves the OCR unchanged at 8.25 percent at the release of its *Monetary Policy Statement*. The Bank notes that inflationary pressures have increased due to higher than anticipated oil prices, rapidly rising food prices and the likelihood of tax cuts. It also notes that global financial markets pose significant downside risk to trading partner economies.
- 10 The Reserve Bank of New Zealand announces that four banks have been accredited to adopt the internal models approach under the Basel II banking capital adequacy regime.
- 17 Finance Minister Michael Cullen announces a new prudential regulatory framework for all insurance providers to be licensed by the Reserve Bank.
- Numeria Finance Ltd. is put into receivership.
- 20 Statistics New Zealand figures show a current account deficit of 8.3 percent of GDP in the year to September 2007.
- 21 Statistics New Zealand figures show that GDP increased 0.5 percent for the September 2007 quarter, bringing annual growth in GDP to 2.7 percent for the year to September 2007.

FOR THE RECORD

DISCUSSION PAPERS

DP2008/01

Some benefits of monetary policy transparency in New Zealand

Aaron Drew and Özer Karagedikli, January 2008

The Reserve Bank of New Zealand (RBNZ) is regarded as one of the most transparent central banks in the world. Recent research suggests that one benefit of such transparency is that financial markets better anticipate a central bank's reaction to incoming data, and in relation, do not over-react to macroeconomic data surprises. In this paper, we provide some institutional details of how the RBNZ communicates its monetary policy decisions to financial markets and conduct an events analysis to test whether there are any transparency benefits in the pricing of New Zealand's yield curve. In line with the recent empirical literature, our results suggest that short-term interest rates tend to react appropriately to the data flow, while longer-term interest rates are not unduly influenced. We also show that market reactions tend to be in line with the RBNZ's inflation target objective.

DP2008/02

Explaining movements in the NZ dollar – central bank communication and the surprise element in monetary policy?

Özer Karagedikli and Pierre L. Siklos, January 2008

We conduct a high-frequency event analysis to estimate the effects of monetary policy surprises, data surprises, and central bank verbal statements on the New Zealand-US dollar and the New Zealand-Australian dollar exchange rates. We find data surprises and monetary policy surprises have significant and large effects on exchange rate movements. More importantly, Reserve Bank of New Zealand interest rate decisions have a largely permanent impact on the exchange rate. Significantly, the impact of the published interest rate track seems to explain some 10 percent additional variation in the exchange rate.

DP2008/03

Changes in the transmission mechanism of monetary policy in New Zealand

Aaron Drew, Özer Karagedikli, Rishab Sethi and Christie Smith, February 2008

Over the last few years, monetary policy in New Zealand has focused on reducing strong demand and inflationary pressures. It has been commented that this task has been frustrated by a weakening of the monetary policy transmission mechanism in New Zealand. In this paper we draw upon a range of empirical models to assess whether monetary policy has lost its potency over the recent cycle, and to identify changes in the mechanism more broadly. Our main conclusion is that the overall impact of monetary policy has not obviously weakened, and in some respects has strengthened, over the past decade.

DP2008/04

'Automatic' cycle-stabilising capital requirements: what can be achieved?

Tim Ng, February 2008

This paper discusses the potential for lenders' capital requirements to be used as 'automatic stabilisers' of the business cycle in New Zealand. The procyclicality of lending, and its importance for cyclical developments, motivates the consideration of regulation of lending for cycle-stabilisation purposes. This application of lenders' capital requirements is distinct from, but complements, the prudential reasons for capital adequacy requirements. I set out a putative capital requirement on housing lending intended to have cycle-stabilising properties. I explore the likely degree of cycle stabilisation that could be expected from feasible calibrations of such a requirement. I conclude that the putative cycle-stabilising capital requirement might have some impact on the cycle at the margin, and that this impact is most likely on the downside of cycles. However, the highly developed and open nature of New Zealand's housing lending markets is likely to limit the degree of cycle stabilisation that can be achieved with this approach.

DP2008/05

How do housing wealth, financial wealth and consumption Interact? Evidence from New Zealand

Emmanuel De Veirman and Ashley Dunstan, February 2008

This paper characterises the relationship between wealth and consumption in New Zealand.

We find that there exists a long-run cointegration relation between household consumption, income, housing wealth and net financial wealth. Permanent shocks account for most of the variation in wealth. This implies that our cointegration estimates accurately capture the effect of most wealth changes, in contrast with the findings of Lettau and Ludvigson (2004) for the United States. Our estimates suggest that consumption has adjusted sluggishly to restore long-run equilibrium, but also that consumption booms have anticipated equilibrium-restoring increases in housing wealth. Furthermore, we estimate two alternative econometric models which are more robust to instability in the long-run relationship. All three of our models suggest that permanent changes in wealth have economically important effects on consumption. The dollar-for dollar-effect of financial wealth exceeds that of housing wealth.

these distortions imply it is often more tax efficient to accrue capital gains than interest earnings, and it is tax efficient to own your own home if it is unmortgaged or lightly mortgaged. Moreover, inflation makes the distortions more significant as real assets like houses will tend to rise in capital value over time in an inflationary environment. In the simple model used in this paper, these distortions have important effects on house prices. However, various simplistic features of the model imply it likely overstates the implications of the distortions and no particular connection is made from these distortions to the recent housing cycle. That said, shifting to a system where only real (instead of nominal) interest flows are taxable or deductible would substantially reduce the tax distortions.

A range of other possible policies are examined, but they tend to either be less effective in reducing the distortion, or appear harder to implement.

DP2008/06

The tax system and housing demand in New Zealand

David Hargreaves, February 2008

This paper uses a simple model to illustrate the influence of the tax system on New Zealand's housing market and analyses several alternative tax treatments. This analysis informed the Reserve Bank's (2007) comments on the tax system and housing in a recent submission to the New Zealand Parliament's Finance and Expenditure Committee. Reflecting present tax policy, two key tax distortions that encourage property investment are factored into our model. First, capital gains on property are often not taxed, but all interest earnings are (and interest payments are fully tax deductible for geared landlords). Second, owner occupiers do not pay rent out of their after-tax income. All else equal,

NEWS RELEASES

RBNZ accredits four NZ banks under Basel II Accord

10 December 2007

The Reserve Bank of New Zealand today announced that four banks have been accredited to adopt the internal models approach under the Basel II banking supervisory regime.

Reserve Bank Deputy Governor Grant Spencer said the banks that have been accredited to use internal models for credit and operational risk from the first quarter of 2008 are ANZ National Bank Limited, ASB Bank Limited, and Westpac New Zealand Limited. In addition, the Bank of New Zealand has been accredited to use internal models for operational risk from the first quarter of 2008. The Bank of New Zealand is expected to apply for accreditation of its credit risk models during 2008.

"A key feature of the Basel II regime is that it increases the sensitivity of capital requirements to key bank risks, particularly credit risk," Mr Spencer said.

Mr Spencer said that the banks that have been accredited are now able to calculate regulatory capital with their respective internal models. The other three locally incorporated registered banks in New Zealand did not apply for accreditation, and will operate on a 'standardised' Basel II approach for calculating regulatory capital.

Mr Spencer added that in order for the four internal models banks to retain their accreditation status they must comply with a number of accreditation requirements.

"Some of these requirements are of a transitional nature, recognising that we have some way to go to fully embed the Basel II regime. In particular, there will be a transitional requirement to maintain capital at a level no less than 90 percent of the previous 'Basel I' capital requirement.

"Other requirements relate to specific risk parameters to be used in some risk models, and improvements to be made to the banks risk models over time."

Reserve Bank welcomes new insurance responsibilities

17 December 2007

Reserve Bank Governor Alan Bollard today welcomed the Cabinet decision that the Bank will take on new responsibilities under a regulatory framework for the prudential regulation of the insurance sector.

The prudential framework will apply to all insurance providers, including life, health and general insurance.

The Bank's role as regulator and supervisor of the insurance sector will include licensing insurers and enforcing disclosure requirements, including a mandatory rating of an insurer's financial strength.

Dr Bollard said the prudential requirements will not be overly prescriptive and will place emphasis on directors' responsibilities to effectively manage the risks within their businesses. The objective of the new prudential requirements will be to encourage the maintenance of a sound and efficient insurance sector that promotes confidence among policyholders.

"The insurance sector is an important part of the financial system which underpins economic activity," Dr Bollard commented. "Policyholders need to have confidence in insurance providers that insurance claims will be honoured. While prudential supervision can never eliminate the possibility of failures within the sector, licensing of all insurance providers helps to ensure that minimum requirements are applied to the sector in a consistent manner."

The Reserve Bank will consult with stakeholders in developing the necessary regulations.

Legislation will be introduced in 2008, and is expected to be brought into force at some point in 2010.

Foreign exchange and derivatives turnover survey

19 December 2007

Earlier today the Bank for International Settlements released the final data report following its survey in April 2007 of international foreign exchange trading.

The report confirms the initial analysis in the preliminary report issued on 25 September 2007.

The report and the associated news release can be obtained from the Bank for International Settlements' website.

Reserve Bank tribute to Sir Edmund Hillary

11 January 2008

Reserve Bank Governor Alan Bollard said today the special character of Sir Edmund Hillary was demonstrated in the fact that he was the only living New Zealander to have been chosen to feature on a New Zealand banknote.

Dr Bollard was commenting on the announcement that Sir Edmund has died today.

"We will all feel the loss of a truly remarkable man whose achievements and humility have inspired New Zealanders for so long. We offer our condolences to Lady Hillary, Peter Hillary and their families."

OCR unchanged at 8.25 percent

24 January 2008

The Official Cash Rate (OCR) will remain unchanged at 8.25 percent.

Reserve Bank Governor Alan Bollard said: "The outlook for the New Zealand economy remains broadly consistent with the view outlined in the December *Monetary Policy Statement*. While the housing market continues to cool, the labour market remains tight, domestic income growth is still strong, especially from dairy, and core inflationary pressures persist.

"Since the December *Monetary Policy Statement* there has been ongoing turbulence in international financial markets and a deterioration in the outlook for the United States and European economies. We will be watching these developments closely, particularly their implications for the Asian and Australian economies and for world commodity prices.

"Despite this, the New Zealand economy is projected to keep growing reasonably well. Ongoing inflationary pressures are underpinned by an expansionary fiscal policy, and rising food

and energy prices, which will be under further pressure with the Emissions Trading Scheme in a year's time.

"On balance, the outlook for interest rates is little changed from the December *Monetary Policy Statement*, but the level of uncertainty has increased. Although CPI inflation is expected to remain above 3 percent during 2008, we believe that the current level of the OCR remains consistent with future inflation outcomes of 1 to 3 percent on average over the medium term."

Reserve Bank says major shocks pose policy challenge

25 January 2008

Economic policy has to be alert to emerging shocks to the economy, and how they might affect price stability and growth, Reserve Bank Governor, Alan Bollard, said today.

In a speech entitled 'Coping with Shocks – a New Zealand Perspective' – delivered to the Canterbury Employers' Chamber of Commerce in Christchurch, Dr Bollard said that over the past few years, New Zealand has come through significant global shocks, and there is no sign of these abating.

He said that, despite these shocks, the New Zealand economy has responded positively.

"We have enjoyed a decade of growth, the longest period of economic growth since the post-World War II era. Inflation has been low, averaging 2.2 percent since 1998.

"However, neither the current global expansion nor price stability – known internationally as the "Great Moderation" – can be taken for granted," he said. "Over recent years inflation has averaged in the top half of the Bank's target range of 1-3 percent, due to higher demand fuelled by the economic expansion, and because of supply-side cost shocks."

Dr Bollard highlighted a number of international price shocks that have posed key policy challenges: the surge in oil prices; a wider commodity price boom; the global housing market boom and its after-effects; the consumption boom in advanced economies; and efforts to offset climate change.

“Inflation pressures in New Zealand have been significantly boosted by the shock to personal consumption from the housing boom and the rundown in household savings. Soaring global dairy prices have added to these pressures by boosting farm incomes. Higher prices for oil and other imported raw materials have also contributed through higher production costs. Soon New Zealand will be hit with yet another price shock as a result of the Emissions Trading Scheme.”

Many of these challenges and associated price pressures are associated with the growing international presence of China and other emerging market economies. The financial market instability emanating from the sub-prime US mortgage market represents the most recent emerging threat to economic growth.

“The current financial market turbulence is a timely reminder of both the interconnected world we live in, and how quickly events can unfold,” Dr Bollard commented.

Since the December *Monetary Policy Statement* there has been ongoing turbulence in international financial markets and a deterioration in the outlook for the United States and European economies.

“We will be watching these developments closely, particularly their implications for the Asian and Australian economies and for world commodity prices.”

Dr Bollard said monetary policy has to be constantly tuned to handle large changes in our economic conditions such as these, so we can manage the inflationary effects arising from shocks.

“Our inflation targeting framework is robust and well-placed to deal with these challenges. We have been able to absorb recent shocks reasonably well because of the improvements in our economic institutions and policymaking frameworks, avoiding the boom-bust cycles of the 1970s.”

Dr Bollard said that all economic players – firms, households and governments – make decisions that can affect how a shock affects the economy.

“Those decisions need to be made with the best interests of growth and stability in mind,” he said.

OCR unchanged at 8.25 percent

6 March 2008

The Official Cash Rate (OCR) will remain unchanged at 8.25 percent.

Reserve Bank Governor Alan Bollard said: “The outlook for economic activity has deteriorated somewhat since we reviewed the OCR in January. The main reasons are weaker prospects for world growth, tighter credit conditions, a sharper-than-expected slowing in the housing market, and recent dry weather conditions. On balance, we now expect GDP growth of around 2 percent over the next three years.

“Despite the weaker outlook for activity, we expect headline inflation to remain high, partly due to the inclusion of the planned emissions trading scheme in our projection. Higher food and energy prices are also contributing to near-term inflation. Furthermore, over the medium term, a tight labour market, strength in commodity prices, and the impact of announced government spending plans and assumed personal tax cuts will add to inflationary pressure. Excluding the effects of the emissions trading scheme, inflation is projected to return close to the mid-point of the target band by 2010.

“There is more uncertainty than usual at present, with downside risks to activity and upside risks to inflation. The main downside risks are a further deterioration in the world economy, tighter credit conditions, and the potential for a more severe downturn in the housing market. Conversely, further strength in labour costs, additional fiscal stimulus, and high inflation expectations represent key upside risks to underlying inflation.

“Given this outlook, we expect that the OCR will need to remain at current levels for a significant time yet to ensure inflation outcomes of 1 to 3 percent on average over the medium term.”

Challenges for small open economies in uncertain times

7 March 2008

The past decade has highlighted challenges that small open economies like New Zealand face in trying to run monetary policy in a connected world, Reserve Bank Governor Alan Bollard said in remarks to be delivered at an International Symposium at the Banque de France in Paris on 7 March.

Over the past decade, the 'global savings glut', generally declining interest rates and a search for yield drove up exchange rates for many small open economies such as Australia and New Zealand, Dr Bollard said. This helped fuel a sharp increase in house prices in many countries, as well as possible collateral damage on exporters.

"Global interest rate developments have sometimes been 'out of sync', lower than domestic conditions warrant, and working against monetary policy, making it spongier, and perhaps less effective at the margin than would otherwise be the case," he said. "We have not always had an ideal mix of monetary conditions."

Dr Bollard said that conditions were changing rapidly, however, with a marked shift away from risk-taking and the pursuit of yield to heightened risk-aversion.

Though New Zealand has not seen the development of the complex financial instruments at the heart of the US's current financial problems, it is affected by the sharp changes in interest rates, credit spreads and exchange rates that have occurred recently.

"We face some quite difficult judgements in assessing how policy settings and global conditions will affect domestic economic activity and inflation in the months ahead.

"Uncertainty surrounds the future of the carry trade, the likely path of the exchange rate over the months ahead, and the nature of the projected housing slowdown. Clearly, the path of global interest rates from here on will have some bearing, given their influence on bank funding costs."

Dr Bollard said global market developments also have important ramifications for financial system stability in smaller open economies. Recent events have highlighted

some risks and vulnerabilities that institutions and regulators need to ensure are properly managed.

"Banks have used a significant amount of short-term funding to minimise costs. We want to look at whether the vulnerabilities that this can create have been adequately priced and managed – noting that some of the costs of a liquidity event are probably externalities that would ultimately be borne by other New Zealand parties.

"Our institutions need to be able to cope with sharp changes in the cost of funds in the global market place," he said.

"But as we saw in July last year, we also need to confront the possibility that global funds may not always be as readily available as we perhaps used to think. The management of funding and liquidity risk by financial institutions are two areas that are likely to receive considerable policy attention in many countries over the coming months."

PUBLICATIONS

Regular publications

Annual Report

Financial Stability Report

Monetary Policy Statement

Reserve Bank of New Zealand Statement of Intent, 2007-2010

Published in October each year.

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

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

Recent Reserve Bank Discussion Papers

2008

DP2008/01

Some benefits of monetary policy transparency in New Zealand
Aaron Drew and Özer Karagedikli, January 2008

DP2008/02

Explaining movements in the NZ dollar – central bank communication and the surprise element in Monetary Policy?
Özer Karagedikli and Pierre L Siklos, January 2008

DP2008/03

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How do housing wealth, financial wealth and consumption interact? Evidence from New Zealand
Emmanuel De Veirman and Ashley Dunstan, February 2008

DP2008/06

The tax system and housing demand in New Zealand
David Hargreaves, February 2008

A full list of Discussion Papers is available from Administration, Economics Department.

Selected other publications

Testing stabilisation policy limits in a small open economy: proceedings from a macroeconomic policy forum
Finance and expenditure select committee inquiry into the future monetary policy framework: submission by the Reserve Bank of New Zealand

Pamphlets

Explaining Currency

Explaining Monetary Policy

The Reserve Bank and New Zealand's Economic History

Central Banking in New Zealand

This is the Reserve Bank

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

Snakes and Ladders – a guide to risk for savers and investors, by Mary Holm

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. 70, No. 1, March 2007

The impact of fiscal policy on the business cycle
New Zealand's productivity performance and prospects
Emerging Asia and global inflation
Tradables and non-tradables inflation in Australia and New Zealand
Economic and financial chronology 2006
Reserve Bank workshop on 'Housing, savings, and the household balance sheet'

Vol. 70, No. 2, June 2007

The transmission mechanism of New Zealand monetary policy
A review of the trade-weighted exchange rate index
The Reserve Bank's policy on outsourcing by banks
Financial literacy and its role in promoting a sound financial system

Vol. 70, No. 3, September 2007

A profile of the NZ dollar exchange market
Price changes by firms in New Zealand – some evidence from the Quarterly Survey of Business Opinion
Payments and the concept of legal tender

Vol. 70, No. 4, December 2007

Lessons learned from the Economics Department's research work on household balance sheets and related issues
Households' attitudes to savings, investment and wealth
Microeconomic analysis of household expenditures and their relationships with house prices
Introducing the MONIAC: an early and innovative economic model