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## Volume 70 No. 2, June 2007

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ISSN 1174-7943 (print)  
ISSN 1177-8644 (online)



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## Editor's note

One of the most frequent questions for the Reserve Bank is how changes in the Official Cash Rate (OCR) affect inflation. There are, in fact, a range of ways through which the OCR influences the inflation rate, some more direct than others. In the first article of this issue, Rishab Sethi and Aaron Drew of the Economics Department provide a detailed account of how monetary policy influences the general price level, sketching out the various steps along the way. The article discusses the channels that the Bank considers to be the most important as well as those that have a more uncertain effect. I am sure the article will become a useful reference for anyone interested in understanding how monetary policy works. A follow-up article planned for later in the year will discuss how the importance of the various channels may have shifted over time.

In the second article, Hannah Kite of the Economic Department reports on a review of the trade-weighted exchange rate index (TWI) that the Reserve Bank has undertaken over the past year. This review considered whether the methodology used to calculate the TWI and the range of currencies included in the calculation remain appropriate.

As a result of this review, the Bank intends to retain the present 5 currency TWI (which includes the US dollar, Japanese Yen, euro, Australian dollar and British Pound) as its official index. The existing calculation methodology (which uses a 50:50 weighting of the GDP of the country or region and its relevant trade share with New Zealand) has also been retained. However, the Bank will begin publishing, as an analytical series, an extended 14 currency TWI, which includes the currencies of a number of Asian economies with which New Zealand's trade has increased markedly in recent years. The article notes that the 14 currency and five currency indices have not been substantially different in history, but this could change in the future given a world of increased exchange rate flexibility, especially in Asia. The new analytical series will be available on the Bank's website and updated daily.

In today's complex banking environment, banks commonly outsource many of their business activities to external providers. In our third article, Tim Ng of the Economics

Department (formerly of the Financial Stability Department) explains the Reserve Bank's policy on the outsourcing of these activities. Tim notes that the outsourcing policy requires that a large bank's board maintain legal and practical control over any outsourced functions such that the bank is able to continue to play its key role of supporting financial activity in the economy, both under normal circumstances and (particularly) under stress.

Our fourth article is by Doug Widdowson of the Financial Stability Department and Kim Hailwood from the Governor's Office. Doug and Kim discuss the importance of financial literacy among households — the ability to make informed judgements and decisions around the use of money and credit. This is an important area and a number of agencies are supporting improvements in New Zealanders' financial literacy in different ways. The article reviews the available evidence about financial literacy and identifies potential areas of concern. It then briefly outlines some of the initiatives underway to improve financial literacy and assesses what else needs to be done.

I hope readers will find these articles interesting and informative.

Bernard Hodgetts

Editor

Reserve Bank of New Zealand *Bulletin*

PO Box 2498

Wellington 6140

Telephone 64 4 471 3781

Facsimile 64 4 473 1209

Email [hodgettsb@rbnz.govt.nz](mailto:hodgettsb@rbnz.govt.nz)



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## ARTICLES

# The transmission mechanism of New Zealand monetary policy

Aaron Drew and Rishab Sethi<sup>1</sup>

In the first of two articles on the transmission mechanism of New Zealand monetary policy, we provide a detailed account of the process by which changes in the Reserve Bank's primary monetary policy instrument, the Official Cash Rate (OCR), eventually come to influence the general level of prices. As such, the article is a guide to how the Bank perceives policy decisions to propagate through the New Zealand economy, and to the relative weight it assigns to the strengths of the various channels that together comprise the transmission mechanism. A second article, to be published in a forthcoming issue of the *Bulletin*, considers how this mechanism may have changed over time and how this has influenced the implementation of monetary policy in the most recent business cycle.

## 1 Introduction

Every six weeks, the Governor of the Reserve Bank decides whether current monetary policy is set appropriately to ensure that the Bank's price stability objective is met, and if not, how policy should be adjusted.<sup>2</sup> This follows a comprehensive decision process that includes a review of a wide range of economic and financial data, economic projections and information from the Bank's business contacts.

A decision to adjust policy settings can be implemented by changing the level of the OCR directly, or by signalling to financial markets a future course for monetary policy that differs from the prevailing market view. There are several links in the 'textbook' causal chain between a change in such settings and eventual inflation outcomes, which are collectively known as the transmission mechanism of monetary policy.

A flow chart that illustrates the key features of the transmission mechanism is shown in figure 1. The diagram provides a stylised representation of how various elements of the economy are affected by an increase in the OCR over time and is intended to serve as a 'roadmap' for the discussion in this article. In the flow chart, the links that are

more important than others for the transmission of monetary policy are mapped in relatively thick arrows. This does not necessarily imply that these links represent empirically strong economic relationships as well, and so we denote 'strong' economic relationships by solid lines. Relationships that are more equivocal, for whatever reason, are shown in dotted lines. Green lines generally form part of the interest rate channel of the transmission mechanism, blue lines denote the effect of changes in the exchange rate, and red lines refer to effects related to inflation expectations. There is some natural overlap between these, especially late in the monetary cycle, and these overlapping links are in black.

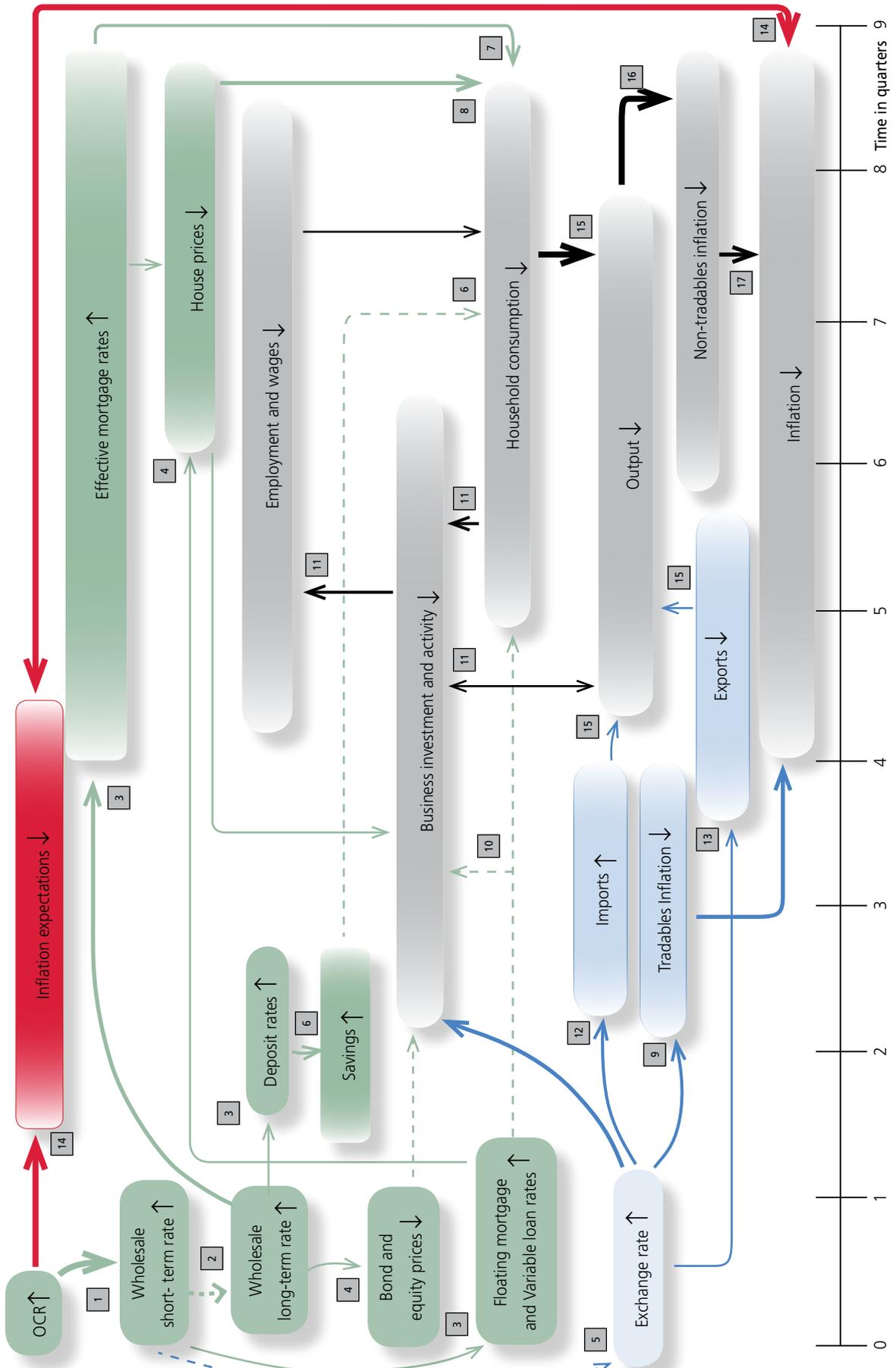
The numbers next to the links provide easy reference to points in the discussion below. The boxes with graded shading indicate the time of peak change in a given variable. Since these times are naturally subject to uncertainty, the faded colours towards the ends of the boxes indicate less likely times for these peak changes.

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<sup>1</sup> Many of our colleagues made valuable suggestions on an earlier draft of this article. In particular, we thank Andrew Coleman, David Drage, Bernard Hodgetts, Michael Reddell and Christie Smith.

<sup>2</sup> The current price stability objective of monetary policy is formally specified in the Policy Targets Agreement 2007 as: "the policy target shall be to keep future CPI inflation outcomes between 1 per cent and 3 per cent on average over the medium term." See <http://www.rbnz.govt.nz/monpol/pta/3027051.html>.

Figure 1  
The transmission mechanism of New Zealand monetary policy



Link	From	To	Reasons (in the context of an OCR increase)
<b>1</b>	Official Cash Rate	Wholesale short-term interest rates	Domestic interest rate arbitrage
<b>2</b>	Wholesale short-term interest rates	Wholesale long-term interest rates	Expectations hypothesis; expected future activity, inflation and monetary policy; foreign monetary policy
<b>3</b>	Wholesale short- and long-term interest rates	Retail borrowing, lending and deposit interest rates	Margin preservation by banks and financial intermediaries
<b>4</b>	Wholesale short- and long-term interest rates	Asset prices including bonds, equities and housing	Future interest, dividend and rental payments are more heavily discounted; higher debt-servicing costs; tighter credit criteria
<b>5</b>	Wholesale short- and long-term interest rates	Exchange rate	Interest parity conditions; foreign monetary policy
<b>6</b>	Retail borrowing and lending interest rates	Household savings and consumption	Returns to savings increase; current consumption more expensive in terms of future consumption
<b>7</b>	Retail mortgage interest rates	Household consumption	Higher mortgage payments; lower disposable incomes for discretionary spending
<b>8</b>	House prices	Household consumption and business activity	Wealth effects; less collateral available for discretionary loans
<b>9</b>	Exchange rate	Tradables inflation	Cheaper imports
<b>10</b>	Retail borrowing and lending interest rates	Business investment and activity	Higher rate of return required from investment; larger debt-servicing costs
<b>11</b>	Expected future household consumption and overall activity	Current business investment and activity	Lower expected earnings in future
<b>12</b>	Exchange rate	Imports	Substitution away from domestically produced goods in favour of imports
<b>13</b>	Exchange rate	Exports	Reduced competitiveness and consequently lower export earnings
<b>14</b>	Official Cash Rate	Inflation expectations	Monetary policy credibility
	Inflation expectations	Current inflation	Workers and firms reduce wage and price demands in expectation of lower future inflation; weaker incentives to spend now rather than later
<b>15</b>	Consumption, investment and net exports	Aggregate output	Output is the sum of consumption, investment, net exports (and government spending)
<b>16</b>	Aggregate output	Non-tradables inflation	Actual output declines relative to economy's supply potential, reducing pressure on economic resources
<b>17</b>	Tradables and non-tradables inflation	CPI inflation	CPI inflation is the sum of tradables and non-tradables inflation

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Figure 1 shows that the most immediate impact of a change in monetary policy settings is seen in the markets for short-term bank bills and bonds, and in those for highly liquid financial assets such as foreign exchange.<sup>3</sup> Prices for longer-term bonds, equities, and other asset classes such as property and housing also respond to a change in policy settings. The net effect of a change in these bond and asset prices is to prompt households and firms to re-assess their consumption, investment and other business decisions. In turn, these decisions percolate through to aggregate spending in the economy, with their presence being significantly felt at the macroeconomic level after one or two quarters, and persisting for up to three years. Finally, and again with a lag, changes in aggregate activity influence pricing pressure in the economy – prices will tend to rise as activity expands and decline as activity falls.

Some of the links noted above are relatively timely and well understood; others are subject to considerable uncertainty around both the timing and magnitude of their impact on the economy. For example, policy changes tend to have a well-defined impact on short-term interest rates, but much less direct and less certain consequences for house prices. Other complications may arise in practice. First, the impact of a change in settings will often depend on the current state of the economy. In a buoyant economy with rising inflation pressure, the Bank may need to tighten policy more aggressively than in an economy where activity and sentiment are subdued. Second, the transmission mechanism tends to change over time as the economy evolves. Finally, a crucial part of the transmission mechanism concerns how households and firms form expectations of future prices and activity. In general, the more the Bank is able to influence these expectations, the easier is the task of maintaining low and stable inflation.<sup>4</sup>

The remainder of this article considers the transmission mechanism of monetary policy in more detail. In section 2, we discuss the monopoly role of the Reserve Bank in supplying New Zealand cash and how this allows the Bank to set the OCR. We also consider how the OCR and Bank communications influence other wholesale and retail interest rates. Section 3 looks at how real activity is affected and section 4 describes the final link in the chain of causality from the OCR to the price level by considering the aggregation of individual decisions and their impact on inflationary pressure.

The discussion in this article is generally framed in terms of a tightening of monetary policy. For the most part, the effects of an easing in policy will be symmetric in direction, though not necessarily in timing or magnitude.

## 2 The OCR and its effect on financial prices

Two important features of the New Zealand financial system help ensure that the Reserve Bank can exercise influence on short-term interest rates. First, like central banks in other countries, the Reserve Bank has been granted a legal monopoly on the issuance of currency notes and coins. Second, the Reserve Bank serves as the government's bank in that all payments accruing to the central government must be settled in Reserve Bank liabilities.<sup>5</sup> The need to issue notes and coins to their own customers and the need to transact with the government combine to create incentives for commercial banks to maintain accounts with the Reserve Bank, with the account balance known as *settlement cash*.

The important implication of being the monopoly supplier of currency and settlement cash liabilities is that the Bank is able to set the price at which it will lend (and borrow) settlement cash. In New Zealand, this price is known as

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<sup>3</sup> The exchange rate can be thought of as an asset price, reflecting the foreign currency value of New Zealand dollar-denominated assets.

<sup>4</sup> This is a major argument for transparent monetary policy and hence the considerable effort the Bank expends communicating policy decisions, such as through the published *Monetary Policy Statements*.

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<sup>5</sup> This means that banks making tax payments to the government, for example, cannot settle by issuing liabilities such as commercial bills or bonds to the government. The only accepted means of payment is cash (or an equivalent claim against the Reserve Bank of New Zealand).

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the 'Official Cash Rate' (OCR).<sup>6</sup> The Bank's counterparties can obtain settlement cash overnight from the Bank at an interest rate 0.5 percent above the OCR and deposit funds with the Bank overnight at the OCR.<sup>7</sup> The OCR is thus the benchmark overnight interest rate in New Zealand because no bank would normally pay another bank a higher interest rate for overnight cash or accept a deposit rate lower than that offered by the Reserve Bank.

Longer-term rates in New Zealand can loosely be thought of as a sequence of overnight rates, which the Bank influences via the OCR (abstracting, for now, from foreign interest rates and other influences on New Zealand rates). In this sense, the OCR is also a benchmark for New Zealand's longer-term interest rates. The corollary is that the shorter the maturity of the interest rate, the tighter its link to the prevailing OCR.<sup>8</sup> In contrast, as the maturity of the interest rate lengthens, its level depends more on expectations of future OCR settings. Adjusting the OCR will influence other interest rates, but the magnitude of this effect depends on whether the move was anticipated by financial markets, and whether the Bank provides an indication for future policy that differs from the prevailing view in the markets.

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<sup>6</sup> The OCR was introduced in New Zealand in March 1999. Prior to this, since the mid-1980s monetary policy had been implemented by controlling the quantity, rather than the price, of settlement cash. However, the main aim of the Bank was always to influence financial market prices. Adjusting the settlement cash target enabled the Bank to influence short-term interest rates, but this influence was much less precise than under the present OCR regime. Brookes and Hampton (2000) discuss the introduction and operation of the OCR and Nield (2006) describes recent changes to the system and the Bank's liquidity management regime.

<sup>7</sup> Commercial banks can obtain settlement cash from the Reserve Bank subject to the collateral requirements on such borrowing, as detailed in Nield (2006).

<sup>8</sup> For example, take the 30-day bank bill rate and assume that the next OCR review date is at least 30 days away. In this case, the 30-day rate will be very close to the OCR, since the overnight rate is not expected to be changed for a month. If 30-day rates did in fact differ from the OCR, there would be an opportunity for traders to arbitrage this difference away, subject to possible credit, liquidity and term risk premia, by borrowing from the Reserve Bank and lending at the 30-day rate.

For simplicity, we have focused on the overnight inter-bank market in this article in explaining the link between the OCR and short-term interest rates. It should be noted that there are relatively few participants in this market when compared to the number participating in forward interest rate markets, especially in those for Overnight Indexed Swaps (OIS), which are the instruments that banks use for much of their short-term funding. See Choy (2003) for more detail on OISs and also footnote 12.

In New Zealand, the monetary policy instrument is the OCR, rather than some measure of the quantity of money. This reflects the view that, in modern economies, it is difficult and most likely undesirable to try and influence demand and inflation by using a monetary target (box 1 expands on this issue).

## Wholesale interest rates

**1** To illustrate the impact of monetary policy on short-term interest rates, we assume that the Bank increases the OCR in a one-off move that surprises the market, and that the market does not anticipate further policy changes over the next 90 days. In this case, we would expect the change in the OCR to be immediately and almost fully transmitted to other short-term wholesale interest rates with a maturity of up to 90 days.<sup>9</sup>

**2** The extent to which an increase in the OCR feeds through to longer-term wholesale rates is much less certain. Longer-term rates are determined by an average of current and expected future short-term domestic rates and by benchmark foreign interest rates, the influence of which tends to increase with the maturity of the domestic rate. In addition, other factors such as country risk premia tend to be more important at longer horizons. Assuming no change in foreign interest rates and other factors, if the increase in the OCR is perceived as just the first step in curtailing rising demand and inflation pressure, longer-term rates of up to around two years in maturity may increase by as much or more than the increase in the OCR, with a diminishing impact on rates with longer maturities. In contrast, and perhaps more consistent with a surprise increase in the OCR, longer-term rates may remain unchanged or even decline on the expectation that monetary policy will need to be looser in the future – either because markets view the OCR increase as unnecessary and/or because inflation is expected to decline in the future, resulting in an eventual decrease in the OCR.

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<sup>9</sup> Wholesale interest rates are defined as those on bank bills, government bonds and other instruments that are normally traded on by banks and financial institutions. These are in contrast to retail interest rates, which generally apply to products that are marketed by these banks and financial institutions to individual investors and firms.

## Box 1

### The role of the money supply in the transmission mechanism

The discussion in this article largely ignores the role of the supply of money. The Reserve Bank is not alone in placing relatively little importance on monitoring various measures of money *vis-a-vis* other economic indicators; financial markets observers and participants also do not actively assess the consequences of changes in the money supply. This may seem at odds with Milton Friedman's maxim that "Inflation is always and everywhere a monetary phenomenon", and with the fact that standard expositions of monetary policy are frequently framed in terms of money supply management. Indeed, one popular textbook defines monetary policy as "the control of the money supply".<sup>10</sup>

So, how exactly does money matter for the New Zealand economy? In one sense, money is auxiliary to the economy – that is, in the absence of economic surprises, output, inflation, interest and exchange rates and other macroeconomic variables will settle at some stable value, and the money supply will adjust to whatever level is necessary to ensure this outcome. For example, for a given set of interest rates, households require a certain quantity of physical cash to finance retail spending, and this is supplied without limitation by the Reserve Bank, directly changing the level of the narrowest measure of money –

that of the sum of the notes and coins in circulation. For this same set of interest rates, the household and firm decisions described below and the financial intermediation and credit creation by banks will result in new levels for other, broader, measures of money. Thus, the Reserve Bank decides only on the price of money – the OCR – with quantities being created either directly by the Bank or by the banking system as necessary to satisfy demand for money.

Though the quantity of money is not a policy target in itself, it could potentially have a role to play in the policy process as an indicator of future activity. This is because a policy tightening that aims to curb activity should, over time, also result in a reduction in the demand for money and thus in the observed growth rate of various monetary aggregates. Continued strong growth in the monetary aggregates may indicate that monetary policy settings are inconsistent with the desired outcome for output and, consequently, inflation. In practice the links between money growth, output and inflation are often quite weak and unstable from one business cycle to the next. As a result, monetary aggregates have generally not proven to be particularly useful indicators for monetary policy.<sup>11</sup> Despite the unstable link between money growth and inflation, the Bank does look to various measures of sectoral credit for corroborative evidence on trends in that sector. Credit approvals by banks for housing are one such example.

### Retail interest rates

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Changes in wholesale rates affect the interest rates that banks and other financial institutions charge and offer their customers for loans and deposits. Overall, these retail rates should increase fairly quickly by an amount similar to the change in wholesale rates, although the speed and extent of this link will depend on the financial product

in question and competitive pressures.<sup>12</sup>

The retail interest rates that matter most for monetary policy may change over time as financial preferences and structures evolve. In the current business cycle for example, two to five year fixed mortgage interest rates, have proven to be

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in implementing monetary policy. For introductory motivation to this strategy, see ECB (2000).

<sup>12</sup> In practice, the link between wholesale and retail rates is more complex. Banks generally raise wholesale funding at maturities of up to 90 days, paying variable interest. This funding strategy poses little problem for banks in terms of managing floating-rate mortgages. However, there is a re-pricing risk associated with the mismatch between the banks' wholesale funding maturities and the maturities of most fixed-rate mortgages. Banks hedge against this risk by 'swapping' the variable interest payments due on their liabilities for fixed receipts from other participants in financial markets. Consequently, the funding costs for fixed mortgage rates are more closely related to these 'swap' rates than to the banks' wholesale funding rates.

<sup>10</sup> See Mankiw (1997).

<sup>11</sup> Financial innovation is an important determinant of the changing patterns of credit creation by banks. Derivatives and swaps allow banks to better manage their asset and liability portfolios and are likely to result in increased credit creation for a given increase in base money by the Bank. In this way, financial innovation may contribute to the instability of the link between money growth and output noted above. See also Boaden (1994). The European Central Bank (ECB) is one of the few developed-economy central banks to place formal emphasis on monitoring the growth rate of money

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the “preferred habitat” of the majority of mortgage lending in New Zealand, and hence have been the rates over which the Bank has desired the greatest leverage.<sup>13</sup> In years gone by, floating rate mortgages were a rather more dominant form of household borrowing.

### Bonds, equities and real estate

**4** To the extent an increase in the OCR affects longer-term interest rates, we also expect to see an impact on the market prices of other assets, such as bonds, equities and real estate. As long-term interest rates rise, bond prices unambiguously fall since the discounted stream of future interest receipts on the bond declines. Future dividend and property rental income streams are also discounted more heavily, reducing the relative attractiveness of equities and real estate in the household asset portfolio.<sup>14</sup> With respect to real estate (or other assets commonly funded by borrowing), a further transmission channel operates: as interest rates rise, some households may find that the servicing costs on their desired loan exceed commercial bank imposed limits. This, in turn, will tend to curtail demand at the margin.<sup>15</sup>

However, other factors may dominate the impact of the monetary-policy induced increase in longer-term rates on asset prices. For example, equity and house prices may continue to climb on the basis of genuine ‘fundamental’ factors (such as rising incomes, immigration and productivity growth rates) or because markets are in ‘bubble’ mode wherein the rational response to increasing rates is ignored by market participants. It is important to note that in this ‘bubble’ mode, asset prices would likely have risen faster if the OCR had not increased, potentially exacerbating the costs of the inevitable correction. Markets may also

interpret a surprise increase in the OCR as being indicative of increased strength in current or expected economic activity, placing further upward pressure on asset prices. Despite these complications, research suggests that, on average, monetary policy has a correctly signed and significant impact on both house and equity prices.<sup>16</sup>

### The exchange rate

**5** In a relatively open economy such as New Zealand’s, the impact of interest rates on the exchange rate is an important part of the transmission mechanism. The exchange rate is the price of New Zealand dollars relative to other currencies and, in the short term, depends on both domestic and offshore monetary policy conditions amongst other factors. All else equal, a surprise increase in the OCR will immediately appreciate the NZD, as higher domestic rates attract foreign capital. In theory, the price of the NZD should be bid-up to a level such that the expected depreciation from that point is just sufficient to leave an investor indifferent between holding New Zealand dollars or some other currency.<sup>17</sup> Empirical support for this relationship is hard to come by, reflecting the fact that the response of the exchange rate to monetary policy actions is likely to be heavily influenced by expectations of future monetary policy.<sup>18</sup> Another empirical anomaly is that both the initial appreciation and subsequent depreciation have tended to be larger than suggested by theory. In broad terms, however, the NZD cycle has tended to follow the monetary policy cycle – appreciating when the Bank is tightening policy or has a tightening bias, and depreciating when the Bank is easing.

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<sup>13</sup> This preference could stem from the fact that banks’ lending margins have tended to be lowest at these maturities as they compete for market share, or that in recent times, world longer-term rates have been at fairly low levels, possibly resulting in relatively cheap borrowing at these maturities. An alternative explanation has it that the market’s expectations of future monetary policy, which have not always aligned with those of the Reserve Bank, have simply pushed down longer-term interest rates.

<sup>14</sup> In 2001, New Zealanders held 85 percent of their household asset portfolios in real estate. See Scobie, Le and Gibson (2007).

<sup>15</sup> In this regard, the households’ self-imposed budget constraints and debt appetites are also likely to be important.

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<sup>16</sup> See Buckle *et al* (2000) for a quantification of the impact of monetary policy on domestic equity prices and Coleman and Landon-Lane (forthcoming) on the impact of interest rates on house prices.

<sup>17</sup> This relationship between interest rates and the exchange rate is known as uncovered interest parity (UIP).

<sup>18</sup> This is not to suggest that monetary policy is the only, or indeed even the unambiguously dominant, explanatory variable for exchange rate movements. A vast literature is devoted to examining both structural explanatory variables such as productivity differentials and trade policies and more cyclical ones such as commodity prices and the terms of trade. Munro (2004) provides a summary of the major drivers of the dynamics of the NZD.

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### 3 Financial prices and their effect on activity, demand and import prices

The next set of causal links in the monetary transmission mechanism is from the newly determined interest and exchange rates and other asset prices to the aggregate level of economic activity. These links are complex in that there are various second-order effects that can either strengthen or offset the direct effect of interest rates on activity. For example, interest rate changes that require a household to make larger mortgage payments over previous levels will, for a given level of income, typically result in a reduction in its discretionary spend on other goods and services. An increase in saving is also expected, given that the return to saving increases with higher interest rates. However, should individuals expect the new monetary stance to reverse in the near future, the consumption-saving tradeoff is likely to be considerably muted.<sup>19</sup> Also, if households expect significant future inflation and doubt the central bank's commitment to low inflation, then current consumption may actually increase.

**6** Despite these complications, a change in interest rates corresponds to a change in the incentives for consumption, savings and investment over time and should therefore have an impact on household and firm decisions. A money interest rate is no more than the price of a current dollar in terms of a future dollar and an increase in this price increases the number of future dollars that are required to compensate for the use of a current dollar. Consumption and investment are dollar-denominated and so a rise in the interest rate should make both current consumption and investment more expensive relative to their future cost. Therefore, all else equal, rising interest rates induce households and firms to postpone current expenditures.

It is important to note that the discussion thus far has been framed in terms of the nominal interest rate; that is, the price of funds has not been adjusted to account for the fact that dollars lose purchasing power over time as a result of inflation. In principle, households and firms have no reason to value dollars in themselves; they are valued because they

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<sup>19</sup> Of course, this depends on the degree to which households are constrained in terms of cash flows.

may be used to purchase goods and services that satisfy wants. A real interest rate discounts a nominal rate for the effects of inflation and it is this interest rate that is the true reward for foregone consumption.<sup>20</sup> This suggests that it is only when the real interest rate increases that current consumption is restrained and current saving encouraged. However, for 'liquidity-constrained' households with significant debt obligations and little discretionary income, increases in nominal interest rates will still tend to depress consumption in the short run, irrespective of the impact on real rates.

In the remainder of this section, we assume that inflation expectations are sufficiently well anchored such that an increase in nominal interest rates unambiguously increases the real interest rate too. We begin by evaluating the impact of interest and exchange rates on household decisions, and then consider decisions made by businesses.

#### Household consumption and savings

**7** As noted above, banks and other lending institutions ordinarily pass on increases in interest rates to those households with variable- or floating-rate mortgage contracts. This and any new borrowings at longer-term rates will tend to increase debt-servicing costs at the margin. In principle, households that already hold fixed or capped interest rate mortgage contracts with lending banks are insulated against interest rate increases until the contracts are renewed. However, given that households with fixed mortgages can expect lower future disposable income, the effects on consumption and saving detailed below will begin to apply soon after headline retail rates increase, though the peak effects are likely to be delayed until the higher repayments actually materialise. In summary, each household that carries a mortgage will face higher loan repayments at some point, increasing effective mortgage interest rates and eventually lowering disposable income for spending on other goods and services.

Survey data show that about a third of New Zealand households hold mortgages and that three-fifths of such

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<sup>20</sup> Taxes on nominal interest income provide an additional complication in the tradeoff between current and future consumption.

households owe less than half of their home's value to lenders.<sup>21</sup> In itself, this may suggest that the bulk of New Zealand households – those that rent, are mortgage-free, or have significant equity stakes in their homes – are largely immune to the consumption-suppressing effect of tighter monetary policy. However, this overlooks several important qualifications. First, banks can be expected to offer higher interest rates on savings accounts and term deposits, increasing the incentive to save.<sup>22</sup> Second, the New Zealand tax system confers advantages to a high gearing of investment property, and so many of the eight percent of households that do own investment property are likely to be especially sensitive to mortgage rate increases. Some landlords will look to pass on mortgage rate increases to tenants, others may look to sell down their residential property investments. Third, many households, including those without mortgages, use other forms of borrowing such as personal loans, credit cards, overdrafts or hire purchase contracts. The interest rates on these other forms of credit may also increase over time, if not for existing loans then for those borrowing at the margin.

**8** Even so, it is the wealth effects associated with house price changes that are presumed to play a major role in the interest rate channel of the transmission mechanism. The net effect of a fall in (real) house prices is that households are likely to feel less well-off than previously, and to consequently reduce expenditure on consumption, especially of durable items. The empirical evidence in New Zealand suggests that the wealth effects for housing in New Zealand are indeed large relative to other OECD countries, while those from changes in financial asset prices are relatively small.<sup>23</sup> In addition, housing is often used as collateral for other loans, including business loans in New Zealand, and falling house prices reduce the availability and attractiveness of such loans.<sup>24</sup>

Finally, it should be noted that households with asset portfolios that are concentrated in interest-bearing deposits will see their incomes rise with higher interest rates and some may choose to increase consumption at such times. However, this effect is not considered important in the New Zealand experience and, on balance, the available evidence suggests that aggregate consumption does tend to decline as interest rates increase.<sup>25</sup>

**9** When the exchange rate appreciates in response to an increase in interest rates, households tend to increase their consumption of imported goods and services.<sup>26</sup> This increase is due to the fact that a given amount of NZD can now purchase more foreign-produced items (an 'income effect') and, as discussed further below, there is also a switch away from the products of domestic, import-competing firms (a 'substitution effect'), whose prices generally become less competitive relative to imports.

An exchange rate appreciation may also affect households via its impact on assets held overseas. As the exchange rate appreciates, the New Zealand dollar value of these assets and the income streams derived from them will tend to decrease. The fall in asset values is likely to have wealth effects and negatively influence consumption as above. Though data limitations prevent quantification, the overall impact of these wealth and income effects on consumption is likely to be much less important than the other channels above (in part, because households that have substantial offshore assets are presumably fairly well-off and hence relatively less sensitive to short-term fluctuations in these asset prices).

<sup>21</sup> See Scobie, Le and Gibson (2007).

<sup>22</sup> Following a monetary tightening, non-bank financial institutions also increase yields offered on riskier debentures and sub-investment grade bonds.

<sup>23</sup> See Hull (2001) and De Veriman and Dunstan (2007) forthcoming.

<sup>24</sup> See Meltzer (1995) and Bernanke and Gertler (1995) for more on the role that banks and financial intermediaries play in the transmission process and also for an assessment of the impact of financial innovation.

<sup>25</sup> Estimates suggest only eight percent of the New Zealand household asset portfolio is held in deposit accounts, Scobie, Le and Gibson (2007). For a range of recent empirical evidence of the impact of monetary policy on output, see Smith and Haug (2007), Liu (2006), Matheson (2006), Lubik (2005), Santacreu (2005), and Buckle *et al* (2003).

<sup>26</sup> For households, the largest 'imported services' are visits overseas.

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## The impact of interest rates on firms

**10** An increase in interest rates is likely to reduce firms' investment in new capital because higher interest rates mean that anticipated revenues from new investment are discounted more heavily, raising the threshold for investment. Rising interest rates also make debt finance more expensive. Firms that can issue corporate bonds will normally have to offer higher yields, and others that borrow on the money market or from banks pay higher servicing costs. Importantly, the small own-and-operate nature of many New Zealand businesses means that firms often borrow from banks using housing as collateral, and may face stricter credit criteria in the face of falling asset values.

Some medium-sized New Zealand firms are either wholly-owned subsidiaries of larger foreign conglomerates or have significant direct foreign ownership. These firms may find it easier to bypass tighter credit conditions at home by directly sourcing funds from parent companies or by using the essentially inherited credit ratings of parent companies to raise cheaper finance in international money markets. Further, just as with households, there may be some firms that actually benefit from interest rate increases such as those with substantial cash reserves. With higher interest income from these assets, the firms may increase investment or pay higher dividends to shareholders.

**11** On balance however, as with consumption, investment is believed to decline in the medium term as interest rates rise. To summarise, firms find it more difficult to raise funds to finance investment and require a higher rate of return from this investment, both making it less likely that this investment will be initiated.<sup>27</sup> Beyond the impact of rates on the level of new business investment, if the decline in broader economic activity is expected to be sustained, over time firms will look to cut back overall activity – scaling back operations, reducing staffing levels or hours worked, and possibly closing plant altogether.

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<sup>27</sup> An alternative explanation of the same effect is offered by the theory of Tobin's  $q$  – the ratio of a firm's market value to its replacement cost of capital. To summarise, when  $q$  is high, the price of equity in a firm is high relative to the outlay it must make on new capital. As such, raising equity finance for investment expenditure is a cheap and worthwhile exercise. See Mishkin (1995).

## The impact of the exchange rate on firms

At the macroeconomic level, an exchange rate appreciation tends to reduce inflation through both direct and indirect channels. The direct, and relatively quick, channel results in a lower NZD price for foreign-produced goods and services, lowering the tradables measure of inflation. These lower prices are normally passed on through the supply chain, lowering prices of both intermediate goods and final goods in the Consumer's Price Index basket. However, the pass-through of changes in import prices through to final goods prices is relatively low in New Zealand. One possible explanation for this may be that suppliers of imports are pricing to market; that is, the New Zealand dollar price of some imported goods may be independent of the international price, with foreign suppliers and/or the local importer absorbing gains and losses from movements in the exchange rate.<sup>28</sup>

The indirect, and relatively slow, effect on exporting and import-competing firms is to make them less competitive, reducing earnings, and dampening overall activity and inflation pressures. The persistence of any exchange rate movements determines the potency of *both* of these channels. Short-term fluctuations in the exchange rate are unlikely to have a large impact on earnings streams as many New Zealand firms can manage this risk through hedging arrangements.<sup>29</sup> Moreover, as an appreciation of the exchange rate reduces the NZD price of elaborately transformed capital goods (of which there is little domestic production), business investment may rise. This is provided firms are confident that any monetary policy-induced slow-down in the economy will prove short-lived. However, over a complete business cycle, the swings in the exchange rate are difficult to fully hedge against and the aggregate forces above generally apply. We now describe how these forces affect individual firms, assuming that they are not able to fully hedge against exchange rate movements.

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<sup>28</sup> Another factor that is commonly proposed is that the low pass-through environment is a reflection of the credibility of monetary policy (see Herzberg *et al.* 2003). Historically, changes in the degree of import price pass-through have been an important factor in explaining changes in the monetary policy transmission mechanism, and this will be discussed in a follow-up *Bulletin* article.

<sup>29</sup> See Briggs (2004) for a discussion of the currency hedging strategies of New Zealand firms. In addition to currency hedges, some firms will have so-called 'natural hedging' arrangements in place.

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### Importers

**12** The import sector of the New Zealand economy can be usefully summarised as consisting of a large number of small firms that (i) import finished goods and services, (ii) manufacture goods with a large share of imported raw materials, (iii) provide domestically produced goods and services that compete directly with those provided by importing firms and (iv) a number of other firms that are subsidiaries of their multi-national parents. In general, the size and nature of the firms in the first three classes implies a lack of significant market power and they are generally believed to either pass on large fractions of gains from cheaper imports or – for firms in the import-competing category – to drive down prices in response to cheaper imports, the net effect being to shift demand from domestically-produced goods to imports.<sup>30</sup>

### Exporters

**13** The export sector in New Zealand is diverse with (i) a relatively large number of medium-sized firms that export primary and manufactured goods, (ii) important onshore industries such as education and tourism, and (iii) one large dairy co-operative in Fonterra. The degree of pricing power that these exporting firms enjoy in international markets varies significantly, and consequently so does their degree of insulation from exchange rate fluctuations. For example, firms that exploit market niches can afford to be relatively inflexible in pricing, while others that supply smaller quantities of undifferentiated products in global commodity markets are unlikely to enjoy this luxury.

For the firms that cannot dictate international prices, a rising exchange rate tends to reduce the competitiveness of New Zealand produced goods and services as they become more expensive in foreign currency terms. Assuming no change in world prices for commodities or manufactured exports, the net effect of this loss of competitiveness is a reduction in revenues for exporting firms. In response to this, firms are likely to curtail employment hours paid, reduce new employment opportunities, resist wage and other input cost

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<sup>30</sup> As noted above, an important plausible alternative is that importing firms simply absorb exchange rate effects into their margins.

increases, pay smaller dividends to shareholders, and may even choose to move production facilities overseas. Each of these effects places downward pressure on various income streams flowing to households, reducing overall discretionary consumption.<sup>31</sup>

### The role of expectations

As noted previously, inflation expectations can have a major bearing on the ease or difficulty with which the Reserve Bank achieves its inflation objectives. We have already discussed the importance of expectations in relation to the link between nominal and real interest rates. However, their significance deserves deeper analysis with respect to the household and firm decisions described above.

Survey measures of consumer and business confidence are keenly scrutinised by the Bank as indicators of future inflationary pressure and of the likely impact of monetary policy. A monetary policy tightening can be relatively ineffective at times when the general economic mood is buoyant: if firms are confident of good demand even at times of high interest rates, they may be prepared to increase investment despite the higher costs of debt servicing. Conversely, as uncertainty about the future increases, agents are likely to be more conservative in their decision-making.

**14** Monetary policy is *credible* if households and businesses are convinced of a central bank's commitment to its stated goals, and of the bank's ability to engineer outcomes that realise these goals. A monetary policy tightening can be interpreted as a central bank's response to undesirable expected future strength in activity and inflation. If the tightening is credible, households adjust down their own expectations and reduce *current* consumption and investment because future economic conditions are now anticipated to be less conducive to new

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<sup>31</sup> Although an exchange rate appreciation will curtail export activity on balance, there is an offsetting influence that can be important at times: even if the trade-weighted exchange rate appreciates, the vagaries of bilateral exchange rate movements can actually render some exporting firms more competitive, at least over the short term. In particular, manufacturing exporters who source inputs denominated in US dollars and export to Australia will tend to gain against their Australian competitors if the New Zealand dollar appreciates against the US dollar, but depreciates against the Australian dollar.

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employment opportunities and wage growth. Of course, since current activity directly influences future activity, the reduction in current output so achieved makes it less likely that further policy tightening will be required.

Heightened inflation expectations are especially pernicious when they are not linked to any well-defined views on future activity. Such expectations are commonly considered self-fulfilling, as manifest in the classic wage-price spiral: households expect prices to rise and so bargain for higher wage increases; these higher wages are quickly spent in anticipation of the rising prices, thereby *actually* increasing prices as demand grows rapidly and well ahead of supply capacity. Consequently, anchoring inflation expectations to activity and more helpfully to a nominal inflation target can lead to desirable economic outcomes with less policy action than would otherwise be required.<sup>32</sup>

## 4 From activity and aggregate demand to a change in inflation

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Total output in the economy is the sum of consumption, investment and government expenditure, plus net exports.<sup>33</sup> We have discussed above how tightened monetary policy reduces these expenditures and now turn to the next step in the causal chain – the link between aggregate activity and low and stable inflation.

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<sup>32</sup> On the other hand, if future inflation is expected to exceed the Bank's target, households are likely to compensate for the expected loss of purchasing power of their incomes by bargaining for larger wage increases in the current period. In the canonical policy view, firms respond to these higher operating costs by raising prices and the higher expected inflation is realised.

<sup>33</sup> The goals and nature of fiscal policy imply that monetary policy has little influence on government spending. Consequently, though this spending accounts for about a fifth of GDP – a third, if government transfers are included – we have paid it little attention.

The dominant theory, both in New Zealand and overseas, for thinking about the link between aggregate activity and inflation is an economic relationship known as the expectations-augmented Phillips curve.<sup>34</sup> The essential features of this relationship in New Zealand are:

1. When aggregate output expands above the economy's 'supply capacity' (also known as potential output) a positive 'output gap' opens up and non-tradables inflation rises.
2. A rise in inflation also causes expectations of future inflation to increase.
3. To prevent ever-increasing inflation and inflation expectations, a more than one-for-one monetary policy response is required to return output to potential levels and to re-anchor inflation expectations at the target rate.

### The output gap and resource pressures

The Phillips curve is couched at the macroeconomic level, but underlying the notion of a positive or negative output gap and inflationary pressures are individual firms operating, on balance, at or away from their normal capacity levels. As we have seen, in response to an interest rate increase and declining demand, firms may limit new job opportunities and perhaps reduce hours worked by existing employees, putting downward pressure on wages.<sup>35</sup> In practice, wages are 'sticky' in that they are not often reduced in nominal terms. Rather, the wage contribution to lower inflation derives from slower increases in wages than previously or from a decline in real wages that reduces purchasing power and, consequently, aggregate demand.

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<sup>34</sup> A recent *Bulletin* article by Hargreaves *et al* (2006) discusses the evolution in thinking about the Phillips curve and how it is used to model and forecast inflation in New Zealand. See Drew (2007) for a recent discussion on New Zealand's potential output and supply capacities.

<sup>35</sup> If, as is common, there are costs associated with hiring new employees, firms are unlikely to actually issue redundancies unless the economic downturn is expected to be protracted. Instead, they are more likely to 'hoard labour'. However, should the downturn be longer and deeper than desired, many firms will be forced into cutting the demand for labour and the economy may undergo a 'hard landing'.

A monetary policy easing on the other hand may result in rather more nominal wage adjustment than is the case when policy tightens. A decrease in the OCR eventually results in expanded activity through much the same mechanism described above. To meet additional demand, many firms look to hire additional staff, or to perhaps increase the hours worked by existing employees. In an environment of strong employment growth and job security, these extra demands on labour tend to increase unit labour costs, because labour is able to achieve relatively favourable employment terms and conditions. Unit labour costs might rise, in addition, because some firms will hire workers that have less skills or experience, and hence lower productivity levels. Overall, the extra demand for labour and improved employment prospects will tend to be associated with upward pressure on wages and prices – economic booms that expand the level of output significantly above its potential level are usually followed by a pick-up in domestic or non-tradables inflation.

Irrespective of a monetary tightening or easing, the change in aggregate output typically results in changes in the non-tradables inflation rate about one or two quarters later. In practice, the lags depend on the exact source of demand pressures, the existing level of capacity in the economy, and a host of other factors that together determine the basic flexibility of an economy to adjust to economic disturbances.<sup>36</sup> In summary, about a year after a surprise increase in the OCR, the economy experiences a decline in tradables inflation, with peak effect in non-tradables and overall inflation arriving somewhat later.

A final element of uncertainty that policy makers must grapple with is the size of the output gap itself. In practice, the output gap cannot be measured with much precision –

the potential growth rate is subject to shocks that alter supply capacities.<sup>37</sup> Some of these disturbances might be very long-lived. Labour market reforms in New Zealand in the early 1990s, for example, paved the way for a prolonged period of increasing employment rates, lifting supply capacities. Other shocks might be relatively short lived, such as fluctuations in weather conditions that affect New Zealand's agricultural supply. In addition to these shocks, different sectors in the economy might start to hit bottlenecks at different stages of an upturn. Overall, the Bank views the output gap as a helpful indicator of aggregate resource pressures, but one that must be corroborated with other indicators of capacity in the economy.<sup>38</sup>

## 5 Summary

In this article, we have considered the various transmission channels of monetary policy in New Zealand in some detail. We describe the sequence of events that lead from a change in the OCR, and/or expectations of future policy changes, to eventual inflation outcomes. We also offer a flavour of the parts of the transmission mechanism that the Bank regards as particularly important, highlight the specific elements of the channels that are relatively straightforward, and those that are subject to considerable uncertainty. The focus in this discussion has been on how the transmission mechanism is thought to work in general, rather than at specific times in New Zealand's economic history. In a subsequent edition of the *Bulletin*, we will turn our focus to how the transmission mechanism has changed over time, and how these changes have affected the operation of policy over the recent business cycle.

<sup>36</sup> An economy with structural policy settings that engender more flexible labour and product markets is better able to cope with positive (and negative) shocks and the monetary policy transmission mechanism overall will tend to work more speedily. For an illustration of these issues in the context of economic adjustment in the Euro Area versus the US, see Drew *et al* (2004) and Bayoumi *et al* (2004).

<sup>37</sup> Measuring output gaps accurately is especially difficult in real time; that is, historical estimates are relatively easier to obtain than those for the current period. For estimates of the uncertainty around potential output in New Zealand, see Claus *et al* (2000) and Graff (2004).

<sup>38</sup> See Hargreaves *et al* (2006).

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# A review of the trade weighted exchange rate index

Hannah Kite<sup>1</sup>

Over the past year the Bank has completed a review of the official trade weighted index (TWI). This article documents that review, noting issues of importance when considering the most appropriate effective exchange rate for a central bank, and presenting a number of different weighting methodologies. Whilst different effective exchange rate indices are suited to different purposes, at this time we believe the current official five-currency TWI remains a good summary measure for monetary policy purposes. However, the Bank will also begin publishing an extended 14 currency TWI, which includes the currencies of a number of Asian economies with which New Zealand's bilateral trade has increased markedly in recent years. This 'extended' TWI will be published on the Bank's website as an analytical series and the properties of the series will be further monitored as trade flows develop.

## 1 Introduction

The exchange rate plays an important role in the tradables sector of the New Zealand economy. Movements in the exchange rate affect both the demand and supply of exports and imports, and the New Zealand dollar prices at which these products are transacted. The rise and fall of the exchange rate against our major trading partners is therefore fundamental to the analysis of the economy.

As a small open economy, New Zealand's international transactions tend to be denominated in a range of different currencies; as a result, New Zealand faces many exchange rates and a weighted average measure of individual bilateral exchange rates against the New Zealand dollar (NZD) is necessary to summarise the country's exchange rate position. These summary measures are often referred to as an effective exchange rate or a trade weighted exchange rate index (TWI). The Reserve Bank has calculated and published a trade weighted index for New Zealand for many years and the index is widely used by analysts. At present, this TWI is based on five currencies — the Australian dollar, US dollar, UK pound, Japanese yen, and the euro.

There are many different ways to construct trade weighted indices and practices differ from country to country. Decisions need to be made on the number of currencies to include and on the most appropriate weighting methodology. These decisions depend partly on the purposes for which the TWI

is being used, and partly on practical considerations such as the availability of data and computational requirements. To ensure that the index is appropriate, the Bank reviews the construction of its TWI periodically.<sup>2</sup>

The Bank last reviewed the TWI in 1997. This review focused on ways of better capturing the indirect link between the exchange rate and external sector competitiveness.<sup>3</sup> Following the review, the weighting methodology used to construct the official TWI was changed to incorporate the relative economic size of the countries included in the index, in addition to the country's weight in trade with New Zealand. The new index replaced the previous TWI that had been based on bi-lateral trade shares only. The review of the TWI also coincided with the introduction of the euro; accordingly, the euro replaced the deutschemark in the index.

This article documents a further review of the TWI undertaken over the past year. A review of the index was timely, given increasing trade flows between New Zealand and many Asian economies, the currencies of which are not captured by the five currency index. Following the latest review, the Bank has decided to begin constructing a 14 currency TWI, calculated analogously to the five currency index. This extended index will be published on the Bank's website alongside the existing five currency TWI. In both cases, the weighting methodology will be that adopted at the time of the last review.

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<sup>1</sup> The author would like to thank to Rachel Holden for her contribution to the article; Tahia Equab and Graham Howard for their work on data series; and other members of the Economics department for comments.

<sup>2</sup> The index weights are updated annually as a matter of course.

<sup>3</sup> See White (1997).

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The structure of this article is as follows: Section 2 briefly reviews the relevance of a TWI for a central bank. Section 3 considers a number of different weighting methodologies that can be used to derive effective exchange rate indices and assesses the potential pros and cons of such measures. Section 4 presents different TWIs based on variations in the number of currencies and weighting methodologies. The section also explains why the Bank has decided to continue with the existing weighting methodology when introducing the 14 currency index. Section 5 then presents some estimates of the real exchange rate — TWIs that take into account relative inflation rates or production costs of the countries concerned relative to New Zealand. In principle, these indices are more appropriate for gauging longer-term trends in New Zealand’s international competitiveness. Section 6 of the article concludes.

## 2 What is the Reserve Bank’s main interest in a TWI?

There are a number of different ways to calculate a TWI, and many purposes for which such indices may be used. The Reserve Bank’s main interest in the TWI is as a yardstick for measuring:

- the *direct* influence of exchange rate movements on prices (exchange rate ‘pass-through’); and
- the *indirect* influence of the exchange rate on inflation through its influence on external sector competitiveness.

In the 1997 review, the new weights were designed to better capture changes in the competitiveness of the external sector by attempting to allow for third-country competition — the competition exporters face from competing suppliers in their export markets (see box 1). To do so, the bilateral trade weights for the currencies included in the TWI were adjusted to reflect the relative size of the economy in question by placing a 50 percent weight on GDP. This was intended to capture the notion that larger economies are likely to be a bigger competitive force in the world markets in which New

Zealand competes.<sup>4</sup> With more emphasis on the link between the exchange rate and export sector competitiveness, the new index was thought to better capture the indirect influence of the exchange rate on inflation.

The new index was also considered to provide a useful yardstick for measuring the direct effect of exchange rate fluctuations on import and export prices and, to some extent, on consumer prices. Econometric studies conducted at the time of the last review concluded that the currencies of large economies tend to have a greater influence on consumer price inflation in New Zealand than indicated by the country’s share in bilateral trade. In effect, the simple bilateral trade weight was found to understate the importance of the US dollar on inflation, and give too much weight to the Australian dollar. At the time, there were some reservations expressed about the robustness of the econometric results, and it was concluded there was insufficient formal evidence for a move away from using simple bilateral trade weights.<sup>4</sup> Nonetheless, by including country GDP in TWI weights in order to take account of external sector competitiveness, we are, in effect, aligning country weights more closely to those suggested by these studies.

The focus on improving the TWI as a measure of the indirect influence of the exchange rate on activity and prices at the time of the last review was considered consistent with developments in monetary policy, away from a focus on the exchange rate’s direct price effects on inflation towards its indirect — and more medium-term — effects on inflation that occur through its impact on economic activity. Given the current Policy Targets Agreement, which requires the Bank to target inflation of 1–3 percent, on average over the medium term, this focus remains appropriate.

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<sup>4</sup> Caveats included the use of historical data to derive weights, given subsequent structural changes in the NZ economy (1985 float of NZ, for example) and the possible evolution of the degree to which firms re-price in response to fluctuations in the exchange rate. For more information, see Hargreaves and White (1999).

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## Box 1

### What is third-country competition?

Third-country competition refers to the competition that New Zealand faces when its exports to a foreign country compete with imports into that country from third countries (as well as domestically produced goods). When considering relative currency weights to be used in New Zealand's effective exchange rate index, it may be important to take into account the currencies of these third countries as well as the country with which we trade directly.

To comprehensively take into account the competition that exporters face we must account for the share of third countries in the market for all New Zealand's traded goods and adjust for the importance of that good to total New Zealand trade. Due to the differences in the way international prices are determined for commodities compared to manufactured goods, we must also account for these separately. This calculation thus requires not only data on New Zealand trade flows, but world trade flows in manufactured goods and world trade of the commodities relevant for New Zealand.

## 3 What are the issues to consider?

In reviewing whether the current five currency TWI remains appropriate, the Bank has considered a number of issues, including:

- The pros and cons of different methodologies for calculating the TWI;
- the appropriate number of currencies for inclusion in the index;
- the current calculation of GDP weights as proxies for country size in the index; and
- the desire of the Bank to provide a TWI that is transparent and easily replicable by external users.

The following is an outline of the issues considered. As noted earlier, the Bank has decided to retain the current official five currency TWI, and to also begin publishing a broader index that includes 14 currencies. The existing methodology has been retained.

### Calculation methods

#### *Multilateral exchange rate indices*

A number of countries now construct effective exchange rates that comprehensively take into account the relative importance of the currencies of trading partners to the home country's competitiveness. These indices are constructed in a similar way to the multilateral TWI used by the IMF.<sup>5</sup> The IMF weighting methodology allows for *import competition*,

*export competition and third-market competition* to be captured. The calculation involves a relatively complex methodology and a vast matrix of cross-country data; the basic steps involved in such an index are described in box 2. Hargreaves and White (1999) discuss the IMF methodology and its application to New Zealand in more detail. The authors found that multilateral TWI weights constructed (based on IMF methodology) for New Zealand tend to be relatively similar to weights that use GDP as a proxy, and the resulting exchange rate indices move closely over time.

Hargreaves and White also identify a number of problems when applying the IMF methodology to New Zealand. In particular, the IMF multilateral methodology does not account for the importance in the world market of countries that produce and consume large amounts of a commodity internally (the world price for the commodity is affected by the internal trade, but without internal production and consumption data the importance of this is not included in the calculation of TWI weights). In New Zealand, we are highly dependent on trade in commodities, and it is important that we take world production of commodities into account when thinking of an ideal exchange rate measure. In principle, it would be possible to construct a 'tailored' multilateral index for New Zealand that took into account the competitive structures of the various markets in which the country operates as well as the relative importance of internal production and consumption of different countries. However, such an index would potentially be extremely complex even relative to the more generic approach adopted by the IMF.

<sup>5</sup> Bayoumi, Tamin et al (2005).

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## Box 2

### A basic summary of how a multilateral effective exchange rate is calculated: Calculating the weight on country A in New Zealand's exchange rate index.

The IMF produces separate formulas for the construction of weights in the commodity, manufacturing, and tourism sectors. The commodity weights are designed so that they incorporate the global importance of the foreign country (country A) in the trade of each commodity and the internal importance of each commodity to New Zealand. The manufacturing and tourism weights account for different goods (services) markets separately; the basic steps involved are described below:

#### **1. Weights for the three types of competition, for each country, for each product, are calculated.**

- (a) *The Import competition* weight assigned to country A is equal to the share of total imports into New Zealand that come from country A.
- (b) *The Bilateral export competition* weight assigned to country A is calculated using the share of New Zealand exports that go to country A and the proportion of

country A's domestic market that is supplied by domestic producers (the degrees of openness of country A for the good). If country A is a relatively closed economy, then country A will have a higher weight, as it is more important as a direct bilateral competitor.

- (c) Weights that take account of *third-market competition* are calculated by multiplying country A's share in total supply of goods to a third market by the relative importance of the market as a destination for New Zealand exports.

#### **2. Aggregation**

The *import competition*, *bilateral export competition* and *third-market competition* weights are then aggregated according to their relative importance to New Zealand. A huge amount of trade flow data is required to determine these weights and they tend not to vary too much over time.

### **More parsimonious methods: The 50:50 trade to GDP methodology**

The 50:50 trade-to-GDP weighted TWI that was adopted in 1999 was designed to be a simpler proxy for the more complicated multilateral index.

The intuition behind the use of GDP in the currency weight is that large countries are more likely to have a presence within other countries' domestic economies, and hence act as a competitor to our export markets. For example, it is more likely that we are going to compete in country A with a third country that is relatively large than one that is relatively small. Thus, by incorporating GDP into currency weights, we can, to some degree, capture the importance of third-country competition. Similarly, it is more likely that larger countries will have a bigger influence on the world price of a commodity than smaller countries. Thus GDP can also be used as a proxy for the importance of a country in the pricing of trade commodities.

This is a straightforward proxy for a complicated process. Although there are conceptually superior ways to account for the competition effects, by using GDP we are applying an easily calculated index that is simple and transparent. In the past, the 50:50 weighted TWI has been found to track closely to the multilateral TWI and the 50:50 weights have therefore been considered an approximation to the more complicated IMF multilateral trade weights.<sup>6</sup>

It may be possible to construct exchange rate indices that better capture the influence of trading partner economies on the world price of New Zealand's commodity exports than the more parsimonious IMF multilateral index. Such indices could include weights based on global trade in particular New Zealand commodities, or country production and consumption of particular commodity exports. However, there are a number of limitations associated with calculating such indices. In order to comprehensively account for trade

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<sup>6</sup> Hargreaves and White (1999).

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or production of New Zealand main commodity exports, a number of countries not currently included in the current five currency index (such as Brazil and Chile) would need to be included. With the increasing number of currencies in the index, the availability and accuracy of data can become a problem and may lead to a considerable time lag in construction of weights. In addition, the direct trade flows between a number of these countries and New Zealand will be small and the influence of countries where direct trade flows are large, but commodity production or trade is small, may be swamped.

Hargreaves and White find that, when calculated on a multilateral trade weighted basis, weights applicable to certain sectors are considerably different to aggregate weights. Given the Bank is more interested in the impact of the exchange rate on aggregate activity, it would not be ideal to have exchange rates measures biased towards competitiveness in certain industries. Thus, a great number of different commodity markets and a large number of countries must be included to get a summary measure and the resulting index will quickly become very complex. Nonetheless, it is important to understand how certain sectors are being influenced by exchange rate movements, and thus would be useful to continue to investigate producing indices that focus on specific sectors or commodities in addition to a more economy-wide measure of exchange rates.

Further, services trade flows are becoming increasingly important in overall trade. Data on services trade is limited and excluding this from a measure of the exchange rate is not ideal. It may, therefore, be the case that a more abstract methodology that does not focus particularly on specific export industries may meet our goals more appropriately at present.

Whilst an index that comprehensively takes into account external competition is important, a guiding principle for the Bank is to construct a TWI that is transparent and replicable by external users. Given some of the limitations inherent in the more complex constructs, the Bank decided to retain the existing 50:50 methodology for calculating its TWI.

## The use of US dollar exchange rates to convert country GDP

There is, however, a question as to whether the current calculation of the 50:50 weights could be improved. Under the current methodology, nominal GDP weights are converted into US dollars at the exchange rate applying for the year in question. The use of market exchange rates means that US dollar movements may cause fluctuations in GDP weights that do not reflect changes in the importance of the currency to New Zealand trade. It has been suggested that GDP weights that have been converted to a common currency using country purchasing power parity (PPP) may be more appropriate.<sup>7</sup> GDP calculated using PPPs tends to be more stable over time than GDP measured using the US dollar exchange rate.

However, it is not clear that the use of PPP-based GDP weights is conceptually appropriate. The intuition behind using the GDP-based weights is to account for the effects of third-country competition by giving more weight to large currencies that are more likely to have a significant impact on the price New Zealand receives for its goods abroad (as discussed above). Increasing the weight of a currency because residents have more purchasing power in domestic markets may be at odds with this intuition.

In addition, there are many problems associated with the quality of the PPP measures, including; poor quality data, inconsistency across member currencies with regard to organisation and collection of data, and problems with aggregation methods. Official benchmark year PPPs are also only calculated every three years; for non-benchmark years, PPP conversion rates are estimated.<sup>8</sup>

Nevertheless, in the following section, we calculate a PPP-based variant of the TWI and examine how different this index is to the current TWI. We find that the two indices are actually very similar, which suggests that, over time, the

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<sup>7</sup> PPPs are the rates of currency conversion that eliminate the differences in price levels between countries see the International Comparison Programme (ICP) at [www.worldbank.org](http://www.worldbank.org). PPP data used in calculations is based on data sourced from the WDI online.

<sup>8</sup> Furthermore, the ICP does not publish data for Taiwan; the PPP-based GDP for Taiwan can be obtained from the Penn World Tables and is an estimate.

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volatility in GDP weights may not actually be a large problem for the TWI. Given the conceptual and data problems, an exchange rate conversion of GDP may be preferable.<sup>9</sup>

### The number of currencies to include in the index

Another issue to consider when calculating a TWI is how many currencies to include in the index. The TWI that the Bank has been publishing to date is made up of five currencies — the US dollar, Australian dollar, British pound, euro and Japanese yen. The countries or regions to which these currencies relate account for approximately 60 percent of New Zealand's international trade. It can be argued that a broader range of currencies would be appropriate to provide a comprehensive measure of New Zealand's effective exchange rate.

Importantly, the published five-currency TWI does not cover any Asian currencies other than the Japanese yen. In the past, the relatively narrow focus of the NZ TWI has been justified on the basis that many Asian currencies have been pegged to the US dollar and hence there has been little justification for expanding the overall number of currencies. But with the recent removal of the currency peg in China, and increasing trade-flows between New Zealand and Asia more generally, capturing exchange rate movements against the currencies of these countries is likely to become increasingly important in the future. The Bank has therefore decided that it should begin to calculate an expanded currency version of the current TWI.

How many countries is enough? There is no magical answer to this question — in the following section we calculate a 14 currency index including all countries that account for more than 1 percent of trade (countries included make up a little more than 80 percent of total trade).

To ensure consistency with the current index, in which the number of currencies is fixed, the number of currencies in the extended index that we construct has been set constant

at 14. In future there may be scope for updating the number of countries included based on trade share. However, in practice the trade share of countries included are unlikely to vary significantly year to year, and given the weight on the lowest weighted currency is small, any minor changes to the inclusion of these countries are unlikely to have a significant bearing on the index.

## 4 Potential TWI measures

To illustrate the significance of some of the issues discussed in the previous section, this section presents a range of different TWI measures for comparison.

It is important to note that the five currency exchange rate series presented in this section is an analytical series calculated in an analogous way to the current official TWI. Post 1999, the weights, and resulting five currency exchange rate series, differ only marginally from the official TWI (see figure 1).<sup>10</sup> However prior to 1999, the analytical series differs more markedly from the official TWI, because of the use of the current 50:50 GDP-to-trade methodology, rather than the simple bilateral trade weights that were used in the official TWI at this time.<sup>11</sup> The use of the analytical five currency TWI facilitates comparison with the extended 14 currency index that has been constructed using historical GDP and the 50:50 GDP-to-trade methodology. Both indices use the deutschemark in place of the euro before 1999.

The analytical five currency series shown in figure 1 shows a higher peak than the official TWI index in the mid-1990s, a reflection of the much larger weight placed on the US dollar, which exhibited a greater cycle over this time. A lower weight was also placed on the Australian dollar. Given its consistent construction over history, the analytical series may be a more telling indicator when comparing highs and lows in the exchange rate.

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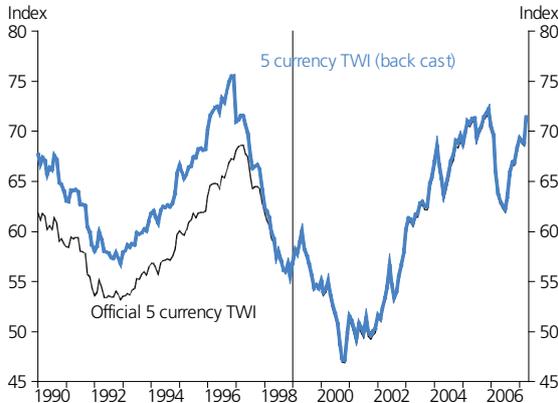
<sup>9</sup> In addition, if the volatility of the GDP weights became a major problem, there may be other ways of handling it (eg, by using moving averages of GDP to smooth year-to-year volatility).

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<sup>10</sup> The difference stems from the use of historical GDP (rather than real-time GDP) to calculate weights. These slight changes were made to the methodology to allow us to calculate a historical time series for the 14 currency index.

<sup>11</sup> In order to calculate TWI weights in 1999 and 2000, we have used synthetic euro exchange rates and GDP.

**Figure 1**  
The current official 5 currency TWI and the analytical 5- currency TWI, back cast using 50:50 GDP-to-trade methodology



Weights set in December 2006 (based on data from the year to 2005) are given in table 1 below. It is important to note that these weights have varied over time, with changes being particularly marked for developing economies and those countries with which trade flows have increased notably over the past decade – for example, the weight of China has increased to 8.1 percent from 2.2 percent in 1990.

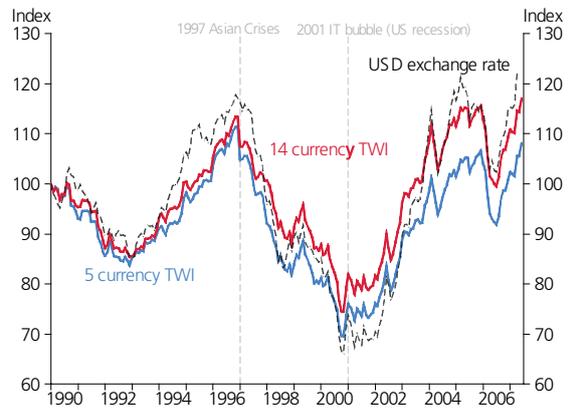
Despite the variation in currency weights, we find that the resulting exchange rate indices move very closely over time.

In the following, we present each index, and identify any divergence between the different measures.

**An expanded (14 currency) calculated using the same 50:50 methodology used in the current TWI**

Figure 2 shows an expanded index that includes the five currencies in the current TWI with the addition of the currencies of China, Malaysia, Indonesia, Thailand, Taiwan, Korea, Singapore, Hong Kong and Canada. These are

**Figure 2**  
The extended 14 currency TWI and 5 currency TWI (analytical series) (Index January 1990=100)



**Table 1**  
(a) Weights for the 14 and 5 currency TWI (analytical series)

Economy	5-currency			14-currency		
	GDP weight	Trade weight	Final weight	GDP weight	Trade weight	Final weight
Australia	2.4	35.1	18.8	2.0	25.0	13.5
USA	41.7	20.8	31.2	35.3	14.8	25.0
Japan	15.2	18.1	16.7	12.9	12.9	12.9
Euro	33.2	19.5	26.3	28.1	13.9	21
UK	7.5	6.5	7.0	6.3	4.6	5.5
Korea				2.2	3.7	3.0
China				6.5	9.8	8.1
Malaysia				0.4	2.5	1.4
Hong Kong				0.5	1.2	0.9
Indonesia				0.8	1.8	1.3
Thailand				0.5	2.3	1.4
Singapore				0.3	2.9	1.6
Canada				3.2	1.8	2.5
Taiwan				1.0	2.9	1.9

(b) Weights for the PPP-based 14 and 5 currency TWI (analytical series)

Economy	5-currency		14-currency	
	GDP weight (PPP)	Final weight (PPP)	GDP weight (PPP)	Final weight (PPP)
Australia	2.3	18.7	1.6	13.3
USA	44.1	32.5	30.5	22.6
Japan	14.1	16.1	9.8	11.3
Euro	22.5	26.0	22.5	18.2
UK	6.9	6.7	4.8	4.7
Korea			2.6	3.2
China			19.6	14.7
Malaysia			0.7	1.6
Hong Kong			0.6	0.9
Indonesia			2.1	2.0
Thailand			1.4	1.8
Singapore			0.3	1.6
Canada			2.6	2.2
Taiwan			1.1	2.0

the currencies of New Zealand's top 14 trading areas and together they make up approximately 80 percent of our trade; each of these countries individually has a trade share greater than 1 percent.

As shown by figure 2, the 14 currency index has tended to be slightly stronger over recent history than the five currency index. Aside from episodes around the Asian crisis and 2001 dot-com bubble, much of the relative movement in the extended TWI reflect movements in the US dollar. The influence of the US dollar on the extended index tends to be greater than in the five currency index, given the inclusion of a number of Asian currencies, such as the Chinese yuan, that have been largely fixed against the US dollar over recent history.

The influence of movements in the US dollar on the extended 14 currency index can clearly be seen in the years before the 1997 Asian crises. Over this time, the 14 currency index appreciated more sharply relative to the five currency index, in line with an appreciation of the NZD vis-à-vis the US dollar. However, following the peak of the Asian crises, the 14 currency index held up relative to both the five currency index and the US dollar cross rate – a reflection of the depreciation of the Asian currencies over this time, with the currencies of Indonesia, Thailand, Malaysia and Korea

depreciating most sharply against the NZD (together these economies had just over 7 percent weight in the index). Again, in the years following the 2001 dot com bubble, the NZD appreciated to a greater extent relative to the Asian currencies than the US dollar. However, more recently, the 14 currency index appears to have been supported by the marked appreciation of the NZD relative to the US dollar.

Of course, the influence of the US dollar on the extended index may decrease over time as the Asian currencies move further away from a US dollar peg. Indices may also diverge in future if changes in the relative GDPs across the countries were to lead to significant changes in the weights.

### Indices calculated using PPP-based GDP weights

Figure 3 (a) compares the newly-calculated 14 currency index with an alternative 14 currency index in which PPP-based GDP has been used to form the country weights (as discussed in section 3). Figure 3 (b) is a recalculation of the five currency TWI using PPP-based GDP.

The effect of PPP-GDP weighting is a relatively higher GDP weight on currencies where purchasing power in the domestic sector is high (relatively poor countries tend to have a higher PPP-based GDP than GDP converted to US dollars at current exchange rates). In the case of the 14 currency index, the final weight increases most significantly for China (see table 1 (b)). The weight on the US and Japan in the indices also decreases when PPP GDP is used. This is a result of the relatively lower purchasing power residents have in the domestic sector.

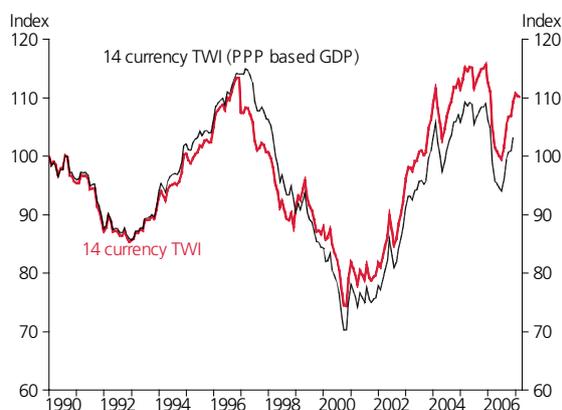
Given the marked difference in weights when PPP-based GDP is used in the 14-currency index, the similarities in the resulting exchange rate indexes may be somewhat surprising (figure 3 (a)). The PPP based GDP series has tended to move with the US dollar to a slightly greater extent in recent years, despite the reduced weight on the US dollar when PPP-based GDP is used. This effect is likely to reflect the higher weight placed on relatively poor currencies that have tended to be tied to the US dollar over this time. Certainly, there is potential for a more significant divergence in these indices in future, in particular, if we see the Chinese yuan move more freely against the US dollar.

For the five currency index, the use of PPP-based GDP has little impact on the final TWI weights; thus, as we may expect, the exchange rate indices calculated using these differing methodologies move very closely over time (figure 3 (b)). The slight divergence between the indices represents the reduced weight on the US in the PPP index.

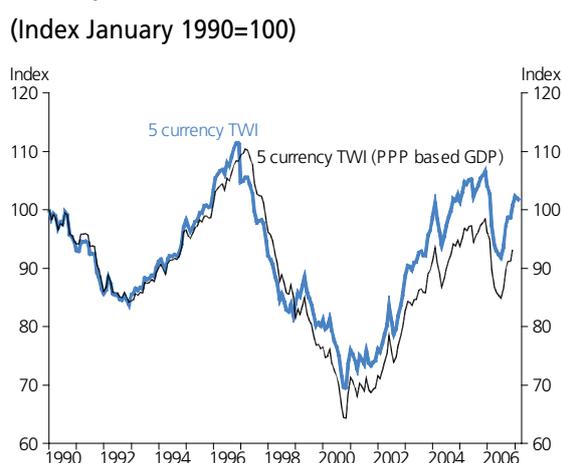
Figure 3

### Comparison of the TWIs with indices based on PPP-based GDP

#### (a) The 14 currency TWI and 14 currency TWI (based on PPP GDP rates) (Index January 1990=100)



#### (b) The 5 currency TWI (analytical series) and 5 currency TWI (based on PPP GDP rates) (Index January 1990=100)



## 5 A real TWI construct

The indices constructed above are 'nominal' exchange rate measures. Although such measures are often used as indicators of external competitiveness, a conceptually superior assessment of competitiveness should be done in terms of a real exchange rate index (where individual currencies in the TWI are scaled by the ratio of domestic production costs between New Zealand and the country or region in question). If New Zealand's production costs are rising more rapidly than in its trading partners, for example, this would be reflected in a real exchange rate appreciation (loss of competitiveness) for any given nominal exchange rate.

When inflation is low and stable among the countries included in the TWI, there should be little difference between movements in the nominal and in the real measures, and, over the short term at least, nominal exchange rate movements can be a useful proxy for real exchange rate movements. However, over the longer haul, and especially in the context of an expanded TWI, which includes countries with divergent inflation rates, it becomes imperative to look at the real exchange rate measures.

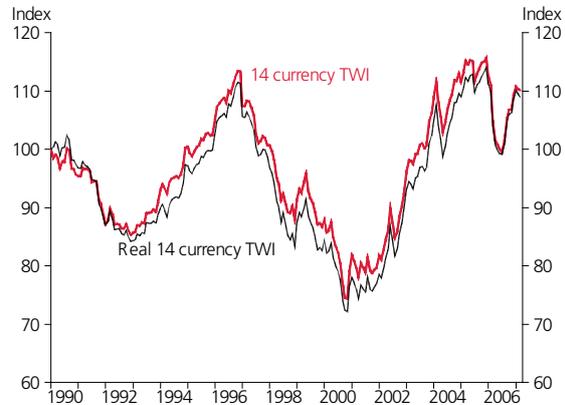
In this section, we calculate real counterparts to both the five and 14 currency indices. We use individual country Consumers Price Index (CPI) inflation in order to construct real exchange rates. Using consumer prices is not ideal, as theoretically the price deflator used to construct the real index should provide some indication of the relative costs faced by producers across the different countries. Box 3 explains why we use the CPI rather than more theoretically robust price measures.

Figure 4 (b) illustrates the nominal and real indices for the five currency exchange rate; in real terms, the NZD has appreciated to a slightly greater extent over the past decade, because inflation has been a little higher in New Zealand relative to the weighted average of the five trading partners captured in the five currency exchange rate. This may not be a surprise, given the deflationary pressures in Japan over this time. The divergence between the real and nominal 14 currency indices (figure 4 (a)) is even smaller than for the five currency index, possibly reflecting the higher weight on Asian economies with inflation rates that tend to move the average trading partner inflation experience closer to New Zealand's inflation experience. We might expect the real and nominal 14 currency indices to diverge more over time, given rates of inflation can be more variable in emerging markets.

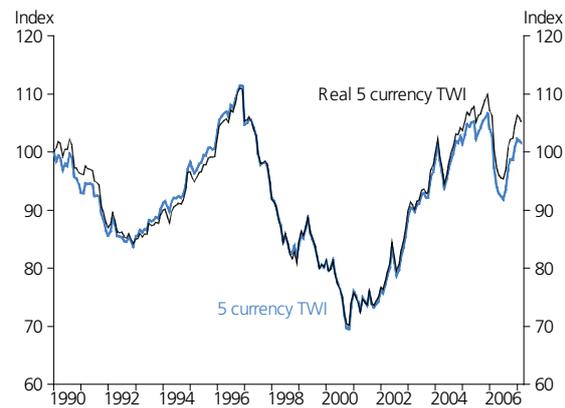
Figure 4

Real TWI constructs

(a) 14 currency TWI, real and nominal series (Index January 1999=100)



(b) 5 currency TWI, real and nominal series (analytical series) (Index January 1999=100)



### Box 3

#### Constructing real exchange rate measures

When constructing real exchange rate measures, you need some measure of relative prices. The relative price measure used will depend on both theoretical and practical considerations. Theoretically, it would be ideal to use price indices that measure either the price of goods produced and exported by each country or a measure of costs faced by producers. Producer Price Indices (PPIs) or Export Price Indices (EPIs) are examples of indices that measure prices of traded goods, while Unit Labour Cost (ULC) indices measure part of the production costs faced by producers.

However, in practice, it may not be appropriate to use these price measures. In addition to theoretical considerations, the price measure should be:

- timely;
- similarly constructed across countries;

- available for a wide range of countries over a long time span;
- representative of price conditions in each of the countries; and
- reasonably free from measurement error.

Unfortunately the PPI, EPI and ULC all fail at least one of these conditions. For example, none of these price measures is constructed similarly across a wide range of countries and, in many cases, they are not available over a long time-span.

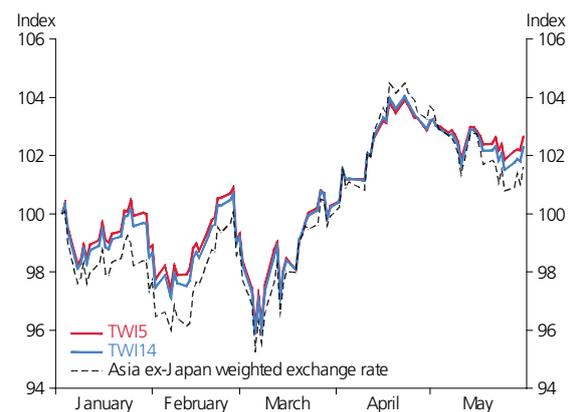
The CPI is not an ideal measure of relative prices in a theoretical sense, but in practical terms performs very well. Of all the price measures available, it is the one that best meets all the practical considerations. Most importantly, it is easily available for all the countries in the 14 currency index. Because all the other price measures perform poorly against the practical considerations, we use the CPI in our real exchange rate calculations. In the future, it may be possible to use a more theoretically appropriate price measure as countries produce more robust and comparable price statistics.

## 6 Concluding comments

In this article we have reviewed the current methodology used to produce the official TWI. We noted that a summary exchange rate measure designed to capture external sector competitiveness is the most appropriate for monetary policy purposes. After reviewing the methodological options, we found the current methodology remains a suitable proxy for the effect of third country competition. However, the importance of an index that captures a broader range of currencies than the five currency TWI has also led the Bank to begin calculating and publishing an expanded 14 currency TWI along with the present index. CPI-based real measures of the TWI corresponding to these two indices will also be regularly published on the Bank's website.<sup>12</sup>

The article showed that the 14 currency and five currency TWIs have not been substantially different in history, but this could change in the future given a world of increased exchange rate flexibility, especially in Asia. Figure 5 shows

Figure 5  
Relative movement in TWI14 and TWI5 in recent months  
(Index February 2007=100)



the divergence in the 14 and five currency TWIs over the course of the past five months. Whilst the series move very closely together, the 14 currency index has tended to exhibit a slightly larger cycle as the NZD has moved to a greater extent against Asian currencies (largely tied to the US dollar) over this time.

<sup>12</sup> Full technical details on the construction of the indices will also be provided.

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Whether the 14 currency index will provide a materially better 'fix' on New Zealand's international competitiveness and on the exchange rate–output linkage *in practice* will be an empirical matter. This should become clear when the various indices are tested over time (eg in export equations and in other modelling situations).

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# The Reserve Bank's policy on outsourcing by banks

Tim Ng<sup>1</sup>

This article explains the Reserve Bank of New Zealand's policy on outsourcing by banks. Banks in New Zealand typically outsource a range of business activities, both to independent and to related-party service providers, and both domestically and offshore. The predominance in our banking system of banks owned by offshore parent banks, who provide important services to their subsidiaries, means that cross-border, related-party outsourcing is of particular relevance. The outsourcing policy requires a large bank's board to maintain legal and practical control over any outsourced functions such that the bank is able to continue to play its key role of supporting financial activity in the economy, both under normal circumstances and (particularly) under stress. The Reserve Bank applies the policy with some flexibility to suit the circumstances of individual banks. The policy thus ensures that the banking system retains the ability to avert distress, and underpins the Reserve Bank's ability to manage a financial crisis, while enabling the financial system to enjoy the benefits of foreign bank participation.

## 1 Introduction

In today's world of global banking and a highly specialised business environment, it is common practice for banks to enter into domestic and cross-border outsourcing arrangements for an increasing range of business activities. The outsourcing providers involved can take a range of forms, including independent specialist providers (such as IT companies) serving a range of industries, and wholly-owned special-purpose subsidiaries within a banking group that provide services to banking subsidiaries elsewhere in the group. Functions outsourced may include the following (either certain aspects or the whole function):

- development of banking application software, and running of banking software on the provider's computers;
- other IT 'infrastructure' functions such as the maintenance of facilities to house customer data and other bank records;
- 'back-office' functions such as processing and settlement of payment instructions;
- finance and accounting; and
- call centres and other customer services.<sup>2</sup>

In New Zealand, outsourcing by banks has reached further across the range of banking activities than is typically the case in most countries, and there remain some strong commercial incentives for banks to continue to seek outsourcing opportunities both domestically and offshore. This probably reflects the predominance in New Zealand's banking system of banks that are either owned by, or are branches of, offshore parent banks – which is itself a reflection of the openness of the New Zealand banking system to foreign bank participation.

This openness provides benefits to the banking system, but comes with risks.<sup>3</sup> The benefits for the local operations may include cost reduction, access to offshore expertise, and attractive funding terms associated with the global bank's (much) larger balance sheet. The risks include 'contagion' through the very same links to foreign operations, which may act as channels for operational or financial distress at the parent bank to spread to the New Zealand operations.

Risks also stem from the parent bank's offshore domicile itself, on the other side of the jurisdictional boundary from the local operation.<sup>4</sup> The jurisdictional boundary creates risk from foreign financial supervisors' legal obligations being, in general, different to the Reserve Bank's. In some cases, there is foreign legislation explicitly conferring a preference on local depositors. The foreign domicile of the parent bank

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<sup>1</sup> Thanks to Willy Chetwin, James Twaddle, Steve Anderson, Adrian Orr, Bernard Hodgetts and Peter Brady for helpful comments on earlier drafts of this article.

<sup>2</sup> Joint Forum (2004) provides a useful survey, and discusses the supervisory issues raised.

<sup>3</sup> Bollard (2004) and Woolford and Orr (2005) discuss the issues raised by hosting foreign-owned banks.

<sup>4</sup> Kane (2006) and Kaufman (2004) provide surveys of some of the relevant jurisdictional and political issues.

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also means that it is legally and practically more difficult for the local bank, the Reserve Bank or the New Zealand courts to enforce a contract with the parent bank, compared to a contract with a local provider – in part because of the possibility of frustration of the contract or some other intervention by the provider’s regulator.

In the case of the four largest banks in New Zealand,<sup>5</sup> these risks are of particular concern because each bank by itself accounts for a large proportion of the banking system. Moreover, the New Zealand economy is highly dependent on foreign funding, and the bulk of this foreign funding is intermediated through the large banks.<sup>6</sup> Finally, the New Zealand operations of global banks are all small relative to those banks’ overall operations, so the interests of a parent bank or banking group as a whole may not always be consistent with the interests of the local operations. Local bank staff may thus not always have the ability or incentive to act in ways consistent with the interests of the local operations.

Against that background, a number of the Reserve Bank’s policies and activities are directed towards maximising the benefits of an open banking system, while minimising the concomitant risks. The next section sets out this legal and policy context, and the third section explains the outsourcing policy itself.

## 2 Legal and policy context

Chetwin (2006) provides a recent discussion of the Reserve Bank’s supervisory approach in the context of the Reserve Bank’s local-incorporation policy. The same principles frame the rest of the banking supervision regime, including the outsourcing policy. In brief, the regime gives effect to the requirement in section 68 of the Reserve Bank of New Zealand Act 1989 (the Act) that the Reserve Bank must supervise banks for the purposes of:

- (a) promoting the maintenance of a sound and efficient financial system; or

- (b) avoiding significant damage to the financial system that could result from the failure of a registered bank.

The regime comprises three elements:

- legal responsibilities for a bank’s decision makers to operate the bank prudently and efficiently;
- required disclosures by banks to enable creditors and financial markets to monitor bank performance; and
- rules and minimum standards relating to a bank’s business.

The regime emphasises the first two – more market-based – approaches, supplemented by the minimum standards where necessary.<sup>7</sup> In the event of financial distress, the Reserve Bank has a range of crisis-management powers and tools to prevent wider damage to the financial system. These range from issuing directions to troubled banks, through to statutory management. Statutory management may result in liquidation, or partial or full recapitalisation by new investors.

The outsourcing policy is a major plank in the policy platform supporting the Reserve Bank’s ability to manage financial distress. Two other key elements of this platform are the local-incorporation policy,<sup>8</sup> and day-to-day cooperation between a global bank’s headquarter (‘home’) supervisor and the Reserve Bank (as ‘host’ supervisor of the global bank’s New Zealand operations).

The local-incorporation policy provides legal personality and strong local governance for the New Zealand operations of foreign-owned banks. Among other things, these elements strengthen the ability of the New Zealand operations to manage the legal and practical risks associated with outsourcing.

Cooperation between home and host supervisors helps build the relationships that facilitate quick and concerted action in times of stress. In the case of the Australian-owned banks in New Zealand, this cooperation has been bolstered by recent legislation in New Zealand and Australia that imposes formal obligations on the respective supervisors – where reasonably

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<sup>5</sup> ANZ National Bank Limited, ASB Bank Limited, Bank of New Zealand Limited and Westpac New Zealand Limited.

<sup>6</sup> Hull (2002) discusses in detail.

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<sup>7</sup> See Bollard (2004) and Bollard (2005).

<sup>8</sup> Chetwin (2006) discusses the local incorporation policy in detail.

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practicable – to consult each other and to avoid actions that may have a detrimental effect on financial stability in the other country.<sup>9</sup>

### 3 The Reserve Bank’s outsourcing policy for large banks<sup>10</sup>

In order to manage a financial crisis effectively and to limit the risk of a taxpayer-funded rescue of a distressed bank, it is vital that there exists the legal and practical ability to continue to operate a failed bank under statutory management. A large bank that outsources its business activities must also be able to continue to function in the event that its service provider fails or becomes dysfunctional, or in the case where the provider is a parent bank, becomes subject to the administration of a foreign supervisor. For both of these purposes, it is essential that the bank in New Zealand has access to the customer records, people and systems it needs to continue operating.

The outsourcing policy was developed to address these scenarios. As discussed in Joint Forum (2004), many financial supervisors around the world have put outsourcing policies in place to ensure that the financial institutions in their jurisdiction do not compromise their abilities to meet their obligations to customers. In New Zealand’s case, consistent with the Reserve Bank’s statutory obligations, the focus is on the stability of the financial system, rather than bank customers *per se*, although a focus on the financial system clearly has benefits for customers also. The Reserve Bank’s outsourcing policy, like those of other supervisors generally, does not seek to ban outsourcing outright, but addresses the risks that outsourcing of certain functions may present to supervisory objectives.

The policy is aimed at large banks, whose size makes them important to the financial system. It is not limited to the cases of cross-border outsourcing or of related-party outsourcing. However, these cases are particularly significant in New Zealand’s banking system, because of the predominance

of subsidiaries that are wholly owned by offshore parent banks.

The policy requires large banks to structure their business so that each bank’s board of directors has legal and practical ability to control and execute all functions needed for the bank to continue to provide and circulate liquidity to the financial system. These ‘core functions’ include providing payments and transactions capability to the bank’s customers. This ability must exist both under normal business conditions and under circumstances of stress or of failure of the bank or of a service provider to the bank.

The policy also requires that a large bank’s board of directors must act in the interests of the New Zealand bank, including where the bank is a subsidiary of an offshore parent bank, and that the staff of the bank are accountable to the board of the New Zealand bank. The use of parent-bank systems, tools and techniques by a New Zealand subsidiary is of course permitted, but only under the full oversight and acceptance of the subsidiary’s board. This oversight applies to all aspects of the subsidiary’s operations. The relevance of this provision again relates to the need for sufficient legal and practical ability to control the bank’s affairs such that it can continue to provide its core functions, as set out in the policy, without material interruption in the event of stress.

The focus on liquidity circulation reflects the urgency of this function under crisis management conditions. Crisis management can be thought of as having two phases (see figure 1).

The *first phase* is the very short period, perhaps a day or two, immediately following the emergence of distress at a bank. In this phase, the Reserve Bank and the bank’s statutory manager must make decisions about whether and how to restore liquidity or solvency to the bank, and about how to maintain its core functions and meet its settlement obligations if it is a large bank. The continuity of a large bank’s core functions is necessary to avoid a potentially disastrous contraction in financial system liquidity. Such a contraction in liquidity could occur if interruption to the core functions caused the bank to fail to settle, or caused the bank’s payment, settlement and intermediation capacity to shut down suddenly.

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<sup>9</sup> DeSourdy (2006) discusses this legislative initiative.

<sup>10</sup> Reserve Bank of New Zealand (2006b) sets out the outsourcing policy itself, and Reserve Bank of New Zealand (2006b) provides a set of questions and answers about the policy.

Figure 1  
Phases of bank crisis management

	First (initial few days)	Second (subsequent weeks, months or years)
<b>Phase:</b>	<ul style="list-style-type: none"> <li>• distress apparent</li> <li>• urgent action needed</li> <li>• objective: stabilise financial system and preserve options</li> </ul>	<ul style="list-style-type: none"> <li>• bank and financial system stabilised</li> <li>• objective: choose best option for exit from statutory management</li> </ul>
<b>Decisions:</b>	<ul style="list-style-type: none"> <li>• lender of last resort support?</li> <li>• meet distressed bank's settlement obligations?</li> <li>• restore solvency (how)?</li> </ul>	<ul style="list-style-type: none"> <li>• liquidate, sell, continue to run?</li> </ul>



In the first phase, a statutory manager needs immediate access to the bank's systems, customer records and staff associated with its core functions, and these systems need to be intact and operational. The systems include those needed to clear and settle the bank's and its customers' local and foreign currency settlement obligations on the day they fall due, and all interfaces with the domestic and international payments and settlements infrastructure. The emphasis and urgency related to continuing the bank's payments and liquidity provision functions is due in part to the interconnectedness of banks and other financial institutions via the payment system. This interconnectedness creates channels through which one bank's liquidity problems can spread to other banks and the wider economy, if not contained and managed promptly.

The *second phase* is the potentially lengthy subsequent period, during which the Reserve Bank and the statutory manager must decide what to do with the failed bank over the longer term. It involves decisions around 'exit' from statutory management – in other words, whether recapitalisation, sale in whole or part, or liquidation may be pursued. As noted earlier, it is important upon initiating statutory management to have options in the first phase that avoid destroying economic value, unnecessarily risking taxpayers' money, or constraining the exit options in phase

two. The outsourcing policy is partly aimed at ensuring that there is sufficient legal and practical control over core functions, so that all reasonable options are preserved.

The policy is not prescriptive about the means by which a bank should achieve the necessary legal and practical ability to control and execute its core functions. Rather, its requirements are set in terms of outcomes the bank must achieve – that is, legal and practical ability to control, and continued provision of core functions. This outcomes-focused approach was chosen to avoid risks of unintended consequences, and to preserve banks' incentives to innovate, as much as possible. The approach reflects that financial system efficiency is one of the Reserve Bank's purposes as set out in section 68 of the Act. Consistent with this approach, banks have flexibility to meet the policy's requirements in a way that best suits their individual circumstances and business models, subject to demonstrating that their particular proposed arrangements achieve the appropriate level of legal and practical ability to control.

The policy discusses a range of risks that are relevant to banks' ability to meet the required outcomes. The risks include those associated with the jurisdictional boundary between the New Zealand bank and any offshore service provider, including a parent bank, as outlined above. Where

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services are sourced from remote locations, the risks may also be operational in nature, for example where multiple time zones are crossed, statutory holidays are different, or extra time is needed to access essential staff and systems.

Risks in outsourcing arrangements when the provider is a parent bank in an offshore jurisdiction may be reduced by supervisory cooperation, and foreign legislation providing some assurance that service arrangements will, where reasonably practicable, be maintained. These factors become particularly relevant during the second phase of crisis management involving a global bank, when significant co-operation and coordination could be expected to occur between the relevant home and host regulators and statutory managers.

## 4 Conclusion

Political, jurisdictional, and currency-related boundaries remain in the world, meaning that banking supervisors – both the Reserve Bank of New Zealand and its foreign counterparts – are likely to continue to have domestically-focused objectives for some time. In this environment, foreign bank participation in local banking systems involves risks as well as benefits. Regular supervisory cooperation and, where politically tenable, legislation requiring a regard for other countries' interests can mitigate the risks to some extent. To strike the right balance between the risks that remain, without unduly reducing the benefits of an open banking system, the Reserve Bank maintains a range of requirements under its outsourcing policy. This policy ensures that large banks operate with adequate legal and practical control over their core functions, which underpins the banks' ability to avert distress, and enables the Reserve Bank effectively to manage a crisis and to preserve options through the resolution of a large bank failure.

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# Financial literacy and its role in promoting a sound financial system

Doug Widdowson and Kim Hailwood

This article discusses the importance of financial literacy. Financial literacy – the ability to make informed judgements and decisions regarding the use and management of money – is important for individual consumers of financial services, the financial system and the wider economy. It influences how people save, borrow, invest and manage their financial affairs. It therefore affects their capacity to grow their wealth and income, and has significant implications for people's lifestyle choices. Financial literacy also has a significant part to play in influencing how financial institutions – such as banks, non-bank deposit takers and insurers – manage their affairs and what products they provide. Because financial literacy influences people's investment decisions, including risk/return tradeoffs, it also affects how resources in the economy are allocated. In turn, this has implications for the potential growth rate and stability of the economy. Accordingly, the main theme of this article is that financial literacy matters – at many different levels. The focus of this article is on financial literacy at the household and individual level.

Research raises some concerns regarding financial literacy in New Zealand. The evidence suggests that many New Zealanders have limited financial literacy. The Retirement Commission and other government agencies are working to improve financial literacy levels. The private sector has also taken initiatives in this area. Work is under way to strengthen the regulation of financial advisers and to improve financial disclosure by issuers of securities to the public. However, there appears to be a need for further initiatives to raise the level of financial literacy in New Zealand. These initiatives should be accompanied by others to improve the delivery of user-friendly financial information to investors and consumers. This article explores the potential for further work in these areas.

## 1 What is financial literacy?

Financial literacy means different things to different people. For some it is a wide-ranging concept, incorporating an understanding of economics and how household decisions are affected by economic conditions and circumstances. For others, financial literacy means focusing quite narrowly on basic money management skills – budgets, savings, investments, insurance.

A consistent theme running through the various definitions of financial literacy involves an individual's ability to acquire essential knowledge and skills in order to make decisions with an awareness of the possible financial consequences. It encompasses being able to manage personal finances in changing circumstances.

The US Financial Literacy and Education Commission defines financial literacy as “the ability to make informed judgments and to take effective actions regarding the current and future use and management of money” (Basu, 2005:1). A similar definition of financial literacy has been adopted by

Noctor, Stoney and Stradling (1992:4) in work undertaken on behalf of National Westminster Bank in the UK, where they define financial literacy as: ‘The ability to make informed judgements and informed decisions regarding the use and management of money’.

Taking these broad definitions, financial literacy has a number of elements, including:

- basic numeracy skills, such as the ability to calculate rates of return on investments, the interest rate on debt, and basic arithmetic ability;
- an understanding of the benefits and risks associated with particular financial decisions, including spending, borrowing, leverage and investing;
- the ability to understand basic financial concepts, including the trade off between risk and return, the main attributes of different types of investments and other financial products, the benefits of diversification, and the time value of money; and

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- the capacity to know when to seek professional advice and what to ask, and the ability to understand the advice given by professional advisers.

The focus of this article is on the financial literacy of non-expert consumers of financial services – that is, members of the general public in respect of their decisions involving budgeting, borrowing, investing and using financial risk protection services. In particular, we focus mainly on financial literacy as it affects the decision-making capacity of non-expert members of the public in their investment decisions. Although the focus is on the household sector, financial literacy is also important for other sectors in the economy, such as small businesses and the farming community, given that many of their business decisions require or would benefit from a reasonable level of financial literacy and capability.

## 2 Why does financial literacy matter?

Financial literacy is important at several levels. It has major implications for the welfare of individuals in the management of their financial affairs. It affects the behaviour of financial institutions and hence has implications for financial stability. And it influences the allocation of resources in the real economy and therefore the longer-term potential growth rate of the economy.

This section of the article discusses briefly each of the reasons why financial literacy matters.

### Financial literacy's importance for individual consumers of financial services

Individuals make many financial decisions each year. These relate to a wide range of financial matters, including decisions on how to budget, how much to spend and to save, where to invest their money, how to manage their financial risks, how much debt they may need to fund their expenditure, and what form that debt should take. These decisions range in complexity, but all require at least a basic level of financial literacy.

In a world of escalating financial complexity, there is an increasing need for financial knowledge and at least basic financial skills (Morris 2001). Technological advances have dramatically transformed the provision of financial services in New Zealand and around the world. There is an ever-increasing diversity of financial products and services, including debt products and investment opportunities available to the public. While this provides increased benefits, it also entails more complex risks, including risks that are not always readily apparent to the unwary. Accordingly, the scope and complexity of the financial decisions an individual has to make in managing their financial affairs has grown significantly. Individuals must be able to differentiate between a wide range of financial products and services, and providers of those products and services.

The ability to make well-informed financial decisions plays an important part in the ability of individuals to manage their financial affairs. The outcomes of financial decisions have significant implications for an individual's financial security and standard of living. A person with a good level of financial literacy is likely to be better placed than someone without those skills and knowledge to manage their financial affairs prudently; all else being equal, they are more likely to budget effectively, invest wisely and manage their debt level in a sustainable manner. By contrast, poor financial choices, possibly based on a lack of understanding of financial matters, can result in a number of negative outcomes, including a lower level of financial wealth and imprudent debt levels.

Financial literacy has a clear relevance for the ability of households to manage debt. Deregulation of New Zealand's financial environment has led to access to a much broader range of financial products and services. In particular, debt has become easier to obtain. However, growth in debt has outstripped growth in household income. Over the decade to December 2006, household debt has increased almost three times. This is mostly housing debt, which has tripled, while consumer debt has more than doubled. Total household debt is now more than \$150 billion, and around 155 percent of household disposable income.<sup>1</sup>

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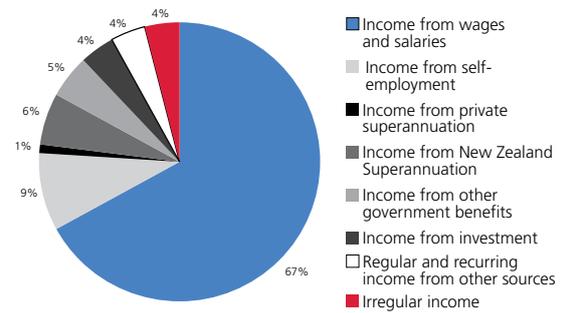
<sup>1</sup> Reserve Bank Data

Around \$13 billion of total household debt is consumer debt. Credit and store card debt accounts for more than \$5 billion of this, with the balance mostly in short-term instalment credit – much of which used to be called hire purchase debt. There are few limits to how many sources of credit the average consumer can have at any time (eg, credit cards, department store cards, bank loans, overdraft facilities), and there is evidence that multiple sources of credit are commonly a factor in reported cases of unmanageable debt.

At the same time as debt has risen, measured household savings have continued to decline. Low savings rates, and the predominance of mortgage lending, have meant that New Zealand household assets are concentrated in housing assets, with relatively low levels of financial assets and a lack of diversification in investments. Most household income is derived from wages and salaries; survey data suggest that less than five percent of total New Zealand household income is derived from sources such as private pension schemes and investments (figure 1). The decision by households to invest mainly in housing and to have relatively few other forms of investment may reflect a range of factors, including expectations of capital growth on housing, lifestyle preferences and other considerations. However, it is certainly arguable that a lack of financial literacy may have contributed to a lack of investment diversification by the household sector, particularly in terms of understanding the relative performance of different forms of investment, the risks associated with holding a large proportion of wealth in housing, and the principle of asset diversification as a means of lowering portfolio risk.

This growth in household debt levels and the concentration of household assets in housing indicates a need for increased financial literacy. Greater financial literacy would allow the householder to choose better options for managing their debt, better understanding risk and return tradeoffs and better understand the risks associated with concentration in particular asset categories.

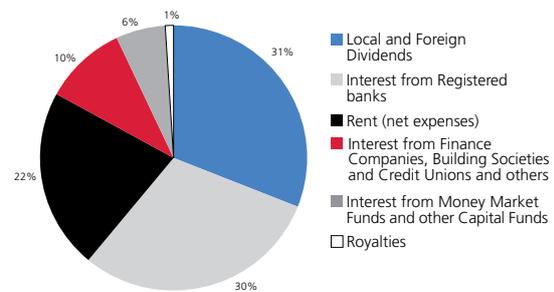
**Figure 1**  
**Sources of Household Income**



**Source: Statistics New Zealand, Household Expenditure Survey.**

This focus on household property assets and lack of sophistication of the New Zealand market is also reflected in the composition of investment income. Just over 71 percent of that investment income is provided by way of simple interest returns and dividends. In contrast to the 22 percent of investment income provided by net rental returns on property, less than 6 percent of investment income in New Zealand is derived from capital markets, and other sources of financial capital in New Zealand. See figure 2

**Figure 2**  
**Sources of investment income**



**Source: Statistics New Zealand, Household Expenditure Survey.**

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## Importance of financial literacy for financial system soundness and efficiency

Financial literacy can be a significant influence on the soundness and efficiency of the financial system. A financially literate, well-informed public could be expected to have beneficial effects on the soundness and efficiency of the financial system. This can occur in a number of ways:

- To the extent financial literacy facilitates a more prudent management of household balance sheets, it could reduce lending risks for banks and other providers of credit.
- Improved financial literacy could result in more discerning choice of investment and other financial products by consumers. In turn, this is likely to strengthen the incentives for financial institutions to respond innovatively to consumer demand, leading to a more dynamically efficient financial system.
- A more financially literate society could be expected to exert stronger market disciplines on financial service providers by exercising greater scrutiny over the risks of particular financial institutions and their products, and through a greater awareness of risk-return trade offs. In turn, stronger market disciplines are likely to encourage more prudent management of risks by financial institutions and a higher standard of financial service delivery.
- Well-informed investment decisions, based on a high level of financial literacy, could be expected to result in a more productive allocation of resources through time, reflecting a more discerning approach to the balancing of risk and return. In turn, this should contribute to a higher potential growth rate, and possibly a less cyclically volatile economy, with longer-term flow-on benefits for financial stability.

Reliance on market disciplines plays an important role in the regulation of banks and some other financial institutions in New Zealand. In the case of banking, the Reserve Bank, New Zealand's supervisor of registered banks, has adopted a regulatory stance that encourages self and market discipline to supplement (and substitute for) the use of regulatory discipline. The key tools that the Reserve Bank uses to

facilitate market discipline are quarterly financial disclosures and mandatory credit ratings. Although a significant source of market discipline on banks comes from corporate investors and the money markets, the non-expert depositor should nonetheless be an important channel for market discipline. In this case, disclosures and credit ratings are effective only if people understand what they mean and incorporate them into their decision making – which requires at least a basic level of financial literacy.

Similarly, the regulation of non-bank deposit takers and insurers relies quite heavily on market discipline – including through non-expert depositors and insurance policyholders, via disclosure and (in the case of property and disaster insurance) mandatory credit ratings. Proposals for enhancements to the regulation of these parts of the financial sector also place emphasis on the role of market disciplines – and therefore implicitly rely on a reasonable degree of financial literacy among depositors and insurance policyholders. The same can be said for some other parts of the financial sector, such as superannuation and managed funds.

Accordingly, the stronger the level of financial literacy among consumers of financial services, the more effective the market discipline channels on financial institutions will be, and the more sound and efficient the financial system is likely to become. By underpinning stronger market disciplines, financial literacy enables a somewhat less intensive approach to the regulation and supervision of financial institutions. It therefore plays a part in reducing the compliance costs and regulatory distortions that can arise under a more intensive form of financial sector regulation and supervision.

Financial literacy also has implications for the efficiency of the financial system. The efficiency of the financial system relates to its role in allocating risk and resources throughout the economy (allocative efficiency), the economic costs of performing its financial service functions (productive efficiency), and its ability to innovate in response to or in anticipation of consumer demand (dynamic efficiency) (Hunter, Orr and White 2005). Financial efficiency can be eroded by factors that make it difficult for consumers to search and compare products and services. It can be eroded by product complexity, or by complexity in disclosures or

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performance assessments – or by insufficient levels of financial literacy.

The result can be sub-optimal and can lead to poor decision making. People can fail to understand risks they take on and may buy inappropriate financial services – for example buying either too much or too little insurance. Or they may simply fail to purchase financial services where it would be beneficial to do so. While financial advice is available, it can be expensive or tied to a particular financial product provider.

Competition may be hindered if people are unable to effectively shop around. More capable consumers are better placed to contribute towards competition and hence stronger and deeper retail markets. John Tiner, CEO of the UK Financial Services Authority and Financial Capability Steering Group Chair, has stated: “If people know what they want, and how to get it, the market for financial services becomes less one-sided and a lot more efficient. Consumers will demand better, cheaper and more appropriate products and services” (Financial Services Authority 2004:1).

### **The importance of financial literacy for the wider economy**

In addition to being important for individuals and the financial system, financial literacy also has important implications for the wider economy. As noted earlier, the potential growth rate of the economy over the longer term is influenced by the allocation of resources within the economy. All else being equal, the higher the risk-adjusted rate of return on resources is, the higher the longer-term growth in the economy could be expected to be.

Financial literacy can influence the allocation of resources in the economy. If investors are financially literate, they are more likely to adopt a discerning approach to their investment strategy, paying greater attention to the risks of alternative investment opportunities and the tradeoffs between risks and return. Financially literate investors are likely to be better placed to seek to maximise the risk-adjusted rates of return on their investments. In turn, this is likely to result in resources flowing to their most productive uses relative to risk, leading to a higher longer-term growth

rate in the economy and, potentially, a lower risk of cyclical volatility in the economy.

It is arguable that New Zealand’s economic growth may have been hindered to some extent as a result of a lack of financial awareness by investors. Specifically, the choices investors have made in allocating their investments and the effect this has had in reducing the size of the domestic savings pool and the operations of a capital market within the country could have had an impact on growth. The choice of investments also affects resource allocation in the economy and can have significant effects on potential economic growth. Of course, the growth rate in the economy is attributed to many factors that go beyond financial literacy. For example, the appetite for debt, the lack of a domestic savings pool and the relatively limited development of domestic capital markets can also be attributed to many other factors, including demographics, lifestyle choices, market size constraints and the lack of significant income growth in New Zealand. Equally, resource allocation in the economy reflects a wide range of factors, of which financial literacy is just one. Nonetheless, it can be persuasively argued that financial literacy does make a longer-term contribution to the growth and robustness of the economy.

## **3 What is known about financial literacy?**

### **International research**

There is a growing body of international research into financial literacy, both by academia and by government agencies. The Organisation for Economic Co-operation and Development (OECD) has researched best practice across its member countries, and Russia made financial literacy a theme of its G8 presidency in 2006. The G8 International Conference on Improving Financial Literacy agreed that the co-ordination of efforts by ministries of finance, economy and education, central banks, and special agencies were important for the establishment of an efficient national system of financial education. The role of governments in promoting financial literacy and providing consumer protection was seen as critical, and needed to be developed in close partnership with other stakeholders, especially with

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private sector and financial institutions. The conference concluded that the next step to be taken to improve financial literacy levels involved each country developing an individual strategy, based on best practices, at the government level.

Tempering this effort by governments, people may not recognise any need to raise their own financial literacy levels. An OECD survey carried out in 2005 found that individuals generally over-estimate their financial literacy. This is consistent with a 2003 German survey conducted by Commerzbank AG. In the Commerzbank AG survey, 80 percent of respondents reported that they were confident in their understanding of financial issues. However, when tested on their financial literacy, only 42 percent were able to answer half of the survey questions correctly (OECD, 2005). Similar results have occurred in the US, the UK and Australia.

Between 1957 and 1985, 29 states in the United States passed legislation mandating some form of consumer education in secondary schools. In 14 states, this enactment required the specific coverage of topics relevant to household decision making, from budgeting, credit management, and balancing cheque books to compound interest and other investment principles. Studying individuals between the ages of 30 and 49 years to determine if participation in a compulsory financial education class at school altered their financial habits as adults, Bernheim, Garrett and Maki (2001) found that before financial education was mandated, there was no difference in savings rates and net worth across states. However, once compulsory financial education classes were established in states, a regular and noteworthy divergence in financial behaviour took place. Those adults who had undertaken financial education classes at high school had higher savings rates (1.5 percentage points higher) and a higher net worth as a percentage of income (one full year's earnings) than those who did not receive financial education. Compared to the overall population, the rate of saving out of income for students exposed to the mandate was 4.75 percent higher; their net-worth-to-earnings ratio was 9 percent higher than that of students who were not exposed.

The Commonwealth Bank of Australia's 2004 survey on financial literacy looked at the link between financial literacy

and outcomes for individuals and the Australian economy. The findings of this study, along with others conducted internationally, demonstrate that there is a definite lack of financial skills and knowledge among people with certain demographic characteristics. The results of the survey showed that younger people, males, students, people with lower levels of education, people with lower income, and the unemployed had poor financial literacy skills. People in older age groups also displayed lower financial literacy, suggesting that financial literacy is not merely a function of age or experience. Lower financial literacy was found to have an impact on an individual's general health, and lower scores significantly related to respondents being unable to pay their utility, telephone and credit card accounts. The survey also revealed that 85 percent of respondents primarily learn about managing their finances through 'trial and error' experiences (Commonwealth Bank Foundation 2004).

### **New Zealand survey data**

There have been relatively few surveys of financial literacy carried out in New Zealand. Two recent surveys are the 2006 *ANZ-Retirement Commission Financial Knowledge Survey*, and a poll commissioned by the Reserve Bank in 2007.

The ANZ-Retirement Commission survey found that, across the entire subject area examined, knowledge increased with age, income, education and net worth. Some highlights from this survey were that:

- New Zealanders generally felt positive about how well they managed their money, with 83 percent saying they felt confident about managing their financial affairs; and
- Over 50 percent of respondents stated that they saved regularly.

These positive findings are, however, tempered by the following:

- Only 8 percent of the respondents stated that they had financial goals.
- 26 percent said their greatest difficulty with managing money was that they did not have enough.

- 19 percent said controlling their own spending was their greatest difficulty.

The survey results also underlined a number of knowledge gaps regarding key financial concepts. For example:

- 53 percent of people did not understand compound interest.
- 70 percent of respondents did not believe that investments in the share market (held in a portfolio) would outperform any other form of wealth generation over the longer term.

The survey also highlighted the lack of understanding of the relationship between risk and return:

- In the 'advanced knowledge' group, which comprise about 15 percent of the population, there were still weaknesses in understanding risk and return for investments offering returns well above market rates.
- 50 percent of all respondents indicated that they would invest lightly in an investment offering above normal returns to determine if the offering was acceptable and that it was paid out, and if nothing adverse occurred within a short period of time they would commit themselves more fully without any further investigation of risk.
- 90 percent of respondents were of the opinion that if an offer greater than the market rate was made by an entity that was well known in the market, the offer would be safe, and they would not consider any further investigation of risk justifying the higher rate.

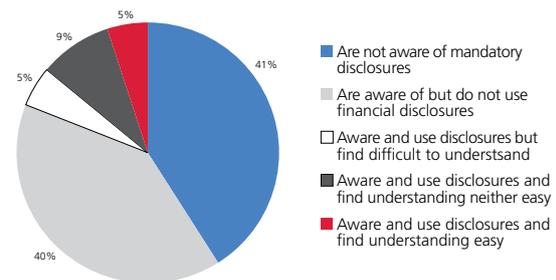
These weaknesses are supported by the Reserve Bank's survey on the understanding of financial information, the use of credit ratings, and perception of risk in the financial sector.

This poll indicated that nearly 60 percent of those surveyed expected the government or the Reserve Bank to bail out a collapsing bank – a further 13 percent were either unsure or felt that a bail-out would depend on specific circumstances. When linked to age demographics, this figure rises to 87 percent of under 30 year olds and falls to 67 percent in the over 60 year olds, indicating that this level of expectation

of a bail out would worsen over time. While not a specific measure of financial illiteracy, this high level of expectation, contrary to the stated intentions of the Reserve Bank, indicates a pressing need to educate consumers about the regulation of financial institutions, and specifically to be aware of the fact that they may lose money when depositing in a bank, and therefore be more willing to read and understand financial disclosures and ratings and exercise market discipline.

The survey also revealed the relative use of financial disclosures issued by banks and non-bank deposit takers. Figure 3 demonstrates that even after many years of disclosure-based regulation in New Zealand, over 80 percent of those surveyed either are not aware of disclosures, or if aware of them, do not use them for decision making.

**Figure 3**  
**Reserve Bank Survey**



**Source: Reserve Bank Survey – Awareness and use of disclosures**

The survey also sought to measure the understanding and use of credit ratings. The survey found that:

- Awareness of credit ratings was high, with 77 percent of those surveyed being aware that banks and some other financial institutions are required to have a credit rating. However, included in that number are 15 percent of those surveyed who claim to know very little about credit ratings. This level of total awareness compares positively to the level of awareness of disclosures which was reported at only 59 percent.
- Around 19 percent of those surveyed said they used credit ratings to decide where to put their money and around 6 percent claimed they knew a lot about credit ratings.

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- The use of credit ratings in decisions to place funds increases with the level of knowledge of ratings, from 6 percent for very little knowledge, to 51 percent for a lot. This finding shows that knowledge of a simple metric such as ratings could be a significant influence on the decision process for the placing of funds – especially when linked to the higher level of awareness of ratings that already exists in comparison to disclosures.

Despite the limited use of both credit ratings and financial disclosures (both around the 20 percent mark), once respondents had heard the definition and an example of a credit rating, almost three quarters of them believed that the credit rating of a financial institution was a very important factor when considering where to put their money. A majority (61 percent) also declared any other financial information made available by a financial institution was important.

Compulsory disclosure of credit ratings from an approved rating agency for financial institutions was seen as helpful by four in five people. A similar majority (79 percent) believed that the disclosure of more financial information in a more user-friendly format would be helpful when deciding where to put their money.

The surveys have indicated that New Zealanders are aware of some of the financial issues that they face, but they are ill-equipped to make financial decisions. They do not effectively understand the basic financial terms or instruments or, more worryingly, the concept of risk and return. Furthermore, they do not use existing financial disclosures or credit ratings in a manner that would enhance their understanding of financial exposures. On the positive side, New Zealanders are aware of their need for financial independence, and when basic financial concepts and disclosures were explained to them, were able to understand the link between these concepts and their needs. The challenge is for the government and other agencies to direct education to enhance financial literacy needs.

## 4 Promotion of financial literacy

The implications of a lack of financial literacy for consumers and financial service markets are not unique to New Zealand. Many countries are developing strategies to raise levels of financial literacy. While governments and organisations internationally have approached financial literacy in different ways, there are a number of recurring themes. These include a move from general to more targeted programmes aimed at different groups in society; an increasing focus on young people, particularly school students; and the emergence of nationally coordinated approaches to developing and delivering programmes, often through a coordinating body.

In the UK, the government is committed to ensuring individuals play a more active role in the financial services market. Recognising that “regulation may protect consumers from making bad decisions, but it cannot empower them to make good ones”, emphasis is being placed on the government’s role in ‘demand side’ initiatives as well as in promoting ‘supply side’ reforms (HM Treasury 2007:19).

In 2005, the Australian Commonwealth Government established the Financial Literacy Foundation. The foundation works in partnership with government, industry and community organisations in providing a national focus for financial literacy issues. Its Advisory Board is responsible for contributing independent and strategic guidance on financial literacy issues.

Additionally, the Australian Government has mandated that school systems must deliver financial education to all students by 2008. In its 2007–08 Budget initiatives, the Australian Government provided funding of AUD 2 million for the provision of professional development for the 1,000 teachers who will be teaching financial literacy from 2008 onwards. As part of the Australian Government’s commitment to lasting generational improvements in financial literacy, a further AUD 4 million was provided to the Department of the Treasury to extend the Understanding Money media campaign.

In the US, a range of federal government initiatives have been taken to promote financial literacy, supported by various private-sector measures. At federal government level, the Financial Literacy and Education Commission has

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played an active role in promoting financial literacy through a range of measures, including educational material and internet-based information. Initiatives have been taken at a range of levels, including financial education programmes for young students and adults.

Established in 1993, the Retirement Commission has the statutory role of promoting public understanding of financial issues in New Zealand. One of the Commission's principal functions is to improve levels of financial literacy within the population, so they can prepare financially for retirement. This involves concentrating on the development of a national approach for the provision of financial education, information and generic advice. Recognised internationally, the Retirement Commission's Sorted programme with its [www.sorted.org.nz](http://www.sorted.org.nz) site provides a valuable resource promoting good money management tools and information. The Sorted brand is reportedly recognised by 60 percent of the population; 20 percent of New Zealanders have visited the Sorted site, and high proportions of visitors report taking action on their finances as a result. The Commission has embarked on a national initiative to highlight the importance of financial literacy and increase the visibility of financial education programmes.

In 2007, the Retirement Commissioner is leading the development of a national strategy for raising the level of New Zealanders' financial literacy. This will be conducted with the assistance of a widely-represented advisory committee. The Retirement Commission is also committed to embedding financial education in schools by 2009. To this end, the Retirement Commission has worked with a range of experts to develop a financial education curriculum covering all years of schooling. This curriculum seeks to enable schools to align their financial education teaching with a nationally recognised standard, and is structured to integrate into key learning areas and increase in depth and complexity as students progress through school. As part of this process, teaching resource needs and requirements for teacher professional development have also been identified.

The Reserve Bank, in common with other central banks, has been an active provider of educational material to help

students and the public better understand the economy and the role of the central bank.<sup>2</sup> The Reserve Bank supports this objective through its publications, a student challenge contest on monetary policy, and its support of the Enterprise New Zealand Trust – a non-profit organisation that operates programmes in New Zealand schools to promote financial literacy, enterprise education, and business understanding. The purpose of the Trust's financial education programmes is to raise awareness and provide innovative opportunities for students to participate in real life financial decision making, whilst developing money management, future investment and financial planning capability. In support of its financial education programmes, Enterprise New Zealand Trust has developed assessment material and a repository of resources for teacher use. Professional development is a core component of the support offered. The Trust has been working with the New Zealand Qualifications Authority to link financial education to unit standards and the achievement standards framework currently used in school curriculum subjects for the National Certificate of Educational Achievement.

Although these and other initiatives, including those promoted by many private-sector entities, are all helping to promote financial literacy in New Zealand, there is a widely-recognised need for further measures to strengthen financial literacy and capability among the general public. This theme emerged strongly in the government's Review of Financial Products and Providers (the RFPP), where numerous submissions reiterated the need for more initiatives to promote financial literacy and the adoption of more user-friendly forms of financial disclosure.

The RFPP does not involve financial literacy measures, but does entail complementary initiatives to enhance the ability of investors to access information on financial service providers. These initiatives include proposals to simplify and

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<sup>2</sup> For example, the Bank of Spain has a customer portal to increase customer understanding of financial services and products; a Bundesbank campaign in Germany targets young people information them about money and monetary policy. In Switzerland, there is a package of materials about money and a monetary policy simulation game.

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strengthen financial and risk-related disclosures by financial institutions and to implement a financial service registration framework that will make it easier for investors and others to access financial disclosure statements and other material relevant to their investment decisions. There are also proposals for some categories of financial institution – including non-bank deposit takers – to be required to obtain and disclose prominently a credit rating from a rating agency approved by a regulatory agency. Taken together, these measures could be expected to facilitate investor access to information on financial service providers and provide more user-friendly and relevant information to them.

In addition to these measures, the government is also promoting major reforms to the regulation of financial advisers to the public, including requiring financial advisers to be registered with and overseen by a professional body approved by the Minister of Commerce. These new requirements will strengthen the regulation of financial advisers and encourage the adoption of higher standards of financial advisory services in New Zealand.

In order for the benefits to be reaped from enhanced disclosures and credit ratings, and the strengthening of financial adviser regulation, there will be a need for further initiatives to enhance financial literacy. A number of initiatives can be considered, including:

- developing educational material to accompany financial and risk disclosures for financial institutions;
- encouraging rating agencies and the financial service industry to promote public understanding of financial and risk disclosures, including through their own educational material;
- working with the business news media to heighten their understanding of financial risks and disclosures, and encouraging them to convey financial risk and disclosure information in user-friendly formats to the public;
- working with consumer groups to heighten understanding of financial risk and other considerations relevant to making investment decisions, and to encourage investors to make greater use of them; and

- there is also significant scope to further integrate financial literacy programmes into the school curriculum and provide other forms of educational material via community programmes.

These kinds of initiatives are likely to be explored by government agencies, including the Reserve Bank, as part of the broader moves to promote financial literacy.

## 5 Conclusion

This article has argued that financial literacy is important at many levels. It is an essential element in enabling people to manage their financial affairs and can make an important contribution to the soundness and efficiency of the financial system, and to the performance of the economy.

The data on New Zealand's level of financial literacy raise some areas of concern. A low level of public financial knowledge can mean that inappropriate risk return decisions are being made, and that people are not necessarily aware of the risks they face in their day-to-day financial decisions.

Improved financial literacy can benefit individuals and families by giving them more control over their money and helping them make better financial decisions. Good financial literacy skills will build the capacity of New Zealanders to better understand and manage financial risk, and take advantage of increased competition and choice in New Zealand's finance sector.

Financial literacy needs to be embedded in the New Zealand culture in the same way that New Zealanders know how to 'Slip, Slop, Slap' before going out into the sun, or 'Buckle Up' their seatbelt before driving their vehicle. Financial literacy is in the interest of New Zealand as a whole, and the creation of a financially healthy New Zealand is the responsibility of all – government, the private sector and community-based organisations. It is too large a task for one group of stakeholders to achieve on their own.

The final result is not to create financial experts; it is more important to equip individuals with sufficient knowledge to make sense of financial activities, seek out appropriate information, feel able to ask relevant questions, and be able to understand and interpret the information that they subsequently acquire.

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**RESERVE  
BANK**  
MUSEUM

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

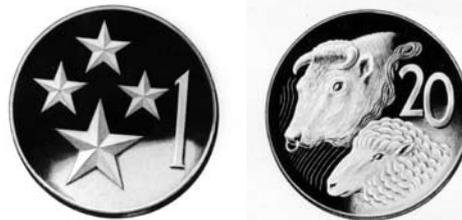
New displays for 2007 include the only working example in New Zealand of the MONIAC hydro-mechanical econometric computer developed by New Zealand economist and inventor Bill Phillips in the late 1940s.

Between July and November 2007 the museum is also hosting an exhibition of coins from the collection of James Berry, designer of New Zealand's decimal coins, celebrating his life and the fortieth anniversary of decimalisation.

Open 9.30 a.m.–4.00 p.m. weekdays.  
Closed weekends, public holidays, and for special events. Please call to confirm opening hours.

Reserve Bank Museum  
2 The Terrace  
Wellington  
New Zealand

ph 04-471-3862  
museum@rbnz.govt.nz  
<http://www.rbnz.govt.nz/about/museum/2766074.html>



Colour photography by Stephen A'Court. Draft 1967 decimal coins by James Berry.

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## DISCUSSION PAPERS

DP2007/03

### Satisficing solutions for New Zealand monetary policy

*by Jacek Krawczyk and Rishab Sethi, March 2007*

Computing the optimal trajectory over time of key variables is a standard exercise in decision-making and the analysis of many dynamic systems. In practice, however, it is often enough to ensure that these variables evolve within certain bounds. In this paper we study the problem of setting monetary policy in a 'good enough' sense, rather than in the optimising sense more common in the literature. Important advantages of our satisficing approach over policy optimisation include greater robustness to model, parameter, and shock uncertainty, and a better characterisation of imprecisely defined monetary policy goals. Also, optimisation may be unsuitable for determining prescriptive policy in that it suggests a unique 'best' solution while many solutions may be satisficing. Our analysis frames the monetary policy problem in the context of viability theory, which rigorously captures the notion of satisficing. We estimate a simple closed economy model on New Zealand data and use viability theory to discuss how inflation, output, and interest rate may be maintained within some acceptable bounds. We derive monetary policy rules that achieve such an outcome endogenously.

DP2007/04

### Stylised facts about New Zealand business cycles

*by Sharon McCaw, March 2007*

This memo characterises the business cycles of the New Zealand economy, à la Stock and Watson (1998). The paper provides a set of stylised facts that New Zealand macroeconomic models should, ideally, be capable of emulating. This paper therefore serves as an important backdrop to macro modelling efforts. We also examine the same data series for the US and Australia, providing an indication of which features of New Zealand's business cycles may be idiosyncratic.

DP2007/05

### A model of spatial arbitrage with transport capacity constraints and endogenous transport prices

*by Andrew Coleman, March 2007*

This article solves a high frequency model of price arbitrage incorporating storage and trade when the amount of trade is limited by transport capacity constraints. In equilibrium there is considerable variation in transport costs, because transport costs rise when the demand to ship goods exceeds the capacity limit. This variation is necessary to attract shipping capacity into the industry. In turn, prices in different locations differ by a time varying amount. Thus, while the law of one price holds, it holds because of endogenous variation in transport costs.

DP2007/06

### Conditioning and Hessians in analytical and numerical optimization - some illustrations

*by Christie Smith, April 2007*

This note illustrates the connections between the Hessians of numerical optimisation problems, variance-covariance matrices for parameter vectors, and the influence that data mismeasurement may have on parameter estimates. Condition numbers provide a central guide to the sensitivity of common numerical problems to data mismeasurement. Examples are provided that clarify their importance. Two simple prescriptions arise from this analysis. First, data must be of an 'appropriate' scale. In some cases this means that the data need similar means and similar variances. Second, in numerical algorithms it is desirable to ascertain the condition number of the Hessian implied by the initial parameter values used for numerical optimisation algorithms. Condition numbers are easy to compute and indicate whether the updates from an initial starting value are likely to be poor.

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DP2007/07

**The pitfalls of estimating transactions costs from price data: evidence from trans-Atlantic gold-point arbitrage, 1886-1905**

*by Andrew Coleman, April 2007*

This paper argues that bilateral spatial price models do not estimate bilateral transactions costs when trade with third cities is important. The paper examines trans-Atlantic gold arbitrage during the gold standard era by assembling a database indicating when trans-Atlantic gold shipments occurred. It shows that two-way gold shipments between New York and London frequently occurred prior to 1901. However, in 1901 gold shipments to London ceased and were replaced by triangular arbitrage shipments through Paris. Consequently, New York and London gold price data cannot be used to estimate New York-London transactions costs after 1901, as no trade took place.

DP2007/08

**The McKenna Rule and UK World War I finance**

*by James M Nason and Shaun P Vahey, April 2007*

This paper argues that UK WWI fiscal policy followed the 'English method' identified by Sprague (1917) and his discussants, and revived by the US to finance the Korean War (see Ohanian 1997). During WWI, UK fiscal policy adopted the 'McKenna rule' named for Reginald McKenna, Chancellor of the Exchequer (1915-16). McKenna presented his fiscal rule to Parliament in June 1915. The McKenna rule guided UK fiscal policy for the rest of WWI and the interwar period. We draw on narrative evidence to show that motivation for the McKenna rule came from a desire to treat labour and capital fairly and equitably, not pass WWI costs onto future generations, and commit to a debt retirement path and higher taxes. However, a permanent income model suggests the McKenna rule adversely affected the UK because a higher debt retirement rate produces a lower consumption-output ratio. Data from 1916-37 supports this prediction.

DP2007/09

**Local linear impulse responses for a small open economy**

*by Alfred A Haug and Christie Smith, April 2007*

Traditional vector autoregressions derive impulse responses using iterative techniques that may compound specification errors. Local projection techniques are robust to this problem, and Monte Carlo evidence suggests they provide reliable estimates of the true impulse responses. We use local linear projections to investigate the dynamic properties of a model for a small open economy, New Zealand. We compare impulse responses from local projections to those from standard techniques, and consider the implications for monetary policy. We pay careful attention to the dimensionality of the model, and focus on the effects of policy on GDP, interest rates, prices and the exchange rate.

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## NEWS RELEASES

### How fiscal policy affects the wider economy

*30 March 2007*

The Reserve Bank has presented a framework for considering how fiscal policy affects the wider economy, an important issue for monetary policy.

The framework appears in an article in March 2007 issue of the Reserve Bank of New Zealand Bulletin, released today.

A key message is that the specific details of new spending or taxation initiatives, and their overall scale, need to be taken into account when analysing how economic activity or inflation may be affected. The impact of fiscal policy changes and their significance for monetary policy will also depend on the state of the economy at the time they occur.

The article notes that increases in spending can have a relatively large impact on economic activity if they prompt additional private sector spending. For example, spending on public infrastructure may lead to additional business investment.

The effects of tax policy changes on economic activity are likely to depend partly on the incentives these create to save, work or invest, as well as their initial effect on household or business incomes. For example, dollar for dollar, cutting company taxes is likely to boost demand more than tax cuts designed to support savings. While some spending or tax changes can impact on the economy's capacity to produce goods and services, particularly if they affect business investment or labour force participation, these effects are likely to be reasonably slow.

As explained in the Bank's March 2007 Monetary Policy Statement, Government spending has been rising in recent years. Until recently the increase in spending has been more than matched by rising tax revenues. However, the article suggests that increases in spending in recent years may have stimulated activity, because not all of the income that was paid as tax would otherwise have been spent. Fiscal policy is expected to remain stimulatory over the next two fiscal years.

The second article of this issue of the Bulletin examines the country's productivity record, drawing on new productivity data recently released by Statistics New Zealand. The new

data suggest that when 'hard-to-measure' sectors are excluded, New Zealand's productivity performance over the past decade appears to have been better than previously believed and compares favourably with Australia's.

The third article considers how emerging Asia has affected inflation in advanced economies over recent years. The fourth article undertakes a comparison of price movements in New Zealand with those in Australia, drawing on detailed data from each country's CPI.

### Yogesh Anand leaving the RBNZ for the BIS

*19 April 2007*

Reserve Bank Chief Information Officer Yogesh Anand is leaving the Bank to take up the role of Head of Information Technology Services for the Bank for International Settlements (BIS) in Basel, Switzerland.

Reserve Bank Governor Alan Bollard congratulated Mr Anand on his appointment.

"During his seven years with the Bank, Mr Anand has made significant positive changes to the Bank's information technology requirements and knowledge management.

"This is a loss for the Bank but we wish him well on his new job," Dr Bollard said.

At the BIS Mr Anand will have responsibility for the Bank's information technology delivery. In addition, he will provide coordination for the regular meetings of the G10 Central Bank Group of Computer Experts.

Mr Anand said he is looking forward to the new role at BIS. "It's an exciting opportunity to work for such a prestigious organisation.

"Parts of the BIS environment are similar to the RBNZ and there are some interesting projects on the horizon. I am looking forward to making a contribution," Mr Anand concluded.

Mr Anand takes up his new position on 1 August 2007. His last day at the Reserve Bank will be 20 July 2007.

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## Reserve Bank raises OCR to 7.75 percent

26 April 2007

The Official Cash Rate (OCR) will increase by 25 basis points to 7.75 percent.

Recent indicators confirm that the resurgence in economic activity that began in late 2006 has continued over recent months, with domestic demand continuing to expand strongly. As we noted in March, demand is being fuelled by a buoyant housing market, increases in government expenditure, a rising terms of trade, ongoing net immigration, and a robust labour market.

The lift in domestic demand is placing further pressure on already-stretched productive resources. Firms report that capacity is very stretched and that they are again experiencing increased difficulty in finding both skilled and unskilled staff. Consistent with these pressures, non-tradables inflation has remained persistently strong and has recently shown signs of re-acceleration.

The trade-weighted exchange rate has risen further, which will exert some downward pressure on medium-term inflation. The exchange rate is now at levels that are both exceptional by historical standards, and unjustified on the basis of medium-term fundamentals. Parts of the export sector continue to face challenging conditions, but the recent sharp lift in world dairy prices is expected to provide a boost to incomes in that sector and tourist arrivals are continuing to grow.

There has already been a recent rise in fixed mortgage interest rates. This further increase in the OCR is aimed at ensuring that inflation outcomes remain consistent with achieving the target of 1 to 3 percent inflation on average over the medium term.

## Banks need to think about broader economic imbalances

9 May 2007

The Reserve Bank today released its Financial Stability Report, a twice-yearly report that assesses the health of the New Zealand financial system. The report covers developments in financial institutions, foreign exchange and debt markets,

and payments systems. It also comments on recent financial policy developments.

The Reserve Bank Governor, Dr Alan Bollard, commented that New Zealand's financial system has continued to be stable. Financial markets are performing well and the banks continue to be well capitalised and strongly profitable.

"However, there are significant economic imbalances which present risks for the financial system. The ongoing housing boom and large savings deficit in the household sector are being funded by international borrowing via the domestic banking system."

"While global markets are currently very liquid, we should be mindful that this will not always be the case. And the longer imbalances run, the more likely we are to see a sharp correction".

"The banks are highly competitive, but while competition is to be encouraged, the low level of lending margins has contributed to ever increasing levels of household debt and upward pressure on house prices," said Dr Bollard.

Reserve Bank Deputy Governor, Grant Spencer, said that financial indicators suggest that banks are managing the risks associated with their individual portfolios adequately. "However, it is not clear that banks are taking appropriate account of the systemic risks associated with the rapid growth in their aggregate lending."

Dr Bollard said this financial stability risk raises the question of whether a regulatory response is needed to better manage the risks to a sound and efficient financial system.

"The increased focus on risk sensitivity in Basel II will introduce a better alignment of risk and regulatory capital – for instance, loans on higher loan-to-value ratios will command higher regulatory capital holdings. The Bank has also been considering whether the current framework should be modified in this direction ahead of the introduction of Basel II," said Dr Bollard.

Dr Bollard concluded by noting that the best contribution to continued financial stability would be a moderation and gradual adjustment in the housing market. The banks should be mindful of this and be careful not to exacerbate the risks inherent in already-stretched household balance sheets.

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## **Reserve Bank wins Award**

**28 May 2007**

The Reserve Bank of New Zealand announced today that it has won a major public relations award for the introduction of New Zealand's new coins.

The public awareness campaign 'Change for the Better' has won the 'Government' Category of the 2007 Public Relations Institute of New Zealand (PRINZ) Awards held on 25 May 2007.

The 'Change for the Better' public awareness campaign helped inform people about New Zealand's smaller and lighter coins, introduced in July 2006.

The PRINZ Awards are designed to celebrate the best public relations campaigns in New Zealand, and are open to all members of the Institute.

Anthea Black, the Reserve Bank's Communications Adviser, said the wide public acceptance of the changes, lack of major issues or confusion arising from the change over, and the speedy return of a high volume of the old coins, indicates the campaign successfully achieved its goals.

"Most of us have got used to the lighter and smaller 10, 20 and 50 cent coins that came into circulation at the end of July, and no one seems to really be missing those heavy old coins (especially the 50s!)" said Anthea Black.

## **Alan Bollard reappointed as Governor**

**29 May 2007**

The Finance Minister today announced that Dr Alan Bollard has been reappointed Reserve Bank Governor and that he and the Governor had signed an unchanged Policy Targets Agreement (PTA).

Dr Bollard's term as Governor has been extended a further five years, expiring in September 2012.

"Alan has demonstrated his integrity and outstanding general management skills in performing his duties as Governor over the past five years so I am pleased to accept the Reserve Bank Board's recommendation to reappoint him for another five year term," said Dr Cullen

The Minister and the Governor agreed that the current PTA continues to ensure transparency and provides an appropriate basis for accountability in the conduct of monetary policy.

"As Minister of Finance my priority is to maintain a disciplined fiscal policy approach to help the Governor achieve the inflation outcomes in the PTA."

Dr Bollard said he was pleased to accept another term as Governor of the Reserve Bank.

Dr Cullen and Dr Bollard added that if their understanding of the appropriate targets and mechanisms changed for the operation of monetary policy, which could arise from the select committee inquiry into monetary policy, then Dr Cullen and Dr Bollard could agree to amend the Policy Targets Agreement at that time.

## **Reserve Bank Chief Information Officer appointed**

**30 May 2007**

The Reserve Bank today announced the appointment of Tanya Harris as the Bank's Chief Information Officer and Head of Knowledge Services Group.

As Chief Information Officer, Ms Harris is responsible for the Bank's information management and technology.

Ms Harris has worked at the Bank for the last five years as Head of Human Resources, and prior to that was a Human Resources Manager with the New Zealand Treasury.

This move follows the resignation of Yogesh Anand, who will be taking up a position as Head of Information Technology Services for the Bank for International Settlements.

Ms Harris said she was looking forward to a new challenge and working with a great team of people in the Knowledge Services Group.

Ms Harris takes up her appointment in July.

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## Reserve Bank raises OCR to 8.00 percent

*7 June 2007*

The Official Cash Rate (OCR) will increase by 25 basis points to 8.00 percent.

Reserve Bank Governor Alan Bollard said: "Domestic demand has grown strongly since late 2006, particularly in the household sector. Housing market activity has been buoyant, consumer confidence has remained relatively robust and a range of business sector indicators, including employment and investment intentions, have been strong. As we have noted recently, government spending continues to increase, which is contributing to domestic demand.

"Following several years of strong growth, firms have indicated that capacity remains stretched and that finding both skilled and unskilled staff has become increasingly difficult. These pressures continue to underpin inflation.

"A sustained period of slower growth in domestic activity will be required to alleviate inflation pressures. Lending rates have risen significantly in recent months, partly due to previous increases in the OCR. Given the usual lags, we have not yet seen the effect of these increases on domestic demand and inflation pressures. There are some early indications from recent opinion surveys and other data that growth may be starting to soften, but these are by no means conclusive. Indeed, at present the risks to domestic activity appear to remain on the upside.

"A significant development in the past six months has been a marked increase in dairy prices. While there are uncertainties about the future path of these prices, the increases will assist in narrowing New Zealand's trade deficit. The rise in dairy sector incomes will provide a substantial boost to economic activity over the next few years, but will also add to inflation pressures.

"Parts of the export sector outside the dairy industry will continue to face challenging conditions due partly to the New Zealand dollar. As we noted in April, the exchange rate is at levels that are both exceptionally high and unjustified on the basis of New Zealand's medium-term fundamentals.

"Had we not increased the OCR this year, it is likely that the inflation outlook would now be looking uncomfortably high. This further increase in the OCR is to ensure that inflation outcomes remain consistent with achieving the target of 1 to 3 percent inflation on average over the medium term."

## Reserve Bank welcomes decision on prudential regulation

*19 June 2007*

The Reserve Bank welcomes the Cabinet decision for the Reserve Bank to be the single prudential regulator for New Zealand, as part of the Review of Financial Products and Providers.

This will widen the scope of the Reserve Bank's prudential functions to include the prudential regulation of non-bank deposit-takers (NBDTs) and insurers.

For NBDTs, trustee corporations will continue to be the front-line supervisors. The Bank's role will be limited to licensing NBDTs, developing and enforcing minimum prudential and governance requirements and applying credit rating requirements. The Bank will also assist in the revision and simplification of public disclosure requirements for NBDTs.

The proposed overall objective for prudential regulation of the NBDT sector is to promote a sound and efficient financial system.

The proposals are expected to provide a more consistent approach to the supervision of NBDTs and provide a stronger basis for confidence in the NBDT sector. Improved disclosure and credit ratings will assist depositors to make better-informed investment decisions.

For more detailed information on key features of the new arrangements please see "Questions and Answers on Proposals for the Regulations of Non-Bank Deposit Takers" on the Reserve Bank's website.

Policy decisions on the regulation and supervision of insurance will be made in the next phase of the Review, expected by November 2007.

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## PUBLICATIONS

<i>Annual Report</i>	Published in October each year.
<i>Financial Stability Report</i>	Published six-monthly. A statement from the Bank on the stability of the financial system.
<i>Monetary Policy Statement</i>	Published quarterly. A statement from the Bank on the conduct of monetary policy.
<i>Reserve Bank of New Zealand Statement of Intent, 2007-2010</i>	
<i>Snakes and Ladders – a guide to risk for savers and investors</i>	
<i>Testing stabilisation policy limits in a small open economy: proceedings from a macroeconomic policy forum</i>	

### Recent Reserve Bank Discussion Papers

#### 2007

DP2007/01	Open economy DSGE-VAR forecasting and policy analysis - head to head with the RBNZ published forecasts <i>Kirdan Lees, Troy Matheson and Christie Smith</i>
DP2007/02	Nowcasting and predicting data revisions in real time using qualitative panel survey data <i>Troy Matheson, James Mitchell and Brian Silverstone</i>
DP2007/03	Satisficing Solutions for New Zealand Monetary Policy <i>Jacek Krawczyk and Rishab Sethi</i>
DP2007/04	Stylised facts about New Zealand business cycles <i>Sharon McCaw</i>
DP2007/05	A model of spatial arbitrage with transport capacity constraints and endogenous transport prices <i>Andrew Coleman</i>
DP2007/06	Conditioning and Hessians in analytical and numerical optimization - some illustrations <i>Christie Smith</i>
DP2007/07	The pitfalls of estimating transactions costs from price data: evidence from trans-Atlantic gold-point arbitrage, 1886-1905 <i>Andrew Coleman</i>
DP2007/08	The McKenna Rule and UK World War I Finance <i>James M. Nason and Shaun P. Vahey</i>
DP2007/09	Local linear impulse responses for a small open economy <i>Alfred A. Haug and Christie Smith</i>

Full lists of Discussion Papers are available from Administration, Economics Department. Lists of the Working Papers and the Research Notes can also be obtained from the Economics Department.

### Pamphlets

*Central banking in New Zealand*  
*Explaining Currency*  
*Explaining New Zealand's Monetary Policy*  
*This is the Reserve Bank*  
*Your Bank's disclosure statement – what's in it for you?*

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

Knowledge Centre  
Knowledge Services Group  
Reserve Bank of New Zealand  
2 The Terrace, P O Box 2498  
WELLINGTON  
Phone 04 472–2029

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

Vol. 69, No. 2, June 2006

### *Articles*

Confronting divergent interests in cross-country regulatory arrangements

Modelling for monetary policy: the New Zealand experience

Major global developments in the new millennium

Supplementary stabilisation instruments: executive summary

Vol. 69, No. 3, September 2006

### *Articles*

The policy origins of the Reserve Bank of New Zealand

Modelling New Zealand inflation in a Phillips curve

An assessment of recent Reserve Bank forecasts

Vol. 69, No. 4, December 2006

### *Articles*

Assessing core inflation

The Reserve Bank's local-incorporation policy

The Reserve Bank of New Zealand Amendment Act 2006

Changes to the liquidity management regime

Testing stabilisation policy limits in a small open economy:  
editor's summary of a macroeconomic policy forum

Vol. 70, No. 1, March 2007

### *Articles*

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'

