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## Contents

|  |    |
|--|----|
| Editor's note  | 3  |
| <b>Articles</b>  |    |
| Lessons learned from the Economics Department's research work on household balance sheets and related issues<br><i>Phil Briggs</i> | 5  |
| Households' attitudes to savings, investment and wealth<br><i>Janice Burns and Maire Dwyer</i>                                     | 25 |
| Microeconomic analysis of household expenditures and their relationship with house prices<br><i>Mark Smith</i>                     | 39 |
| Introducing the MONIAC: an early and innovative economic model<br><i>Tim Ng and Matthew Wright</i>                                 | 46 |
| <b>For the record</b>  |    |
| Discussion papers  | 53 |
| News releases  | 56 |
| Publications   | 57 |
| Articles and speeches in recent issues of the Reserve Bank <i>Bulletin</i>   | 59 |

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## Editor's note

In this edition of the Reserve Bank *Bulletin*, we focus on the theme of the household sector. Household spending, saving and investment patterns strongly influence developments in the economy and financial system. Household expenditure amounts to roughly two-thirds of GDP, and lending to households – the vast bulk of which is secured on houses – accounts for just over half of total lending by New Zealand banks and other financial institutions. A substantial part of this lending needs to be funded from overseas sources, as there is a shortfall of domestically-sourced funding. The household sector's behaviour thus profoundly affects the dynamics of the business cycle, the exposures of the financial system, and the conduct of monetary policy and financial system oversight.

In the first of our three articles relating to the household sector, Phil Briggs provides a stocktake of the extensive research programme conducted in the Reserve Bank on the persistent rise in household debt, decline in the rate of household saving, and rise in house prices. These phenomena have featured starkly in economic developments in New Zealand over the past few years. The article summarises a range of research, draws out the lessons learned and likely future trends, and outlines areas for further work. The research suggests that the high levels of consumption associated with negative saving have been sustained by equity withdrawal from housing and farms, as lowly-g geared sellers have sold property to highly-g geared buyers, in the environment of strongly rising house prices.

The second article is a report by external consultants, Janice Burns and Maire Dwyer, engaged by the Reserve Bank to conduct a small-scale, exploratory study into householders' attitudes to saving, investment and wealth. We deliberately asked sociologists, rather than economists, to undertake the study, as we wanted to see if a sociologist's perspective on the issues would yield insights not so readily revealed by the economist's approach we would typically take in-house. The New Zealand experience of the household sector's behaviour, at the macroeconomic level at least, has been somewhat different to that seen in other Western countries. The report sets out some of the cultural and psychological factors that, along with the economic and policy environment, may have been influential in this experience.

In the third article, Mark Smith looks at how household-level (microeconomic) data may be used to supplement macroeconomic data in the analysis of household sector issues. Looking at variables measured at the household level, such as householder age, whether or not the householder owns the house, and the level of debt secured against a house that is owner-occupied, can enrich our understanding of the relationships evident in macro variables. Alternative explanations for macro phenomena such as the positive association between house price inflation and household expenditure may be explored and tested using such household-level data. The article sets out an example and some broad results of work we will soon be reporting in more depth in this area.

In our fourth and final article in this edition, Matthew Wright and I take a brief, mostly photographic, look at the restoration recently of the MONIAC hydraulic economic computer now installed and in working order in the Reserve Bank Museum in Wellington. This computer was designed and built by the pioneering New Zealand economist, Bill Phillips, in the 1940s. Since that time, the economic models in use for regular policymaking at the Reserve Bank have evolved considerably, taking advantage of the enormous advances in computing power. In these models too, Phillips' significant intellectual contribution to economic thinking remains apparent.

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

**Tim Ng**  
Editor

 **RESERVE  
BANK**  
**MUSEUM**

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

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.

Until early 2008 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, and the 'five cent' dress from the 2006 World of WearableArt Awards.

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

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



Photography by Stephen A'Court.

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## ARTICLES

# Lessons from the Economics Department's work on household balance sheets and related issues

by Phil Briggs

Over the last three years, the Economics Department has undertaken a range of research regarding the financial position of households. This article provides an overview of this research. The work was largely motivated by concerns about: rising household debt, an apparent decline in household saving, and rising house prices. Things that have been learned include the following:

- Data on financial assets and borrowing can be used to derive an alternative estimate of household saving. Like Statistics New Zealand's measure, the alternative measure suggests that the household saving rate is currently negative.
- The high levels of consumption associated with negative saving appear to have been sustained by equity withdrawal from housing and farms, which in recent years has been large. Most of this equity withdrawal has probably occurred as the result of property sales rather than refinancings. The high levels of equity withdrawal reflect the strong rises in property prices that have occurred since the early 2000s.
- Factors that are likely to have affected the demand for housing over recent years include: lower interest rates, financial deregulation, the surge in net migration in 2001-2002, rising household income, the taxation treatment of rental housing, and households' expectations of continuing house price growth.
- In the short term, housing supply has not been able to match demand and the result has been rising house prices. Furthermore, the rise in the house price-to-income ratio over the last two decades or so suggests that there may be some factors that have been constraining the supply of housing over the long term.

The article concludes with a look at likely future trends, and outlines areas for further work.

## 1 Introduction

Over the last three years, the Economics Department has undertaken a range of research on issues related to the financial position of households. This work has been motivated largely by concerns about:

- rising levels of household debt
- an apparent decline in household saving
- rising house prices.

Each of these issues can have consequences for financial stability and the economic cycle, and hence are of vital interest to the Reserve Bank.

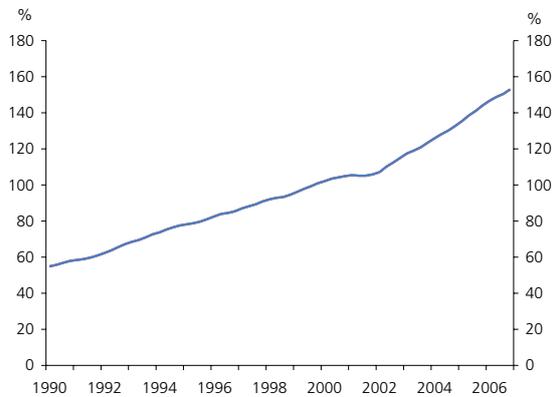
## Rising debt

The rise in household debt has long been evident from data that the Reserve Bank collects directly from the financial sector. The debt-to-disposable income ratio showed a sustained rise through the whole of the 1990s, and it began an even sharper climb from around 2002 (figure 1). When would it end, and what would be the consequences of these higher debt levels? Would households be more likely to get into difficulties if economic growth were to falter?<sup>1</sup>

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<sup>1</sup> The Reserve Bank's financial stability division has also been looking at these issues, using household-level data from surveys like the Household Economic Survey (HES). For initial reports on this work see *Financial Stability Report*, Reserve Bank of New Zealand, May 2006, pp13-14. Available from [www.rbnz.govt.nz](http://www.rbnz.govt.nz).

**Figure 1**  
Household debt as percent of household disposable income

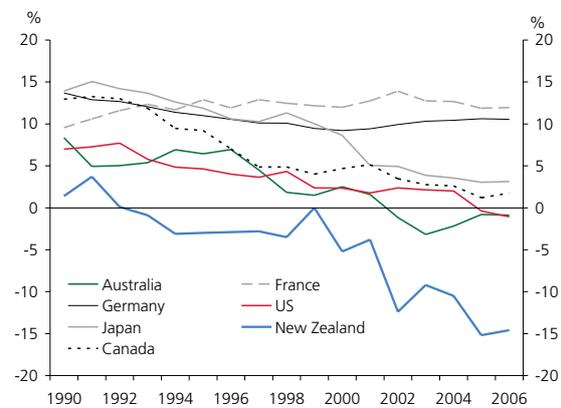


Sources: RBNZ, Statistics New Zealand.

### Declining household saving

Another issue of long-standing concern has been an apparent decline in saving by the household sector. Figures from Statistics New Zealand suggest that the household saving rate has been negative for most years since the mid-1990s and has been strongly negative since 2002 (figure 2).<sup>2</sup> With the government sector now having a high level of saving, and the business sector producing positive saving, the household sector appears to be the one that has been holding down the level of national saving. Clearly a low level of household saving can be a major factor in the emergence of macroeconomic imbalances. A low level of national saving, where saving is lower than the level of investment, results in a higher current account deficit and a higher net level of international debt.

**Figure 2**  
Household saving as percent of household disposable income

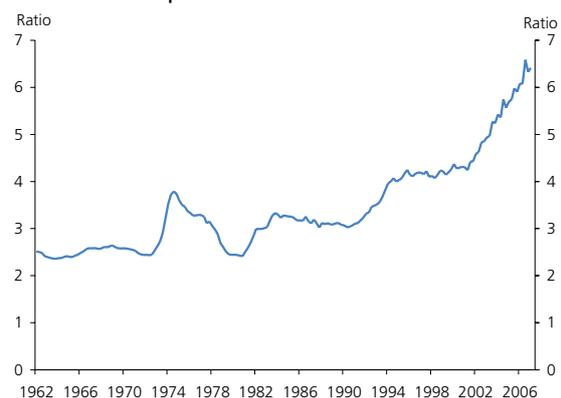


Source: OECD, Statistics New Zealand.

### Rising house prices

A third issue, and the one that has probably been of the greatest concern in recent years, is the rise in house prices. House prices have risen sharply since the end of 2001, with both house prices and section prices essentially doubling since then. However, rising house prices, especially relative to household income, have not been a new phenomenon. As figure 3 shows, the house price-to-income ratio has generally been on an upward trend since the early 1980s.

**Figure 3**  
Ratio of average house price to average household disposable income



Source: Quotable Value, Statistics New Zealand, RBNZ.

In looking at the household sector's financial position, we have given attention to both the household balance sheet and the household income and outlay account (HIOA).

The balance sheet for the household sector gives us a measure of the sector's wealth or net worth, with this being the difference between assets and liabilities. This is a stock

<sup>2</sup> Statistics New Zealand's figures are labelled 'experimental', which largely reflects the fact that the methodology for compiling them is likely to change, especially when institutional sector accounts are derived for other sectors beside the household sector. See Statistics New Zealand (2007b).

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measure – it measures the stock of wealth at a particular point in time. Currently there is no official household balance sheet; unofficial estimates of assets and liabilities are produced by the Reserve Bank.

The HIOA, which is produced by Statistics New Zealand, includes estimates of household disposable income and household consumption. The difference between these two estimates is household saving. This is a flow measure – it measures the flow of money in a specified time period. In general, saving is the part of income that is left over and which can be invested.

Some analysts use the term ‘savings’ (note the extra ‘s’) to denote wealth. It can be argued that this reflects common usage of the word, since money in a bank account is often referred to as savings. But given the confusion that this can cause, this article uses the term ‘wealth’ for the stock measure, and ‘saving’ for the flow measure.

Note that saving is distinctly different from wealth or changes in wealth, although the concepts are related. Wealth is affected by the amount of saving but it is also affected by asset revaluations.

Revaluations – especially rises in house prices – have been a major factor regarding changes to the household balance sheet. Given that housing is the dominant component on the asset side of the account, the rise in house prices has resulted in a sharp rise in total assets. Similarly, borrowing that is secured on housing is the dominant component of the liabilities side of the account, and increases in this borrowing have driven up total liabilities. The result of the revaluations has been a rise in households’ net worth.

Overall, the rise in house prices has been a central issue with respect to changes in household balance sheets. And as we will see, the rise in house prices has also been a factor behind the changes in saving behaviour.

Section 2 of this article looks at what has been learned about household wealth and saving, while section 3 looks at what has been learned about house prices. In the work that we have done, we have looked at both measurement issues and behavioural issues, in a bid to get a better understanding of what has been going on. An understanding of how things

interact and change over time will influence our views on how best to maintain price and financial stability.

In section 4, possible future trends with respect to household balance sheets are identified, while section 5 draws some broad conclusions and takes a brief look at further work.

## 2 What have we learned about household wealth and saving?

*a. Home ownership rates as derived from censuses prior to 2006 were underestimates, since they did not fully account for homes held in family trusts. However, even when trust homes are accounted for, home ownership rates still show a long-term decline.*

Initial results from the 2001 census indicated that home ownership rates had been declining. However, there was some doubt about this given that a lot of homes were held in family trusts and it was unclear as to whether these had been counted as being owned. The census had, for the first time, tried to pick up the number of dwellings held in family trusts, but it was not possible to identify the number of trust homes from census tables. Using reprocessed census data, and data on trusts from the Household Savings Survey (HSS), it was possible to estimate the proportion of dwellings held in trusts (6.9 percent).<sup>3</sup> Some, but not all of these households, had been counted as being owned by the occupier. Including the ‘missing’ trust dwellings in the ‘owned’ category increased the home ownership rate from the original 2001 census value of 67.8 percent to 70.5 percent. Using IRD data, the number of dwellings held in trusts were estimated for 1991 and 1996, and the census home ownership rates for these years were adjusted upwards. However, like the official figures, the adjusted figures showed home ownership rates falling since 1991.

The 2006 census contained a revamped question regarding trust ownership. The census showed that 12.3 percent of all occupied private dwellings were held in a family trust by the

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<sup>3</sup> Briggs (2006).

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dwelling's usual residents. Including these trust dwellings in the 'owned' category gave a home ownership rate of 66.9 percent, indicating a further decline.

***b. Around a fifth of household assets are now held in family trusts, and this can affect measures of wealth and income at both the aggregate and household levels.***

Additional tables were obtained from the HSS, which gave a more detailed picture of the wealth held in trusts than the original report on the HSS.<sup>4</sup> In this report, Statistics New Zealand showed total household assets (excluding assets held via Maori incorporations) as being \$435 billion. Of this, 'trust assets' accounted for \$29 billion. However, these trust assets cover only the debt that trusts currently owed to households.

When a trust is set up, the trust settlor – the person setting up the trust – usually sells assets to the trust. The purchase of these assets is usually funded by a debt from the trust back to the settlor; this debt is considered an asset to the settlor. The debt is usually repaid by the trust being forgiven a certain amount of the debt each year by the settlor. The 'trust assets' of \$29 billion reported in the HSS cover the debt that is still outstanding and is the part of the total amount of trust assets that are still regarded as being owned by households.

However the HSS also gives us the total amount value of assets held in trusts – these being referred to as 'trust holdings' – and these were worth \$93 billion. It can be argued that households still have a certain degree of access to this wealth, even though it is held by trusts. Subtracting 'trust assets' of \$29 billion – the debt – from household assets of \$435 billion, and adding on the \$93 billion of 'trust holdings' gives a total of \$499 billion. Hence it can be argued that total household assets, in round terms, were \$500 billion in 2001 with about 19 percent of these assets being held off balance sheet.<sup>5</sup> Unfortunately, the HSS did not itemise the values of various types of assets (houses, farms, businesses, etc) held in trusts.

Taking only debt to settlors as being trust assets – and a similar approach is used in the Survey of Family Income and Employment (SoFIE) – can provide problems for analysts using household-level surveys. The asset data is not complete, unless total asset holdings are also included. Household income data may also be incomplete, since for some households income may be retained by trusts.

Most trust holdings in households and financial instruments should be covered in the aggregate data on household assets compiled by the Reserve Bank. These figures include the value of all dwellings, so they will include trust dwellings; they also include all those financial assets that are deemed by banks to be held by the household sector. However, trust holdings in businesses (including farms) are not currently included in the Reserve Bank's figures.

Statistics New Zealand recently made some upward adjustments to household income, expanding the coverage of trust income.<sup>6</sup> This lifted the estimate of the household saving rate from what it had been previously. However, as figure 2 showed – and figure 2 uses the revised estimates of household saving – the household saving rate is still strongly negative.

***c. Equity withdrawal from both housing and farms has been large in recent years, providing a segment of the population with more cash to spend.***

Equity withdrawal by households is the change in borrowing secured on household assets less investment by households in those assets. It generates a net positive cash payment to households, which is available for consumer spending and other uses. A particular form of equity withdrawal is housing equity withdrawal (HEW) and this has been large in recent years. For more details on the concept of HEW, see box 1, overleaf.

HEW is usually calculated using aggregate data (as was done in producing figure 4).<sup>7</sup> However, aggregate measures of HEW mask withdrawals and injections made by individual households. At any point in time some households are

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<sup>4</sup> Statistics New Zealand (2003) is the original report.

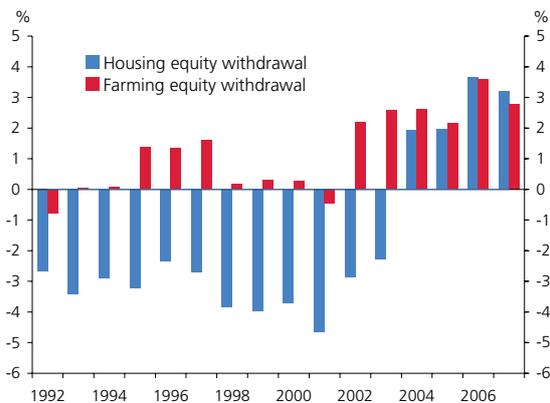
<sup>5</sup> For more details see Briggs (2006).

<sup>6</sup> Statistics New Zealand (2007a).

<sup>7</sup> For more detail on how HEW is calculated see Smith (2006).

withdrawing equity, other households are injecting equity, whereas others will be doing neither. While equity withdrawal affects a household's equity it does not affect its net worth; net worth is affected only when the withdrawn equity is spent. Similarly, aggregate HEW does not change the household sector's total net worth – net worth changes only when HEW is spent.

**Figure 4**  
Annual equity withdrawal as a percentage of annual household disposable income



Source: RBNZ.

As Figure 4 shows, the incidence of HEW in New Zealand is a relatively new phenomenon. The historical norm has been a net injection of funds. These net injections largely reflect the effects of households making principal repayments on their mortgages. In recent times, it seems that higher borrowing has more than offset the effects of principal repayments.

Recent high levels of HEW appear to be linked to strong rises in house prices, with most of the HEW occurring as a result of property transactions, rather than refinancings. When a lowly-g geared seller sells a property to a highly-g geared buyer (such as a first-home buyer), then equity withdrawal occurs. The size of this withdrawal is influenced not only by the relative gearing levels but also by the rise in the price of the property. This form of withdrawal can be referred to as passive HEW. This form of HEW tends to increase when turnover in the housing market increases and earlier capital gains are realised. Active HEW occurs when the owner of the house increases the size of the mortgage on the property.

A study of housing equity withdrawal in Australia surveyed individual households and estimated the flows of withdrawals and injections (Schwartz *et al* 2005). The study found that property transactions accounted for around three-quarters of the total value of withdrawals. Assuming that the situation is similar in New Zealand, it would appear that most of the net HEW that has occurred is due to passive rather than active equity withdrawal.

Aggregate housing equity withdrawal in New Zealand does not appear to be highly correlated with changes in private consumption, suggesting that the short-term impact of equity withdrawal could be relatively modest. It seems likely, however, that HEW has a long-term effect on consumption. A significant proportion of HEW is likely to be due to last-time sales, where the previous owner has gone into a rest home or died. The resulting HEW will eventually be recycled via bequests to younger generations. However, it will take time for this to happen, and this may partly account for the fact that HEW does not have a strong immediate impact on consumption.

The withdrawal of equity from farms has also been large in recent years. As with housing, this reflects strong rises in property prices in the sector. Some farmers will access their equity when they sell up the farm and retire. If the farm is sold to a purchaser who is more highly geared than the seller, then the sale contributes to aggregate equity withdrawal. And as with housing, a proportion of farm equity withdrawal will occur after the death of the property owner and be recycled via bequests.

*d. Household saving has declined in recent years and does appear to be negative. Despite this, household wealth has climbed sharply, with the rise in house prices being the main factor behind this.*

The link between saving and wealth is reasonably straightforward. But the situation is often confused by the terminology used. As noted earlier, the term 'savings' (with the extra 's') is used by some to refer to wealth. This can lead to thinking that saving and savings are virtually the same thing, which they aren't.

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## Box 1

### Housing equity withdrawal

Housing equity withdrawal occurs when equity is extracted from a house, either by increasing the mortgage on the house or by selling the house.

Increasing an existing mortgage on a house provides an owner with additional cash, which can be used to buy other things. Note that the equity withdrawn is equal to the change in borrowing on the property.

Equity withdrawal also occurs when an owner sells a house. After paying off what remains of the mortgage, the owner is left with a sum that can be spent.

The opposite of housing equity withdrawal is housing equity injection. This occurs when a person puts cash into a house, either via an initial payment – a deposit on the property – or through subsequent repayments of mortgage principal.

In the case where an owner extracts equity from a house by selling it, there is usually an injection of equity being made by the buyer, with the rest being borrowed. The net amount of equity being extracted from the property is equal to the change in the borrowing on the property (ie the buyer's borrowing minus the seller's final debt on the property). So, as in the case where the owner simply adjusts the level of the mortgage (either up or down), the net equity withdrawal on a property that is sold is equal to the change in borrowing on the property.

It follows that net housing equity withdrawal by the household sector as a whole is simply the change in total borrowing on housing. However, an adjustment needs to be made to this total to account for investment in additional housing. This additional housing covers new houses (including sections), additions and alterations, and existing houses bought from other sectors, such as businesses and government. Any sales of housing by the household sector to other sectors are treated as negative additions.

In general, aggregate housing equity withdrawal occurs when the change in borrowing exceeds the sector's investment in additional housing:

$$\text{HEW} = \text{Change in mortgage debt} - \text{Investment in additional housing}$$

The intuition behind this aggregate measure is reasonably clear. The housing sector as a whole does not begin to withdraw its existing equity until the change in borrowing exceeds the value of net additions to the sector's housing.

Note that aggregate HEW is a net measure; it is equal to households' withdrawals minus households' injections. When aggregate HEW is positive, there has been a net withdrawal of equity; when it is negative, there has been a net injection of equity.

Perhaps another difficulty in understanding the distinction between saving and wealth arises from the fact that the two measures need not move in the same direction, and this will be illustrated below.

Hodgetts *et al* (2006) show the algebraic links between the two measures. In general terms, investment (in either tangible assets like houses or intangible assets like bank deposits or shares) is funded either by saving or increased borrowing. This investment (less depreciation in the case of tangible assets) affects total assets, while any increased borrowing affects total liabilities. However existing assets and liabilities are also affected by revaluations. In the case of

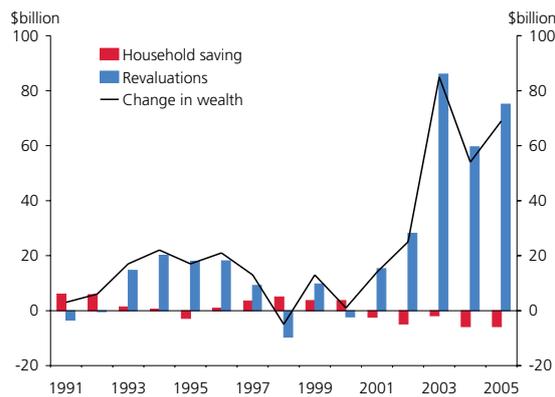
housing assets, these revaluations have been large in recent years, reflecting changes in house prices.

Hodgetts *et al* use Reserve Bank data on changes in household assets and borrowing to back out an alternative estimate of household saving. Unfortunately, the Reserve Bank data on assets and liabilities is not complete, with a major omission being the assets and liabilities of unincorporated businesses that are owned by households. It was thought that most of these missing assets and liabilities probably related to farms. Hodgetts *et al* took estimates of farm equity withdrawal as being proxy measures of farm sector saving and used these to adjust their alternative saving measure.

The final measure seemed to confirm that the household saving rate had declined in recent years and was now strongly negative. However, the alternative saving rate was not as negative as the official measure (which was shown in figure 2); it was estimated as being around -7 percent of household disposable income in the year ended December 2005.

Figure 5 shows the reconciliation of wealth and saving as estimated by Hodgetts *et al.*<sup>8</sup> Note that while wealth has been growing – with this being almost totally due to housing revaluations – saving has generally declined. This shouldn't be surprising, since it reflects the wealth effect. As households become wealthier, they are inclined to spend more, and hence save less (more on this below).

**Figure 5**  
**Contributions to changes in household wealth**



Source: Hodgetts *et al.*, 2006.

Statistics New Zealand, in conjunction with The Treasury and the Reserve Bank, is now working on updating the institutional sector accounts, which should result in more accurate estimates of saving by government, business and households. As noted earlier, Statistics New Zealand has already made some upward adjustments to household income, with increased coverage of trust income. It would not be surprising to see household income rising further in subsequent revisions, with coverage of income from overseas also being increased.

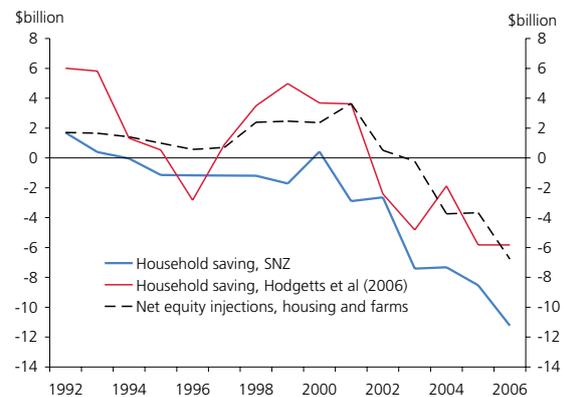
<sup>8</sup> Contributions to changes in wealth come from three sources: saving, revaluations, and net capital transfers from overseas (mainly migrants' capital). Net capital transfers are relatively minor and are not shown in figure 5.

**e. Negative saving appears to have been sustained by equity withdrawal and other injections.**

How can the saving rate be negative? How can households spend more than they earn for a sustained period of time? Equity withdrawal, and its long-term effects on consumption, seems to be the main factor behind this. Figure 6 shows two estimates of household saving – Statistics New Zealand's estimate and the estimate by Hodgetts *et al.* (2006). It also shows the sum of net equity injections for housing and net equity injections for farms. Negative values for injections indicate that equity is actually being withdrawn. As can be seen, the rise in net equity withdrawal in recent years correlates well with the sharp move towards negative saving.

Note that saving as estimated by Hodgetts *et al.* is more variable than the Statistics New Zealand measure. Changes in this alternative measure seem to correlate reasonably well with cyclical changes in consumption, with the two being negatively related (Hodgetts *et al.* 2006).

**Figure 6**  
**Household saving and net equity injections**  
\$Billion



Sources: Statistics New Zealand, Hodgetts *et al.*, 2006, RBNZ calculations.

Hodgetts *et al.* note that equity withdrawal is not a phenomenon that is related only to houses and farms. Equity can be withdrawn from investments in the share market, businesses and assets overseas.

There have also been other injections of cash into the household sector, which are not treated as income in the household income and outlay account. Migrants' transfers

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of cash and other financial assets are a direct boost to the spending power of the household sector. While net transfers are not normally large, they averaged about \$1.4 billion per annum in the 2001-02 period, when immigration was high. There have also been a range of transfers to households from businesses. The largest was the demutualisation of AMP in 1999 but there have been other examples, such as the sale of publicly-owned electricity distribution companies. These transfers did not, strictly speaking, produce a change in household wealth. But they did provide households with the opportunity to sell their newly-issued shares, thereby giving them the ability to turn part of their wealth into cash.

*f. Factors other than equity withdrawal that may have contributed to the decline in the household saving rate include: the wealth effect, increased interest payments, the rise in government saving, the life-cycle stage of baby boomers, and the level of income growth.*

### The wealth effect

De Veirman and Dunstan (2007) use a number of econometric techniques to look at the linkage between housing wealth and consumption. They found that a 1 percent increase in house prices today is associated with an increase in consumption in the next quarter of 0.07 to 0.10 percent. This is broadly consistent with the rule of thumb used to approximate the effect of house price changes in the Forecasting Policy System (FPS), the Reserve Bank's macroeconomic model. They also found that a 1 percent increase in house prices is associated with a total long-run increase in consumption of about 0.2 to 0.3 percent. This is similar to the estimate of Hull (2003). Another way of interpreting this result is that when housing values rise by 1 dollar and remain at their new level, then annual consumption will be 6.5 cents higher in the long run. Hull's estimate was 6.8 cents.

It is not easy to reconcile these estimates of the wealth effect with the possible impact of HEW on consumption. The reason is that HEW and the wealth effect measure different things. In recent years it seems that, on an annual

basis, HEW has exceeded the change in consumption that has occurred due to increased wealth. However, HEW is a one-off change of equity to cash – most of which probably goes to people in older age groups – and this cash may or may not be spent. The wealth effect is the net impact of a rise in wealth on consumption. As house prices rise and lift wealth, some people, especially those in older age groups, will consume more. However, younger people who have taken on a large mortgage may actually be consuming less. Hence, HEW and the wealth effect measure different things, and the estimates of each are not necessarily inconsistent with each other.

### Increased interest payments

Hodgetts *et al* (2006) note that buying houses that are financed primarily by borrowing could affect the saving rate to the extent that interest servicing costs increase over time as more borrowing is undertaken. This appears to have been the case, with households' interest servicing costs relative to disposable income increasing from around 7 percent in 1987 to around 11 percent in 2005. This rise reflects the volume of additional housing debt taken on over this period, and occurred despite a fall in interest rates. However, this explanation does raise the question of why households have not curtailed their consumption on non-housing items as their interest-servicing burden has increased.

Coleman (2006) offers a different take on interest payments. He notes that a portion of the interest earnings on capital is not true earnings but merely a compensation for inflation. If adjustments are not made for inflation, then the real earnings of the lender and the real payments made by the borrower are overstated. In effect, the inflation component paid by the borrower can be regarded as saving, because the real value of the debt falls by the same amount. However, the inflation component received by the lender is dissaving. Coleman notes that the SNA guidelines recommend including such adjustments as memorandum items.

Coleman adjusts both the interest earnings and interest payments shown in the HIOA. In recent years interest payments are far larger than interest earnings. The net adjustment is positive, which means that the published

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saving number is being understated. In the year ended March 2005, for example, Coleman estimates that saving is being understated by \$1.5 billion. However, other countries, like New Zealand, do not generally make this adjustment to their published estimates of household saving; our published household saving rate is still very low relative to comparable figures for other countries.

### The rise in government saving

Government saving has grown strongly in recent years. Crown saving increased from around 0 percent of national disposable income in 2001 to around 7 percent in 2005.<sup>9</sup> Coleman looks at how this might have affected household saving. Using data from the HIOA, he takes total tax payments and subtracts government transfer payments (such as national superannuation) and government consumption expenditure (such as health). The difference is the net contribution to government that is not spent on consumption. This contribution increased strongly from 2000, rising by \$3.7 billion in the period to 2005. Hence the recorded decline in household saving does not just reflect higher consumption expenditure but also increased tax transfers to government. In some senses, these transfers can be regarded as saving by households. However, as Coleman notes, the increased tax take need not have reduced measured household saving; if households had reduced their consumption by \$3.7 billion, measured household saving would not have declined.

Coleman notes that the inflation adjustment to interest income, together with the increase in net taxes, account for some \$5 billion of the \$10 billion decline in household saving between 2000 and 2005.

### Life-cycle effects

Coleman (2006) describes the life-cycle model of saving. The basic idea behind this is that individuals try to smooth their consumption over a lifetime. A typical household will accumulate assets during the members' working years, and run these assets down during retirement. If the economy is demographically stable, and there is no income growth,

the life-cycle model predicts that the aggregate saving rate will be zero. Saving by working people will exactly offset the dissaving of retired people. The aggregate saving rate will be positive when income growth is positive since young people will have earned more than the older people at the same stage of life.

While the saving rate of working people will have little effect on the aggregate saving rate, it will affect the accumulation of assets. Individuals who save 20 percent of their income while working will have peak asset levels that are twice as high as those who save only 10 percent. Hence the saving rate of those working will be much more informative about the adequacy of retirement income than the aggregate saving rate.

In modern societies, the existence of social security systems tends to mask the dissaving of the old, and also the saving of the young. Coleman takes saving rates for different age groups – as derived from the Household Economic Survey (HES) – and adjusts these for the effects of superannuation and health spending. In effect, he assumes that superannuation and health are funded under save-as-you-go schemes rather than pay-as-you-go schemes. He also adjusts for the effects of inflation (see above). The result is that groups of the working age population have positive saving rates while the retired have strongly negative rates.

Coleman suggests that the recent decline in aggregate saving may reflect the spending habits of the retired. It is also possible that private consumption amongst the retired has increased rapidly since 2000, given the large increase in the value of New Zealand assets, particularly land, that has occurred since then.

Although this is not mentioned by Coleman, it is also possible that soon-to-be-retired baby boomers have also begun to cash up and significantly increased their spending as a result of the recent run-up in house prices.

### The level of income growth

Coleman (2006) examines income dynamics over the last 35 years by exploring the changing patterns of earnings of different age cohorts through time. The data shows a

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<sup>9</sup> Hodgetts *et al* (2006), p6.

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levelling off in real male earnings since the early 1980s, while female earnings have risen, reflecting higher participation rates. While no firm conclusions can be drawn from the data, low income growth, Coleman suggests, could be a reason for New Zealand's poor saving performance compared to many rapidly growing countries. Again, though, there is the question as to why households have not constrained their consumption; lower incomes do not by themselves 'explain' falling saving rates.

***g. Saving rates are difficult to observe via household surveys, and other methods of analysing saving behaviour may be more informative.***

The HES is a survey of around 3000 households that is undertaken every three years. It collects data on the income and expenditure undertaken by households. In principle, this data can be used to obtain another measure of saving. Estimates of the saving residual (income minus expenditure) from the HES have been typically positive. This has been in contrast to estimates from the HIOA, which, as we have seen, are now strongly negative.

However, Bascand *et al* (2006) advise caution when attempting to derive a saving residual from the HES. Their paper has a comparison of the income from the HIOA and income from the HES. Both measures were adjusted so that items covered were basically the same. The results showed that HES income was around 96 percent of HIOA income, which was very close.

However, a comparison of expenditure measures showed that HES expenditure was only 84 percent of HIOA expenditure. It seems clear that the HES is undercounting expenditure and hence gives a significantly higher estimate of saving than the HIOA. This undercounting of expenditure is consistent with the general tendency of household surveys to under-report spending on things like smoking, drinking and gambling.

If even the HES – with its comprehensive approach to collecting spending data – cannot collect accurate data on household expenditure, it is unlikely that any household survey will be able to do this. It seems that using a household

survey to measure saving directly, as the difference between income and expenditure, is unlikely be successful.

This raises a problem, especially if, as Coleman suggests, it is important to focus on the saving rate of the working age population. There seem to be no adequate sources of data for doing this.

Perhaps the best way of looking at the saving behaviour of the working age population will be to examine administrative data, like flows into Kiwisaver, and where possible look at the socio-demographic characteristics of those contributing to the scheme. Similarly, the best use of surveys like the HES may be to examine variables that relate to saving flows; eg, payments into superannuation schemes and principal repayments on mortgages.

Burns and Dwyer (2007) note that households tend to do better at saving where there is a contractual element – like contributing to a superannuation scheme or paying off a mortgage. An initial aim might be to analyse the flows from such contractual arrangements, and determine how these have changed, or might change, over time.

### **3 What have we learned about house prices?**

***a. Factors that are likely to have affected the demand for housing include lower interest rates, financial deregulation, high net migration, rising household income, taxation treatment of rental housing, and households' expectations of continuing house price growth. However, the impacts of these factors on house prices are not easy to quantify.***

Reserve Bank (2007) – the Bank's submission to the inquiry of the Commerce Select Committee on housing affordability – listed a range of factors that influenced the demand for housing. These included:

- The move in the early 1990s to a low inflation/low interest rate environment, which meant that households could borrow more, since they could now service a higher level of debt.

- Deregulation of the financial sector and increased competition in the mortgage market, which has increased the access to credit for many, if not all, households.
- Population changes, which in the mid-1990s and early 2000s were driven to a large extent by gains from net migration.
- A steady rise in real household income since the early 1990s, and a general fall in the unemployment rate.
- Taxation policy, where the treatment of capital gains on rental properties appears to be relatively favourable when compared to other countries.
- Expectations of continuing house price growth, which has resulted not only in a rise in the number of people buying rental properties, but a rise in the number of owner-occupiers 'trading up'.

Some of these factors have been included in analyses of what drives house prices (more on this below). However, it is difficult to test the impact of some factors. An example would be financial deregulation, which can be seen as being more of an 'enabling factor' rather than a direct driver of housing demand.

In its submission to the Commerce Select Committee, the Reserve Bank expressed the view that housing policies that increased demand should continue to be carefully targeted. The aim should be to minimise the impact of such schemes on house prices, and avoid such schemes being self-defeating.

The Bank noted that there were two areas on the demand side where government might want to consider policy changes:

- Managing migration flows with a view to lessening their impact on house prices.
- Reviewing tax policy, which appears to be more favourably disposed towards rental property than it is in other countries.

Work on both of these issues is reported on below.

*b. On the limited evidence that is available, it appears that the proportion of properties purchased by people overseas is small.*

The Reserve Bank has investigated several data sources on overseas buyers, including:

- IRD data on non-resident individuals claiming rental income or losses on New Zealand property; and
- Quotable Value Limited data on the addresses of property owners, as recorded in the certificate of title.

While these data sources are likely to significantly undercount the level of overseas ownership, the level is still likely to be quite low (less than 5 percent of all New Zealand residential property). Also, some of these owners are likely to be New Zealanders who are currently living overseas. It is difficult to tell from the data whether overseas demand has moved with or against the New Zealand residential property cycle. However, the available data implies fewer overseas purchases recently, possibly reflecting the high level of domestic property prices, rising domestic and overseas interest rates, and the high New Zealand dollar. Rates of overseas ownership tend to be higher in traditional tourist destinations, like Queenstown, and in areas offering higher prospective rental yields for investors, like the South Waikato.<sup>10</sup>

*c. The persistent rise in the house price-to-income ratio over the last two decades or so suggests that there may be some factors that have been constraining the supply of housing over the long term.*

As figure 3 showed earlier, the house price-to-income ratio has generally been on an upward trend since the early 1980s. Periods of strong economic growth and high migration inflows – such as those that occurred in the mid-1980s, the mid-1990s, and the early 2000s – have tended to result in significant rises in the house price-to-income ratio. The puzzle is why the ratio hasn't adjusted down after each period of strong inward migration has ended. This points to there being some long-term supply constraints on housing.

<sup>10</sup> See Reserve Bank of New Zealand (2007c), p14.

The Reserve Bank suggested to the Commerce Select Committee that government policies should generally focus on increasing the responsiveness of housing supply. The Bank's submission showed that construction prices have not risen as much as prices of sections. Hence, looking at supply-side issues may require a review of planning practices, especially those relating to new development and urban redevelopment. It was noted that supply-side issues were not likely to be solved easily and quickly.

Reserve Bank work on supply issues has been limited – other government agencies clearly have more knowledge and expertise in these areas.<sup>11</sup>

*d. As in other countries, low interest rates have played a major role in the rise in house prices.*

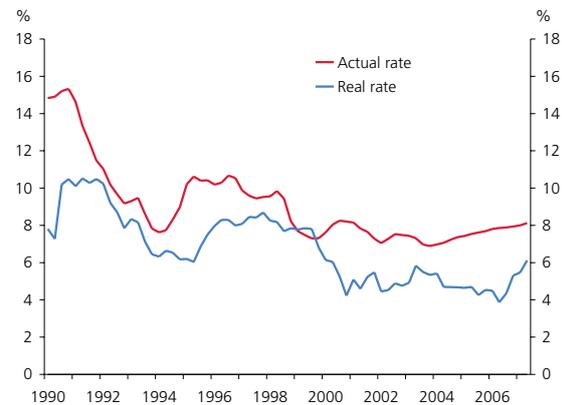
Consumers Price Index (CPI) inflation fell suddenly in the early 1990s and has remained at relatively low levels since. As Figure 7 shows this fall in inflation led to lower nominal interest rates. Both nominal and real interest rates have fallen further since then, which reflects, to some extent, low interest rates overseas.

Ellis (2006) suggests that this general fall in nominal interest rates, coupled with the effects of financial deregulation, resulted in higher demand for mortgage finance and a widespread desire on the part of households to live in a better house. This resulted in owner-occupiers improving the quality of their own homes, either via renovations and building, or by 'trading up' to another property. Lower interest rates also enabled many households to buy second houses or rental properties. Given that housing supply is 'sticky', this increase in demand was basically unsatisfiable, at least in the short term. The result has been higher house prices.

Figure 8 illustrates how the impact of lower interest rates has fed through to house prices. The red line is the size of a loan that a household with average disposable income could afford to take on. This amount is calculated assuming that 35 percent of average disposable income is available

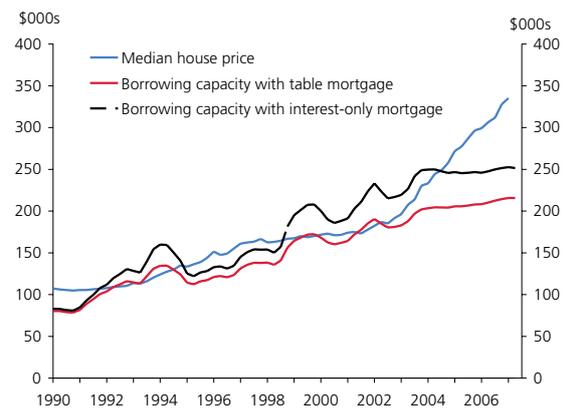
<sup>11</sup> Some discussion of land prices is included in the Reserve Bank's submission to the Commerce Select Committee. Also, Coleman and Landon-Lane (2007) includes a brief look at the history of housing supply in an appendix.

**Figure 7**  
Effective mortgage interest rate



Source: RBNZ.

**Figure 8**  
Borrowing capacity of household with average disposable income, and median house price



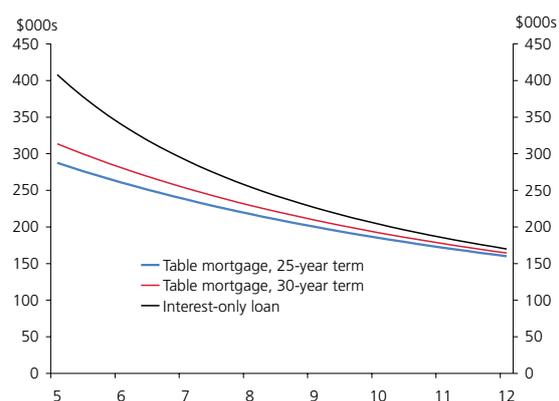
Sources: REINZ, RBNZ.

for making payments on a table mortgage with a 25-year term.<sup>12</sup> As can be seen, borrowing capacity rises over time, reflecting a steady rise in disposable income, and a general downward trend in nominal interest rates. The upward trend in borrowing capacity is very similar to that for the average house price. The chart appears to lend some support to the Ellis thesis: that a general fall in interest rates has boosted demand, which, coupled with sticky supply, has resulted in a general rise in dwelling prices.

<sup>12</sup> Household disposable income as used here excludes imputed rent but has had depreciation and interest payments added back into it. Hence, it is basically a cash measure of income, before any interest payments are made. Banks would tend to look at a household's cash income when assessing the size of the loan that could be serviced. They would also tend to want the servicing costs to be no more than 35 percent of the household's income.

Figure 9 is another illustration of the impact of mortgage interest rates on borrowing capacity. In the last year or two, the standard term for a table mortgage appears to have moved from 25 years to 30 years. This has obviously increased the borrowing capacity of households. Using interest-only loans increases borrowing capacity even more. A recent informal survey by Reserve Bank staff of the major banks found that around 15 percent of all residential housing mortgages are interest-only loans, and that these loans account for around 25 percent of the total value of mortgages. Clearly, interest-only mortgages tend to be for greater amounts than other mortgages. A significant proportion of these mortgages will be held by people who have invested in rental property; there is little incentive for investors to hold loans that repay principal since only interest payments can be deducted from rental income for tax purposes. However, discussions with banks have indicated that interest-only loans are also used by some owner-occupiers. The move to longer term loans, and the use of interest-only loans, means that borrowing capacity as shown by the red line in Figure 8 may be underestimated, especially for recent years.

**Figure 9**  
**Borrowing capacity where total mortgage payments are \$20,400 per annum<sup>13</sup>**



Source: RBNZ.

Coleman (2007) adds another facet to the interest rate argument. His paper develops an overlapping-generations model to look at conditions faced by credit-constrained home buyers. The model assumes that potential rental property owners are not credit constrained. These people

bid up house prices to the point where the real return from a property (including rent and capital gain) is equal to the real interest rate. Given this, home buyers tend to get priced out of the market, opting to rent rather than make high mortgage repayments and reduce real non-housing expenditure. While Ellis seemed to suggest that much of the upward pressure on house prices came from home-owners, Coleman's model suggests that a significant part of the rise in prices has been due to the decline in real interest rates and the subsequent impact of rental property purchases.

The impact of interest rates on house prices presents something of a conundrum for monetary policy. The Reserve Bank does not target house prices, it targets CPI inflation. But CPI inflation is influenced both directly and indirectly by house prices. The CPI is affected directly since it includes a series covering the purchase and construction of new dwellings. Movements in this series tend to reflect changes in existing dwelling prices and hence they generate some variability in non-tradables inflation. Therefore, to the extent that monetary policy responds to this variability, it is implicitly responding to developments in house prices.<sup>14</sup>

The indirect effects of house prices are probably more problematic. As we have seen, a rise in housing equity can lift consumption, which in turn may add to inflation. The problem is deciding when to react to rising house prices. Analysis suggests households' expectations of house price inflation are slow to adjust (see below), which means that episodes of house price rises can be difficult to end, even with sharp and sustained rises in interest rates. This would suggest that an early response to house price rises is probably preferable to a late response. However, it is difficult to accurately assess whether house price increases are showing 'bubble type' behaviour, especially in the early part of a house price cycle.

<sup>13</sup> The figure of \$20,400 is about 35 percent of average household disposable income as at March 2007.

<sup>14</sup> Hargreaves *et al* (2006) look at housing-related inflation – which includes construction costs of new housing – and non-housing inflation, and analyse the cycles in both components.

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***e. Surges in net migration are strongly correlated with rises in house prices.***

Coleman and Landon-Lane (2007) use a structural vector autoregression model to analyse the relationship between migration flows, housing construction and house prices. It suggests that a net migration inflow equal to 1 percent of the population is associated with a short-term increase in house prices of about 10 percent. The size of this change is much larger than would be expected from the average change in the population and house prices in the long term.

One explanation is that migration flows occur at times when the local people are revising their expectations about future income growth, and that these revised expectations result in changed demand for housing. Another explanation is that migrant flows change expectations about the fundamental value of houses.

The Reserve Bank's submission on housing affordability to the Commerce Select Committee noted that immigration policy may have a role to play in ensuring that migration flows do not exacerbate the housing cycle. However, given that government can control only the inflow of non-residents, there are limits to how much net migration flows can be fine-tuned. Nevertheless, government did make a slight downward adjustment to its immigration target recently, noting the need not to add to inflationary pressures.

***f. Current taxation policy means that the value of a house to a highly-g geared landlord will generally be higher than the value to a highly-g geared owner-occupier.***

For tax purposes, rental property owners can deduct any losses on the property from total income. This total income includes earnings from sources other than the rental property. This appears to favour rental property owners over owner-occupiers who, cannot deduct any of their housing expenses from their income. On the other hand, owner-occupiers do not pay tax on imputed rent. Imputed rent is equal to the rent that could be obtained on the property; the owner-occupier does not pay tax on this income, whereas a rental property owner does pay tax on rent.

Hargreaves (2007) shows that for a fully-g geared rental property owner – one with a 100 percent mortgage – the value of a property is higher than for a fully-g geared owner-occupier. The ability of the rental property owner to deduct losses more than offsets the fact that the owner-occupier pays no tax on imputed rent.

In deriving the values for each type of property owner, Hargreaves uses a formula that equates the returns from property (rent and capital gain) to the cost of holding the property (interest and other costs, including tax). He then backs out the value of the property from the formula.

Hargreaves also looks at ungeared property. He shows that the value of a property to a rental property owner with no debt is similar to the value to a fully-g geared rental property owner. However, the value to an owner-occupier with no debt is significantly higher than the value to either a fully-g geared or ungeared landlord. This is largely due to the fact that no tax is paid on imputed income.

Hargreaves looks at various tax regimes and how they would affect the values for each of the four types of property owner. He shows that ring-fencing losses on rental properties would even up the value of a property to a fully-g geared landlord and a fully-g geared owner-occupier.<sup>15</sup> He notes that a shift to taxing only the real component of interest would narrow the gap between the value to a geared landlord and the value to an owner-occupier, since the landlord would be able to deduct only the real component of interest payments for tax purposes. Also, this approach would go some way towards removing the advantage rental property has over bank deposits. Hargreaves notes that moving to a 'dual taxation' approach, with a lower tax rate on capital income than other income, would also reduce distortions regarding the decision to purchase property.

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<sup>15</sup> Ring-fencing means that losses from a rental property can be deducted from only the property's income, and not from an investor's total income as at present. Ring-fencing was initially discussed in *Supplementary Stabilisation Instruments*, a 2006 report by the Reserve Bank and The Treasury. More commentary on ring-fencing can be found in the Reserve Bank of New Zealand (2007b).

*g. Estimating how overvalued house prices are, and forecasting house prices, are difficult tasks.*

There is a range of published estimates about how much New Zealand houses are currently overvalued. The estimates range from an overvaluation of around 30 percent to no overvaluation at all.<sup>16</sup> The estimated level of overvaluation depends on the model being used.

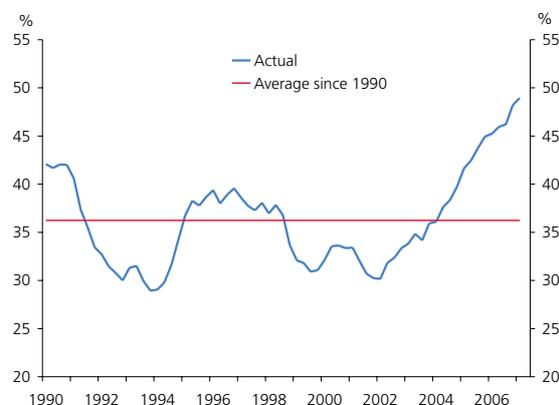
Hodgetts (2004) used an asset price model to basically compare house prices with rents. He found that the long-term trends in house prices and rental yields – strong price rises and falling yields – were not inconsistent with each other. In fact, the different trends were largely accounted for by the secular fall in real interest rates. An interpretation of the results was that the sharp rise in real house prices was not of itself an indication of overvaluation.

Analysis undertaken a year later produced similar results to Hodgetts' earlier work – if the secular decline in interest rates was taken into account, the housing market did not appear to be significantly overvalued. From a cashflow perspective, the burden of servicing a mortgage (for both an owner-occupier and an investor) did not look extremely high relative to previous housing cycles.

However, since then, affordability for an owner-occupier has declined markedly. Figure 10 shows payments on a median-priced house as a proportion of average household disposable income.<sup>17</sup> This ratio is now much higher than at any time since the low-inflation period began in the early 1990s.

A number of attempts at forecasting house prices in New Zealand have been based on the approach of Pain and Westaway (1996).<sup>18</sup> This approach is based on an inverted demand equation where real house prices are a function of two variables: the ratio of real housing consumption to real total consumption, and the user cost of capital.

**Figure 10**  
**Mortgage payments as percentage of average household disposable income (90% loan)**



Source: REINZ, RBNZ.

Minot (2004) adopted this approach, and the resulting model, which was a co-integration model, was used for some time as an adjunct to FPS. In the long-run equation, real consumption of housing services was proxied by a real measure of the housing stock. The user cost of capital was taken to be the real 90-day interest rate less the expected real return on capital. The proxy for expected real return was the past three years' real capital gain on housing; this formulation was the one that gave the best fit for the long-run equation. All other New Zealand studies have used a similar proxy for the expected real return; it seems that New Zealand households' expectations about house price movements are very slow to adjust. Variables that entered the short-term equation included changes in the housing stock/consumption ratio, and changes in the working age population.

The estimated coefficients suggested that over the long run a 1 percent increase in the housing stock leads to a 1.6 percent fall in real house prices. A 1 percentage point increase in the user cost of capital, on average, led to around a 3.5 percent fall in real house prices over the long run. From a monetary policy perspective, this could be interpreted as a one percentage point increase in the real interest rate, all else equal, leading on average to a 3.5 percent fall in house prices.

Including the user cost of capital in the long run equation meant that in-sample forecasts of house prices tended to reflect short-term variations in interest rates. It was felt

<sup>16</sup> For a brief summary of this research, see *Financial Stability Report*, May 2007, Reserve Bank of New Zealand, pp11-12.

<sup>17</sup> As in figure 7, which showed borrowing capacity, the mortgage was taken to be a table mortgage with a 25 year term. The mortgage covers 90 percent of the value of the median house price; ie, the deposit is 10 percent.

<sup>18</sup> Examples are O'Donovan and Rae (1997), Grimes *et al* (2003) and Rosborough (2005).

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that the equation was not providing a good view of what the long-term equilibrium price level looked like. Another problem was the equation's forecasting performance - the forecast produced back in 2004 was that nominal house prices would be showing zero growth by 2006. Perhaps households' expectations regarding future house prices have been even slower to adjust than was assumed in the equation.<sup>19</sup>

A paper by Abelson *et al* (2005), which looks at explaining house prices in Australia over a period of more than 30 years, may provide some guidance on a better way of determining the long-run equilibrium price level for housing.

#### 4. In view of what's been learned, what can we expect going forward?

*a. House prices appear to be overvalued, relative to household income, but how they will adjust is difficult to predict.*

As figure 8 showed, growth in average house prices has outstripped growth in borrowing capacity. And as figure 10 showed, payments on a new mortgage on a median-priced house are at a very high level relative to average household disposable income. Houses have simply become less affordable, and this is affecting demand. As demand eases, so will house price growth, and house prices can be expected to adjust relative to household income.

It is difficult, though, to say exactly how this adjustment will occur. If house prices were to level off and stay flat, the gap between current house prices and their long-run equilibrium level could take many years to close.<sup>20</sup> On the other hand, the adjustment could occur more quickly, with outright falls in nominal house prices occurring. In such a scenario, house

prices might move below their long run equilibrium level for a time, reflecting the slow adjustment in households' expectations.

Overall, though, it seems that house prices will adjust towards their equilibrium level, where this level is related to the current borrowing capacity of households. Unfortunately, this equilibrium level is likely to be too high for a significant proportion of households, and the home ownership rate is likely to continue falling, at least in the short term. Long-term measures aimed at restraining further house price growth – such as measures to increase the supply of medium-priced houses – may be helpful. Over time, these could result in a decline in the house price-to-income ratio, thereby improving affordability.

*b. If nominal house prices were to level off, housing equity withdrawal would stay high for some time, lending some support to consumption. As a result, the household saving rate would be slow to adjust, probably remaining negative for a period. Also, the debt-to-income ratio would continue to rise for some time yet.*

Passive equity withdrawal occurs when a highly-gearred house buyer purchases a house from a lowly-gearred seller. Given that only around 7 to 8 percent of the housing stock gets sold each year, there is still a large stock of houses that have been held for some time. Some of these will be held by older people who, over the coming years, will begin to 'trade down', or to cash up their holdings in residential property. As this happens, existing equity will be unlocked. Provided that nominal house prices level off rather than fall sharply, the level of withdrawn equity will remain high, providing some support to the level of household consumption. As a result, household saving will be slow to adjust, and will probably remain negative for a period. Furthermore, the level of mortgage debt will continue to rise, as highly-gearred buyers replace lowly-gearred sellers.

A fall in house prices would probably result in a faster adjustment process, with the household saving rate making a quicker return towards positive territory.

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<sup>19</sup> Another possibility is that in the last few years house prices have reflected a 'collateral effect'. As house prices rise, owners' equity increases, and this generally allows owners to borrow more. If owners then buy a bigger home, or additional residential properties, this may result in house prices moving even higher.

<sup>20</sup> The value of this equilibrium level is unclear. Estimates of 'borrowing capacity', as shown in figure 8 are, at best, rough guides as to where the equilibrium level might be.

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## 5 Conclusions

Our work to date seems to suggest a number of broad conclusions:

- The rise in the household debt-to-income ratio since 1991 is due largely to the rise in house prices relative to income. Financial deregulation has been an enabling factor in this regard, with households generally being able to obtain the mortgage finance that they have needed in order to purchase residential properties.
  - The fall in household saving is related to the rise in house prices. Since the early 1990s, households have generally accumulated wealth not by saving but by borrowing money to purchase residential property, which then produces capital gains. In recent years, equity withdrawal has been large, and this has underpinned consumption growth.
  - The major factor behind the rise in house prices since 1991 has been the fall in interest rates. This fall, coupled with financial deregulation, has enabled households to service larger loans. The initial fall in interest rates, in the early 1990s, was the result of the move to a low-inflation environment. As inflation fell, so did interest rates. This occurred across many countries. A second wave of worldwide downward movements in interest rates occurred in the early 2000s. This was largely in response to the fall in the 'tech wreck' – the severe fall in technology stocks – and the events of 11 September 2001.
  - The resulting rise in housing demand outstripped supply, at least in the short term, and house prices rose sharply. In New Zealand, housing demand was boosted even further by a largely unforeseen consequence of September 11 – a sudden climb in net inward migration. This reflected New Zealanders returning home, or staying at home, and the arrival of a greater number of ESL students, who probably saw New Zealand as being a safe learning environment.
  - On top of this, the local economy continued to grow strongly through the 2000s, producing what has now become the longest economic expansion since 1960. Agricultural earnings – especially dairy earnings – have also been high as growth in China has continued to underpin international demand for commodities. This has kept demand for both housing and rural land high.
- Rises in the price of housing and rural land resulted in a significant amount of equity being withdrawn from both housing and farms, and this kept consumption high. The household saving rate seemed to be negative, partly as a result of this equity withdrawal. Most of this equity withdrawal probably occurred as a result of property sales, rather than a conscious 'gearing up' on the part of owners. Property sales unlocked the equity that had built up as a result of rising property prices.
  - Persistently rising house prices meant that residential property was seen as an attractive investment option. Perceived tax advantages for housing relative to other forms of investment reinforced this. Increased interest in housing from investors reinforced the rise in house prices.
  - There are also tax advantages to home ownership, relative to some other forms of investment. For example, income from an owner-occupied house – imputed rent – is not taxed, while income from a bank deposit is. This may partly account for the fact that newly constructed homes have got progressively larger over the last decade or so.
  - Construction prices have not risen markedly, suggesting that the rise in house prices has been largely related to rises in land prices. To some extent, this may reflect planning practices; the general approach has been to limit urban sprawl and encourage in-fill housing. Or the rise in land prices may reflect household preferences regarding location, with many households not willing to start their home-owning career with a home at the urban fringe.

### Where to from here?

The global transition to a low inflation and low interest rate environment may be close to being complete. However, it seems that houses in New Zealand are now overvalued relative to the level that can reasonably be supported by household income.

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While house price inflation is currently slowing, it seems likely that the level of house prices, relative to income, will remain high compared to the levels of a decade or so ago. As a result, housing affordability is likely to remain an issue for parts of the household sector. Hence, from a public policy perspective there is likely to be an emphasis on finding long term ways of constraining house price growth. If this approach proves successful, the house price-to-income ratio could gradually decline, improving affordability and making home ownership attainable for a larger proportion of the population.

A gradual decline in the house price-to-income ratio would eventually make the ratio of household debt to income lower, thus making the household sector less vulnerable to economic shocks. In short, a gradual decline would be beneficial to financial stability. Long-term measures – such as measures to improve the supply-side response to changes in housing demand – could also help to reduce inflationary pressures coming from the housing market.

One aspect of the Reserve Bank's approach to household sector will be to focus on long term issues. This will be done by:

- Working with government agencies on issues that can have long-term effects on house prices: taxation, housing supply issues, land use planning, migration, etc. We are already doing this via our involvement with the Centre for Housing Research Aotearoa New Zealand (CHRANZ), the Department of Labour, The Treasury, and other agencies.
- Encouraging a shift in focus to investing in financial assets rather than housing. Recent changes to government policies – like the introduction of Kiwisaver, and the reduction in the tax rate on financial savings through the establishment of Portfolio Investment Entities (PIEs) – may help to increase awareness and knowledge about financial assets.

Meanwhile, work that increases our understanding of household-sector issues, and their consequences for both financial stability and price stability, will continue. This work will also inform attempts to better incorporate financial

phenomena in formal macroeconomic analysis and models. Intended further in-house work at the Reserve Bank includes:

- Looking again at the long-term movement in house prices relative to other asset prices and various economic aggregates.
- Working with Statistics New Zealand to improve the institutional sector accounts, including the HIOA (already under way).
- Looking at the feasibility of including estimates of the assets and liabilities of unincorporated business in the household balance sheet. These unincorporated businesses would include those that are owned via trusts.
- Further work on the wealth effect (international comparisons, household-level analysis).
- Looking for data on bequests with a view to determining how much of the current housing equity withdrawal is being recycled to younger generations.
- Looking at data sources from which we might be able to identify regular saving flows – including deposits in saving schemes and mortgage principal repayments - for various age and income groups.

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# Households' attitudes to saving, investment and wealth

*Janice Burns and Maire Dwyer*

Household saving – the difference between household disposable income and household consumption – has declined over the last two decades and now appears to be negative. On the other hand, household wealth has risen. This has been due to rises in house prices, which have pushed up the equity held by households in residential property.

While a downward trend in household saving is evident across many developed countries, New Zealand's household saving rate has been among the lowest, or the lowest, for much of the last 20 years. Also, New Zealand households have lower levels of wealth than households in Australia, Canada, the UK and the US. While New Zealanders' wealth in housing, as a proportion of disposable income, is around the same as for these other countries, it seems that on average New Zealand households own less financial wealth (e.g. shares and bonds).

In view of this pattern, the Economics Department of the Reserve Bank decided to undertake a small-scale exploratory study of households' attitudes to various forms of investment. The idea behind this work was to get a view, from a sociological perspective rather than an economic perspective, on why wealth in New Zealand is held in the way it is. This perspective contributes to the Economic Department's ongoing programme of work on the financial position of households.

Two consultants, Janice Burns and Maire Dwyer, undertook the initial study. The study was designed to provide an overview of:

- what is known about investment attitudes and behaviour in New Zealand; and
- factors that are likely to influence saving and investment attitudes and behaviour.

The study drew on three sources of information:

- a review of policy settings and published studies on saving;
- interviews with individuals knowledgeable about investment and saving behaviour and attitudes ('key informants'); and
- background interviews with a small number of 'consumers' aged between 30 to 50 years. It was felt that people in this age group were more likely to be turning their attention to investment issues than people in other age groups.

The report notes that wealth is more unevenly distributed than income. Financial skills are also unevenly distributed. People with high financial knowledge generally have higher education, higher incomes and their own homes. A recent survey showed that only 15 percent of the population had advanced financial knowledge, in that they understood basic and advanced financial concepts, were in control of their borrowing and debt, and were financially confident.

The report looks at the role of property and financial investments. According to the report, the decline in the share of wealth held as financial assets has been driven by a number of factors, including the following:

- a valuation effect from house prices, which rose strongly relative to prices of financial assets;
- a continuing desire by New Zealanders to own their own home;
- a rise in average dwelling size;

- historically high returns from rental property compared to shares;
- the absence of price crashes for housing in recent decades, in contrast to shares;
- the ability of owners to use their house as collateral in order to buy additional property;
- perceptions that there are tax advantages regarding property;
- perceptions that there are lower risks in 'what you know', which for many people is residential property;
- unease by investors regarding the recent performance of financial assets (eg managed funds), the level of fees, and the complexity of products;
- a decline in recent years of employer-based superannuation schemes; and
- the lack of any compulsory retirement saving.

The advantages of being in property – especially in recent years when house prices have shown such strong growth – appear to be widely acknowledged. However, the risk that the future may not reflect the past and that house prices might undergo a sharp downward correction does not appear to be widely understood.

Studies suggest that consumers often have difficulty in ascertaining the quality of investments, and faced with lots of information, some people come up with 'rules of thumb' on how to proceed. The consumer interviews suggested that advice from family and friends was also important regarding investment decisions. Only a small proportion of people appear to use professional financial advisers.

The report suggests that households will tend to be better at saving when there is a regular and contractual element to it – like paying off a mortgage, or contributing to a superannuation scheme.

The report concludes that a number of factors may have a positive impact on investment in financial assets in the future. These include: the introduction of Kiwisaver, lower taxes on managed funds, and recent changes in the regulatory regime for the financial sector. The consultants emphasise the need for clear information regarding financial products. They also strongly support educational measures to increase financial literacy.

An edited version of the report's findings is printed below. The views expressed in the paper are those of the authors and do not necessarily reflect the views of the Reserve Bank. The full report is available from [www.rbnz.govt.nz](http://www.rbnz.govt.nz).

The findings are grouped into a number of sections. Each section refers to information from the three sources of information – published studies, key informants, and consumers.<sup>1</sup> Key informants are listed in Appendix 1.

## 1 Factors impacting on the level of household savings

### The studies

A wide range of factors impact on household saving, spending and debt. Saving can be motivated by: provision for retirement and bequests; precautionary motives; and the need to acquire a target level of savings. Saving can be undertaken for its own sake and tends to increase with income. The saving constraints on low earners are mirrored in the distribution of wealth, with wealth of Pacific and

Maori New Zealanders being substantially lower than that held by Pakeha and Asian New Zealanders.

The proportion of income saved varies with age and is lower for those with children. (Scobie *et al*, 2005; Skilling and Waldegrave, 2005). Cohorts also exhibit different savings patterns due to the differential effects of policy and socio-economic factors (Cook, 2006; Scobie and Gibson, 2003).

<sup>1</sup> Given that only eight consumers were interviewed as part of this exploratory study, their views are presented largely for illustrative purposes.

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A broad range of factors impact on saving. The provision of universal superannuation at age 65 in New Zealand means that people with low or modest incomes are unlikely to be motivated to save in order to provide for their retirement because the level of national superannuation will provide an equivalent or better living standard. Scobie *et al* (2004) concluded that for “(many of) the lowest 40percent of the income distribution...additional saving for retirement would not be a preferred strategy, assuming they were aiming to smooth their consumption over the lifecycle”.

A worldwide phenomenon is that individuals feel wealthier as their homes increase in value, and this, along with the ease of borrowing against revalued homes, leads to increased spending (*The Economist*, 2004). Housing is also costing more; dwelling values, particularly the land component, have increased, and so have expectations of house quality and size. The size of mortgages, and their duration, will have increased as a consequence.

Higher rates of tertiary education – which could perhaps be counted as another form of investment – have also contributed to increasing debt.

It has also become easier for households to accumulate debt through a greater diversity of credit products, including flexible mortgages and credit cards. This, along with the rise in the costs of servicing mortgages, unrealised wealth effect of increases in house values and the increase in government saving are all likely to have contributed to the fall in net household savings over recent years (Hodgetts, Briggs and Smith, 2006).

Observation of actual savings behaviour led to Richard Thaler restating the rules that people use to guide their saving and spending as:

- Live within your means. Do not borrow to increase consumption except during well-defined emergencies (such as unemployment).
- During emergencies, cut consumption as much as possible.
- Keep a rainy day account equal to some fraction of income. Do not raid the account except in emergencies.

- Save for retirement in ways that require little self-control.
- Borrow only on the security of a real asset.<sup>2</sup>

Thaler’s “rules of thumb” suggest that people are better at saving where there is a contractual element – paying off the mortgage or contributing to superannuation schemes – and that the lack of strong motivation to save for retirement justifies having a contractual element for such saving (Easton, 2004).

### Views from key informants

Key informants differed in their views about whether there was a “savings deficit” in New Zealand. One mentioned that student debt has created a culture of debt acceptance and several mentioned pressures to consume. Another informant said we did not have a savings culture. For Maori and Pacific people, the absence of investor role models (outside those investing in land and housing) was mentioned.

On the other hand, several informants drew attention to the difficulties some people had in saving for a house, let alone further investments, given their incomes. One informant said that many people saw investment in their children as an important investment in their own future.

Several informants did not consider there was a problem, from an individual point of view, with household savings being too low. Points to back this up included that:

- for many low-income people, being on national superannuation was not much different from the living standard they were used to;
- for many people, obtaining a house was a reasonable and achievable investment for retirement and the market in equity withdrawal products was beginning to grow;
- paying off debt was properly a top priority and locking people into too much saving could lead to worse debt and/or lowered living standards; and

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<sup>2</sup> Thaler, Richard (1992) *The Winner’s Curse: Paradoxes and Anomalies of Economic Life*. Princeton University Press, cited in Easton, Brian (2004) “Lock into savings” *New Zealand Listener*, October 23, p54.

- many people planned to provide for an adequate income in retirement by continuing to work, at least part time, after 65.

## 2 Decline in the share of wealth held as financial assets

### The studies

Several factors have contributed to the decline in the share of wealth held as financial assets over recent years.

Firstly, the large increase in the value of housing assets throughout most of the country, and the tendency for the growth in the value of housing assets to outstrip the growth in the value of most other assets, means that, if nothing else changes, they become a larger share of total asset value. From 1979 to 2000, housing equity was a relatively constant share (55 percent) of total net wealth but this rose to 68 percent in 2004 with the boom in house prices (Van Zijl de Jong and Scobie, 2006).

#### Consumer view

*Interviews with consumers showed two views of property – one view was that “rental property is a low risk and low effort option” and the other that rental properties bring unwelcome “responsibility and hassle”. No one disputed the recent past and current returns on property.*

Secondly, people are choosing larger dwellings (on a per head basis). The average number of people per dwelling declined from 2.8 people per household in 1991 to 2.7 people per household in 2001 and is predicted to further decline to 2.4 people by 2021 (Scion and Branz, 2006). The average dwelling size is also increasing; the proportion of four, five and six bedroom dwellings increased from 19.3 percent in 1991 to 25.8 percent in 2001 (Statistics New Zealand Census data, cited in Scion and Branz, 2006, p16). For new residential dwellings, the average floor area increased from 139 square metres in 1991 to 176 square metres in 2002; in other words, new stand-alone dwellings

were approximately 50 percent larger in 2005 than they were in the early 1990s.

At the same time, the proportion of homes that are owner-occupied has dropped so there is a concentration of investment in property in a smaller proportion of the population. However, owner-occupation of housing, while it has fallen, is not markedly out of line with that of other comparable countries. Private ownership of rental properties has risen substantially, and is now at a similar level to that in Australia (Scobie *et al*, 2006).

Thirdly, returns on rental housing have been better than average returns on shares, bonds and cash over the 18 years to 2006.<sup>3</sup> A sample survey found that rental stock in New Zealand is overwhelmingly owned by landlords who have one (42 percent of landlords) or two (20.6 percent of landlords) rental properties. Only 5.6 percent of landlords owned 10 or more properties. Three-quarters of rental properties are owned as personal assets, 14 percent within family trusts and 12.5 percent within companies (Saville-Smith and Fraser, 2004). More recent analysis in Auckland concurs that the small investor is primarily motivated by capital gain and identifies most private rental market investors as couples over 45 and earning more than \$70,000 per year (DTZ and NZIER, 2007).<sup>4</sup>

By contrast, average returns on financial assets have been unimpressive. *Consumer's* analysis of returns to balanced managed funds between 1994 and 2004 prompted them to note that “the big balanced funds gave poorer returns than term deposits...More worryingly, if the decade has been so bad for clients, why are balanced funds still being promoted as good five year savings options?”<sup>5</sup> In all cases, the funds fell short of the Retirement Commission’s expectation that balanced products would, on average, yield a net return of 2.6 percent above inflation.<sup>6</sup>

<sup>3</sup> [www.garethmorgan.com/performance/longterm.asp](http://www.garethmorgan.com/performance/longterm.asp).

<sup>4</sup> Data is from a small sample of 35 investors and a regional cut from the Survey of Family Income and Employment (SoFIE) The data is therefore indicative only.

<sup>5</sup> [www.consumer.org.nz](http://www.consumer.org.nz).

<sup>6</sup> <http://www.sorted.org.nz/home/sorted-sections/investing/different-returns-from-different-product-types>

### Consumer view

*Only one interviewee was currently investing in managed funds, and this was seen as being a low-effort option. One had a small share portfolio in New Zealand businesses and one had shares in a New Zealand business owned by a friend. For other investors, financial assets were beyond their experience and capacity for personal control.*

*Two people mentioned the time required to effectively invest in the share market. The market needs to be regularly monitored and this was considered to be extremely personally time-consuming. A few people had experience of friends who did well through committing a lot of time to the investment.*

The structure and level of fees and the limited disclosure of information about fees is also likely to be a factor in the reduction in assets held in managed funds. *Consumer* notes that fees are almost never shown in dollar terms so it is difficult for investors to understand them, or make simple comparisons across different funds.

Skilling and Waldegrave (2005) comment that the withdrawal of specific supports to saving – eg the fall in employer-based superannuation schemes – is an important part of why financial asset holdings are so low in New Zealand. There is some evidence that workplace superannuation is associated with greater total retirement wealth (Scobie and Le, 2004). Hawke (2006, p3) similarly comments that we should not be surprised that New Zealand has relatively little private savings in financial assets since “the main vehicle for participation in equities around the OECD world is a pension fund”.

### Consumer view

*Superannuation was discussed in all the interviews. One couple would not consider superannuation (including Kiwisaver), based on personal experience of a scheme losing money. Others were positive and a few already had a scheme, and most actively welcomed Kiwisaver. A majority of those interviewed had done some work to understand Kiwisaver and the choice of a provider. Having a financial inducement to join was clearly important.*

Widdowson and Hailwood (2007), however, attribute the concentration of household assets in housing, and the growth of household debt levels, to a need for increased financial literacy. Higher financial literacy would allow householders to choose better options for managing their debt and have a better understanding of the risks associated with concentration of wealth in particular asset categories.

### Views from key informants

Key informants generally concurred that property has been an attractive investment proposition over the last two decades. The steady growth in house values, with no price crashes in recent history, was an obvious counterpoint to the more chequered performance of shares.

One informant said:

“If (someone) buys two to three rental properties, and these increase in value by an average of 5 percent pa and they pay interest only...no other investment can match these returns.”

Other factors cited as making property investment attractive, and reflected in the experiences and view of consumers interviewed, included:

- the opportunity for leverage against the value of one's own house to buy a second property;
- the possibility that small players in the rental housing market avoid tax on capital gain; and
- the relatively low cost of entry into the rental property market.

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Informants saw tax advantages in property investment, both through the option of setting up a Loss Attributing Qualifying Company and through untaxed capital gains. One informant noted that while some property investors focus on the income stream, others are focused on capital gain. There was also a view that many people who trade in property in a small-scale way, by, eg, buying apartments from plans and then selling when built, should, but may not, be paying tax on capital gains.

#### Consumer view

*Most consumers were either aware or somewhat aware of both the current tax advantage of property versus other investments and had read of possible changes to the tax treatment of investment property. However, this information did not figure large in decision making.*

Several informants drew attention to our history. The close relationship that both Maori and other New Zealanders have with land and property was noted. Moreover, even from early times, government policies, including those related to initial European settlement, tended to reinforce and support home ownership. Other government policies have included the provision of State Advances loans, the capitalisation of family benefits, and tax rebates for first-home buyers. Until recently, we have had higher home ownership rates than comparable countries. Several informants mentioned that home ownership was still a strongly internalised goal for New Zealanders, including Maori and Pacific people.

#### Consumer view

*The importance of the experience of family and friends was a theme throughout the interviews. A person's 'cultural' approach to investment was very much influenced by these experiences. Family and friends not only influenced the range of 'comfort' that a consumer had with different investments, but they were also consistently used as key sources of trusted advice.*

The concept of investment itself is likely to have some cultural specificity. Two informants spoke of the difference between cultural and financial investments – some land for Maori is a cultural rather than a financial investment. The ability for some New Zealanders to have access to money for family purposes is also important.

#### Consumer view

*A Maori consumer favoured "having some money available to provide informal loans to her family".*

Provisions that enable owners to evict tenants swiftly in order to sell a property make rental properties a more fungible and hence desirable asset and, in addition, strengthen the desirability of home ownership. Other factors cited as reinforcing the attractiveness of property investments included the DIY culture and the familiarity people had with property through home ownership.

One informant raised the absence of any compulsory retirement saving, and the relatively low level of employment-based superannuation, as possibly having led to investment in housing being higher than it otherwise would be. Kiwisaver was seen as having the potential to shift the balance towards financial assets.

On the other hand, another informant commented that most people had taken on board the strong messages about paying off their mortgage and student loans and it might therefore be difficult to get people to buy into Kiwisaver or to take account of any message about diversifying investments. This point mirrors the behavioural economists' view discussed later that, in the light of complexity, people are likely to operate on the basis of simple "rules of thumb".

Informants identified a number of barriers to investing in financial assets:

- The sharp falls in 1987 and 2002 in the values in stocks and shares, and the perceptions of lower returns and greater risks across these products. "People don't trust shares and business investment – everyone knows of failures."

- The size of, and fallout from, the 1987 share market crash, including a loss of trust arising from subsequent trials and prosecutions.
- Declines in the value of managed funds in the 2001-2004 period, which made it hard to attract people back to these investments.
- Recent increases in the value of the New Zealand dollar, which have meant a drop in returns from overseas investments, particularly in the US.
- The complexity of products and people's uncertainty about the products.
- The view that managed funds involve "lots of people taking cuts along the way".
- The fact that managed funds can take up to a week or longer to cash up, and that this is a risk factor during a downturn.
- The 33 percent tax rate on earnings in funds (this will be set at an individual's tax rate from October 2007 and reduce to a maximum of 30 percent from April 2008).

A couple of informants commented that they wished they had gone into property instead of managed funds, on the basis of the respective yields on these investments.

Another informant said that if the Reserve Bank or government wanted more investment in the productive sector, they needed to look at the incentives to invest in businesses. The informant drew attention to the negative impact of high interest rates on investments and profit.

### 3 Financial literacy

#### The studies

Financial knowledge contributes to skills in budgeting, money and investment management, and financial planning. Financial literacy has been defined as "the ability to make informed judgments and to take effective actions regarding the current and future use and management of money". Widdowson and Hailwood (2007) break this down into:

- basic numeracy skills;
- an understanding of the benefits and risks associated

with particular financial decisions including spending, borrowing, leveraging and investing;

- the ability to understand the trade-off between risk and return, the attributes of different types of investments, the benefits of diversification and the time value of money; and
- the capacity to know when to seek professional advice and to know what to ask and be able to understand the advice given.

The ANZ-Retirement Commission survey found that financial knowledge varied widely in New Zealand (Colmar Brunton 2006). It found the population split into three equal-sized groups of low financial knowledge, medium knowledge and high knowledge. As a general pattern, the higher the financial knowledge group, the higher the proportion of people having higher education, higher incomes, and owning their homes. Around 15 percent of the population had advanced knowledge, in that they understood basic and advanced financial concepts, were in control of their borrowing and debt, and were financially confident.

#### Consumer view

*Almost all the consumers interviewed had a relatively high personal or family income. However, most people appeared to have undergone a sharp learning curve in relation to making their investment decisions. As well as holding discussions with trusted and experienced family and friends, people used the web or professional advisers who they either knew of or had targeted because of their particular investment expertise. In most cases it appears that people asked for advice once they had made up their mind on their investment preference.*

One said that she "had always used friends and family for advice and chooses those to ask based on their own ability to manage money". She also commented that she was not sure how she would go about choosing a good adviser.

The ANZ-Retirement Commission survey also found that 75 percent said having a variety of investments was a way

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to reduce risk, but 20 percent considered investing only in property was a way to reduce investment risk. In addition, around a half of respondents indicated that they would invest lightly in an investment offering above normal returns and, if nothing adverse occurred, would commit themselves more fully without any further investigation. Sixty percent of respondents had a current will, and one-third had an enduring power of attorney.

Widdowson and Hailwood (2007) report that a poll commissioned by the Reserve Bank of New Zealand found that 60 percent of respondents (87 percent of those under 30) expected the government or Reserve Bank to bail out a collapsing bank, and that over 80 percent of those surveyed were either not aware of mandatory disclosure by bank and non-bank deposit takers, or did not use disclosures for decision-making.

At this stage, there is no definitive, comparative data from which to judge whether New Zealanders' levels of financial literacy are similar to those in comparable countries. There is also no data to indicate how literacy has changed over time although the Retirement Commission intends to replicate the 2006 survey of Financial Knowledge. The Commission's on-line surveys of its Money Management website [www.sorted.org.nz](http://www.sorted.org.nz) suggest that frequent users progress in literacy and money management.

#### Consumer view

*One interviewee said that in spite of having done as much research as they could before buying their investment property, it was all well beyond their or their immediate family's experience – and to some extent they "were flying blind".*

#### Views from key informants

Key Informants generally thought there was scope to improve financial literacy in New Zealand. A useful distinction made was that while basic budgeting skills are vital, and within the grasp of most people, being able to read and vet investment statements is likely to always be a less common, specialised skill.

While one informant considered that financial literacy here was likely to be similar to that in the UK, USA and Australia, most thought literacy was likely to be lower in New Zealand than in comparable countries, or indicated that they could not generalise.

Several informants saw current low literacy as a product of the relatively simple financial world of the recent past, with one commenting that older people – the "mum and dad" investors – had grown up with a much smaller range of products than exist now. Another drew attention to the relatively small New Zealand share market as an example of the small role of these assets in our investments.

Literacy was seen as particularly important to ensuring people could manage and consolidate debt. Several informants saw it as likely that products that provided an opportunity for hands-on involvement – such as on-line banking, on-line options for buying shares, and the introduction of Kiwisaver – are likely to lead to improved financial literacy. The website [www.sorted.org.nz](http://www.sorted.org.nz) was also referred to positively as an education tool. Getting basic financial literacy established at school was seen by several informants as being key to higher overall literacy standards. Improving financial literacy was seen as being particularly important for children in households where there is low income and/or no savings/investment experience.

## 4 Complexity of, and information about, investment products

### The studies

At the best of times, investment products are complex and returns are uncertain. It is difficult for consumers to ascertain the quality of the alternatives. As discussed earlier, most people, when faced with lots of information they aren't sure how to process, come up with rules of thumb on how to proceed.

Literature on behavioural economics points to many investors being backward looking – something that may explain continued optimism about property investments – and that consumer investment decisions are influenced by swings between optimism and caution, by a bias towards the status

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quo (the investments they already have), and by the way investments are framed or described (Grimes, 2005).

#### Consumer view

*The interviews supported the view that lower 'risk' is more likely to be associated with investment products that people feel familiar with in some way.*

Thaler and Cronqvist found that, when Sweden partially privatised its social security scheme, Swedes who actively invested their own pensions chose more expensive, less diversified funds than those picked by the default plan. To quote Richard Thaler, "...there's no reason to think that markets always drive people to what's good for them. Markets also drive people to what's good for the people selling" (Stewart, 2005).

The complexity of the market and products, as well as the costs of switching products, set up demand-side limitations that mitigate competition in the investment market. Grimes notes that "the New Zealand market appears particularly susceptible to the marketing of complex, high-fee products that may be inappropriate for consumers' needs". He also notes that "...if this pattern of savings behaviour (New Zealanders holding a small proportion of their net wealth in financial products) is to alter, New Zealand investors need to be able to place greater trust in the range of investment products on offer, and particularly on the investment advisers who help direct investors into available products". (Grimes, 2005, pp18-20).

A gap in the New Zealand market is the provision of independent and expert financial advice and comparisons of investment products and performance. *Consumer* produced some Managed Fund surveys for its paying clients in 2004 and 2005, and the Retirement Commission is in the process of producing a comparison of fees, and the impact of fees on earnings, for the different Kiwisaver providers. One factor regarding this gap is likely to be the absence of effective demand, with people being unwilling to pay for advice, given that no advice can eradicate risk. Independent advice based on comparisons is expensive to produce and update

and, unless undertaken with considerable care, could risk litigation.

#### Consumer view

*Only one consumer had paid for independent financial advice.*

Litigation risks also limit the role of the media in the case of a poorly performing company (Hargreaves, 2007). The Securities Commission is also constrained in its ability to act. For example, as evidenced in the case of the recent Bridgecorp receivership, a firm first has to inform the Commission that it is in default and then be given the chance to comment on the proposed cancelling of prospectuses, before the Commission can cancel any prospectus (Securities Commission, 2007).

#### View from key informants

Informants considered information about financial products could be improved, and the lack of good information contributed to a low-trust environment. Key informants were generally keen on better disclosure about products, particularly fees, charges, and what terminology means. Examples that informants had come across included people who:

- thought that an A credit rating was the top rating, not realising there was a triple A rating;
- thought that secured debenture stock was completely secure and without risk; and
- only consulted trusted people that they knew, or who were from the same cultural background, even if this meant paying more charges.

Several informants expressed a lack of confidence that the industry would willingly disclose information in a simple form, given the prevalent practice of producing unduly complex financial statements. One informant considered that a campaign to simplify information, associated with awards for simple investment statements, might be helpful. Another view was that there could be a standard disclosure

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statement developed that all products needed to comply with.

Most informants pointed to commission selling of products as leading to a conflict of interest for advisers, given that they are acting for both the buyer and the seller. The incentives are to promote products with the best commissions. It was noted that commissions or incentives such as bonuses existed right across the sector, including in the large financial institutions and banks. One informant identified the way forward as being the growth of fee-for-service advice – advice independent of any relationship to particular financial products. Another informant considered that most New Zealanders would not be prepared to pay for advice directly, so commission selling was likely to continue.

Several informants identified current disclosure provisions as being inadequate, with one saying you needed to know the questions to ask. Two noted there was no “cool-off” period when purchasing investment products.

In contrast to information about fees and charges, the quality of investment management in funds was identified as one area where it was very difficult to have adequate disclosure and information, due to ongoing changes in the mix of investments and recruitment of investment personnel. One informant said careful investment in managed funds would work fine if you were a sizeable player and could play close attention to the decisions of fund managers. This was not, however, feasible for individual investors.

A further issue raised was the lack of commitment by government officials to simple information systems and that, in desiring to cover all bases, their requirements on financial statements might also reinforce their complexity.

## 5 Quality of financial institutions, products and the regulatory framework

### The studies and policy settings

Government’s regulatory interest stems from the complex nature of financial products, the size and significance of investments for households, and the importance of products working well for businesses.

While New Zealand has a wide mix of financial products, New Zealand’s small size means there are likely to be more challenges in achieving economies of scale. New Zealand has a small share market, which means it is difficult to get a well-balanced portfolio just from New Zealand shares.

New Zealand is in the process of introducing a more robust regulatory framework for the financial sector. This framework, and the financial sector itself, has come in for criticism both within New Zealand and internationally.<sup>7</sup> *Consumer*, for example, in its analysis of managed funds raised the issue of how fees are managed and communicated.<sup>8</sup>

Kiwisaver, a new voluntary retirement savings regime that is subsidised by government now, and in future by compulsory employer contributions that will be phased in between 2008 and 2011, has the potential to significantly alter the quantity and nature of financial investments.

Major reforms have addressed disclosure, insider trading and the powers of the Securities Commission to take action in the case of breaches of the law (Diplock, 2007).

Recent reviews covering financial products and providers, and the regulation of financial intermediaries (advisers) in New Zealand, have been completed. These aim to ensure New Zealand meets its international obligations and achieves a more effective and consistent regulatory environment that improves consumer confidence and keeps compliance costs to a minimum.

The Taskforce on the Regulation of Financial Intermediaries (2005) found that, in comparison with the comparable

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<sup>7</sup> Jane Diplock (2007) notes the IMF and World Bank had a number of concerns about New Zealand’s regulation of the financial sector in 2003.

<sup>8</sup> See [www.consumer.co.nz](http://www.consumer.co.nz).

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jurisdictions of Australia, the UK, Ontario, British Columbia, Hong Kong, Singapore and Ireland, New Zealand has the lowest level of regulation of financial intermediaries, the least state involvement in regulation and the least state involvement in sanctions and remedies. New Zealand regulations are product/sector specific and therefore variable, in contrast to the UK, Australia and Ireland, which have regulation covering all investment activity.

Government has announced that legislation will implement the following:

- registration of all financial service providers;
- licensing of trustees that act as supervisors of debt issuers, non-bank deposit takers, and collective investment schemes;
- improved prudential supervision of non-bank deposit takers, who will need to be licensed by the Reserve Bank; and
- provision for a comprehensive approach to consumer dispute resolution and redress.

A second round of legislation will be undertaken later.<sup>9</sup>

From 1 October 2007, earnings in managed funds will be taxed at each investor's specific tax rate and capital gains on New Zealand shares and certain listed Australian resident company shares will no longer be subject to tax. Specific regulations have also been introduced for Kiwisaver providers.

Even when all these changes are bedded in, the regulatory regime will remain relatively light-handed by international standards.

Grimes's investigation of ways to improve trust in the retail savings industry recommended a number of other prescriptive actions:

- a standard disclosure form for all investment products;
- a mandatory requirement for investment advisers to declare their fees and income (from all sources) for a client's product, and a mandatory requirement to offer a range of similar products to clients;

- an increase in the Retirement Commission's educational activities;
- the Retirement Commission or some other body undertaking a regular 'mystery shopper' programme amongst investment advisers and reporting the results publicly; and
- the creation of a financial ombudsman to cover complaints across a broad range of services (Grimes, 2005).

### Views from key informants

Several informants raised the importance of having more robust regulations in place to provide a better balance of power between the sellers and buyers in the financial product market. An effective regulatory framework, quality of information about products, and financial organisations operating with integrity, were seen as important to building more public confidence in financial assets and to making it easier for people to judge the quality and risk of what is on offer, and to gain redress in the case of unfair practice.

Several informants commented on the high fees and poor performance of larger managed funds. One noted the emergence of better-performing niche investment companies.

Another issue canvassed was the education of fund managers. One informant considered that, in the future, all financial advisers, both the small operators and those working within large finance companies and banks, would end up with diplomas in financial planning. Another informant was not so optimistic, noting that banks and the larger finance companies had been resistant to setting up industry training and had large internal training systems and a vested interest in their people being good at marketing their products.

Informants differed in their views on the proposed changes to regulations. One felt it was important to retain a relatively light-handed approach to regulation and to focus on eliminating the power imbalance, while another supported relatively light-handed regulation because more complex systems had not proved effective elsewhere.

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<sup>9</sup> For more details, see [http://www.med.govt.nz/templates/ContentTopicSummary\\_\\_\\_27653.aspx](http://www.med.govt.nz/templates/ContentTopicSummary___27653.aspx).

Several informants thought Kiwisaver was likely to assist the financial market to develop and become more profitable. One described the expected process as more interest in shares pushing up prices, which would then attract more companies to sell shares in the New Zealand market, which in turn would attract more buyers.

One informant considered that the absence of sizeable not-for-profit operators (such as cooperatives or trusts) in the financial product market in New Zealand meant that there was a lack of an alternative paradigm in the market and less real choice for the public.

## 6 Concluding comments

### Changing investment environment

A number of factors are likely to work together over the next few years to increase the assets of, and improve public confidence in, the financial sector:

- the introduction of Kiwisaver, and its associated inducements;
- the application of lower tax rates to earnings in managed funds; and
- forthcoming regulatory changes that will improve disclosure and prudential arrangements applying to financial products, providers and advisers.

Research informants and broader conversations in the course of this project suggest that the necessity to choose a Kiwisaver provider is leading people, often previously uninformed or unfamiliar with the financial industry, to investigate and discuss their options. This is likely to increase financial literacy and create greater familiarity with non-property investment products. All interviewees were aware of Kiwisaver and most were actively considering their options. The opportunity for 'structured' or 'contractual' savings seems appealing.

The consumers interviewed seemed to know that investment involves risks that can be reduced but not eradicated. Those who had chosen to invest in property often cited 'lower risk' as a key consideration. Perceptions of relative risk may be currently informed or reinforced by reported instability

and volatility in worldwide markets and the seeming lack of control New Zealand investors have over these movements. This may confirm property as the low-risk option.

### Consumer view

*Having control over their own investments was a key theme of the interviews. One woman was very forceful in her view. She was "not convinced that the people who manage the money are experts – they are just employees".*

*One consumer said that when they sold their land they would "hold term deposits – investments are looking risky at the moment".*

### Investment in property vs financial/business products

Property investment emerged as a fairly logical investor response to perceptions of relative risks, returns and the desire for personal control over investments. In addition, property is seen by New Zealanders as the only investment that can be funded by borrowing – generally against an owner-occupier house.

While consumers did not indicate a strong association between tax and investment options, the attractiveness of "free money" in Kiwisaver was evident. It may be that, over time, behaviour could be influenced by increasing the attractiveness of financial products. This could be assisted by:

- ensuring that publicly funded league tables and/or consumer checks on investment products, providers and advisers are available;
- providing for a 7 day "cooling off" period when specified financial products are purchased;
- mandatory "plain English" disclosure of products, fees, and investment performance on a simple, standard template; and
- developing more sophisticated financial literacy for the future through education in schools.

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As far as property investment is concerned, some key informants suggested better enforcement of existing provisions of tax capital gains on individuals, trusts or companies that trade in property. However, interviews with consumers (bearing in mind the small number) indicated that this might not be currently key in their decision-making.

Overall, the review supports a view that adequate income and money management skills are important precursors to sound saving and investment behaviours.

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## Appendix 1

### Key informants

Tom Farkas, Vantage New Zealand Ltd

David Feslier, Executive Director, Retirement Commission

Angela Foulkes, member Taskforce on the Regulation of Financial Intermediaries

Frances Hartnell, former director, Pacific Island Business Development Trust

Grant Huwylar, CEO, Hokotehi Moriori Trust Board

Dr Bill Kain, Independent Agribusiness Consultant

Lyn Meachen, private banker, Bank of New Zealand

David Russell, former director, Consumers' Institute

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# Microeconomic analysis of household expenditures and their relationship with house prices

by Mark Smith<sup>1</sup>

The use of microeconomic data sources can provide important insights into how household and firm behaviour influence developments in the economy. This article summarises some of the key features of household surveys produced by Statistics New Zealand, including the Household Economic Survey (HES). It then outlines recent work by the Reserve Bank that uses data from the HES to analyse various hypotheses for why a positive correlation exists between house prices and consumer spending. Findings suggest this positive correlation is evident for various age groups of householders, and for households living in rented accommodation as well as for owner-occupiers. There is some evidence of a wealth effect for older householders, with the pick-up in household expenditures for this group since the late 1990s occurring during a period of sizeable house price rises.

## 1 Introduction

The household sector (residential investment and private consumption) accounts for approximately two-thirds of total economic activity. Hence, developments in this sector have an important bearing for monetary policy via their impacts on activity and inflation. There are also financial stability implications to consider, with house prices and household debt levels having risen strongly in recent years.

In carrying out its monetary policy and financial stability functions, the Reserve Bank of New Zealand looks at a wide variety of data, encompassing microeconomic and macroeconomic sources. In addition to the macroeconomic data reported by Statistics New Zealand, and aggregate household balance sheet and money and credit statistics collected by the Reserve Bank, a wide range of microeconomic data about households is available. Analysis of microeconomic data offers another angle of analysing developments in the household sector that are of interest to researchers and policymakers. The release of the 2006/07 HES in November adds to this information set. This is particularly timely given developments in the household sector since the last HES (2003/04 period).

This article summarises recent work at the Bank using microeconomic data from the HES to analyse developments in the household sector. Following a brief outline of the HES, some of its key differences with other microeconomic data sources are outlined. The article then highlights an area where household-level data can provide insights for policymaker, namely evaluating alternative hypotheses for why a link between house prices and household expenditures exists. A brief conclusion follows.

## 2 The Household Economic Survey and other household datasets

The HES records expenditure and income data for a sample of all private New Zealand resident households living in permanent dwellings.<sup>2</sup>

The HES was conducted annually from March 1974 to March 1988. It subsequently shifted to a triennial cycle, with surveys in the June 2001, 2004 and 2007 years.<sup>3</sup> Each survey year, around 3,000 households are interviewed. The main purposes of the HES are shown in figure 1.

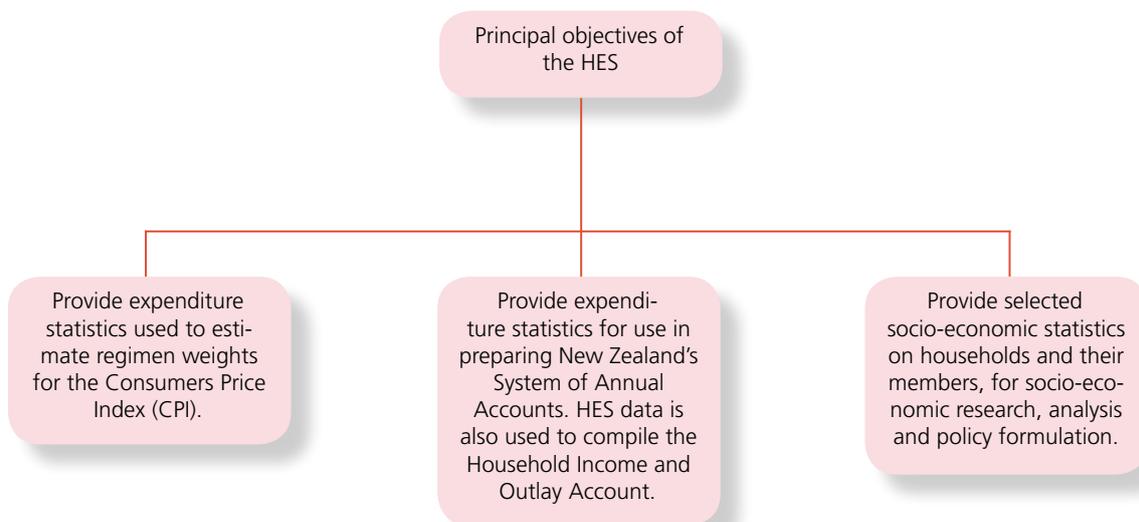
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<sup>1</sup> The author would like to thank Reserve Bank colleagues for helpful comments and suggestions. Thanks also to Statistics New Zealand. Access to the data used in this article was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the author, not Statistics New Zealand.

<sup>2</sup> For survey purposes, a household comprises a group of people who share a private dwelling and normally spend four or more nights a week in the household. They must share consumption of food, or contribute some portion of income towards the provision of essentials for living as a group.

<sup>3</sup> From 2007/08 onwards, Statistics New Zealand will run a shortened version of the HES, collecting information on household income, expenditure on housing costs, and living standards in the years between the full HES.

Figure 1  
Principal objectives of the HES



Source: Statistics New Zealand (2004)

There are five survey components to the HES: a household questionnaire, an expenditure questionnaire, an income questionnaire for each household member 15 years and over, an expenditure diary for each household member 15 years and over, and (from the 06/07 survey) an economic living standards index short form for one member per household aged 18 years and over. Expenditure data in the HES is collected by a range of different methods, including 12-month recall for large payments, information on the latest payment for regular commitments, and 14-day diary keeping for adult members of each household aged 15 years or over.<sup>4</sup>

There are a number of equivalent household surveys in other countries, including the Household Expenditure Survey in Australia (10,000 households surveyed every six years), the UK Food and Expenditure Survey (7,850 households annually), the Consumer Expenditure Survey in the US (7,500 households annually), and the Canadian Survey of Household Spending (over 20,000 household annually).

Table 1, opposite, summarises the key features of the HES

<sup>4</sup> Expenditure data from HES 2006/07 is not directly comparable with previous years due to the implementation of a new expenditure classification (more consistent with international conventions). There are now 14 expenditure groups, as opposed to 8 in the 2003/04 HES. See <http://www.stats.govt.nz/datasets/social-themes/household-economic-survey-06-07.htm> for a link to HES questionnaires.

and compares them with some other household datasets provided by Statistics New Zealand.<sup>5</sup>

The HES is a rich dataset providing a considerable range of information. However, there are inevitably going to be gaps:

- Information on household balance sheets is only partial. The HES collects information on the current rateable value of owner-occupier properties and some mortgage debt information. It also collects some information on other properties owned by the household.
- In recent years, family trusts have become an increasingly popular means to protect assets such as property (houses and farms) and financial assets. Up until the 2006/07 survey, the HES did not have a tenure categorisation for family trusts.<sup>6</sup>

Other data sources can be used to fill in some of the gaps in the HES. For example, gaps in household balance sheet information can be supplemented with data from the Survey of Family, Income and Employment (SOFIE) and the Household Savings Survey (HSS).

<sup>5</sup> See <http://www.stats.govt.nz/datasets/a-z-list.htm> for a list of datasets available from Statistics New Zealand.

<sup>6</sup> Estimates from the 2006/07 HES showed that approximately 12 percent of private households held their principal dwelling in a family trust, the same portion as recorded in the 2006 census. See also Briggs (2006).

Table 1

Summary of household survey information available from Statistics New Zealand

| Survey            | Period          | Survey type   | Major information  | Respondents  |
|-------------------|-----------------|---|--|--|
| HES               | 1974-           | Random sample. Annual survey up to 1988, triennial afterwards                   | Household income & expenditures. Some information on assets                    | Approximately 3,000 private households resident in NZ (2,800 in 2006/07 HES).                              |
| SOFIE             | 2002-           | Longitudinal survey - data collected annually from same respondent over 8 years | Record changes in living arrangements, employment, income and wealth           | Data collected from over 22,000 eligible individuals aged 15 years and over in 11,500 households in wave 1 |
| HSS               | 2001, 2009      | Random cross sectional nationwide survey  | Net worth and income for individuals & couples                                 | 5,374 including 2,392 individuals and 2,982 couples (2001 survey)  |
| NZIS              | 1988-           | Random cross sectional nationwide survey. June years                            | Wages & salaries and other household income                                    | 28,000 personal including 5,000 imputed records (June 2007 survey)   |
| <b>Memo item:</b> |                 |   |  |  |
| Census            | 5 yearly (2006) | Official count of NZ population & dwellings                                     | Accurate counts & statistics on characteristics of NZ population and dwellings | 4.028m individuals (1.454m households) residing in 1.479m dwellings (2006 census)                          |

HES refers to the household economic survey, SOFIE is the Survey of Family, Income and Employment, the HSS is the Household Savings Survey, and the NZIS is the New Zealand Income Survey.

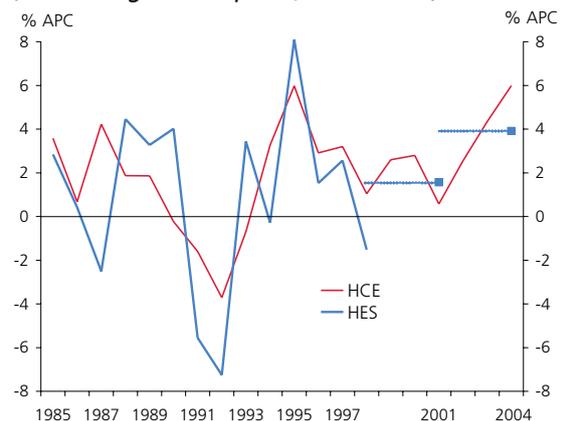
### 3 How does the HES data compare with macroeconomic data?

Microeconomic data can be useful in providing a greater degree of richness to our understanding of the relationships apparent in the macro data. So that the insights from household surveys can be brought into an economy-wide context, it is useful to ascertain how closely aggregate survey data from the HES corresponds to macroeconomic aggregates.

As household survey datasets are compiled using different data sources and methodological approaches we would not necessarily expect to see an exact correspondence between scaled-up estimates from the HES and macroeconomic data estimates from the national accounts. Bascand *et al* (2006) find the HES is likely to considerably under-report household consumption expenditure relative to the national accounts. By contrast, scaled-up HES estimates of household incomes are similar to those in the national accounts.<sup>7</sup> The large discrepancy between the macro and micro estimates

of household income and expenditures highlights that care should be used when using the HES to make inferences about macroeconomic behaviour.

Figure 2  
Growth to real consumption per household  
(*ex-housing consumption, HCE vs HES*)



Source: Statistics New Zealand. Author's calculation.

around 5 percent. The HES does not include information on imputed rental payments, is likely to underestimate expenditures for certain goods and services (eg, alcohol, tobacco and gambling, contributions deducted at source), with expenditures of non-private households not in the HES.

<sup>8</sup> Figure 2 assumes a constant annual average growth rate for the 1998-2001 and 2001-2004 periods.

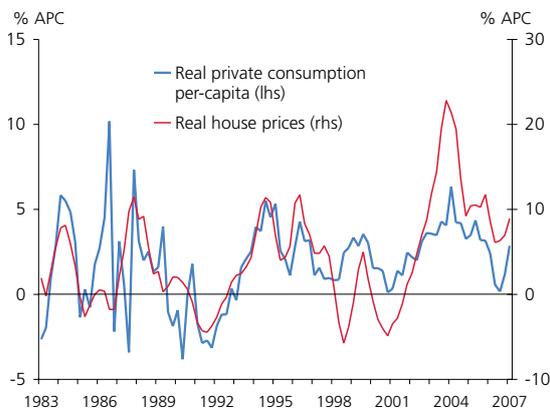
<sup>7</sup> Over the 1996 to 2004 comparison period, the authors find that expenditures from the HES are only between 80-84 percent of equivalent national account (HCE) outlays, whereas for income the discrepancy is only

The next section discusses work at the Bank that uses HES expenditure data as a proxy for household consumption from the national accounts. Comparing growth rates in annual real per-household expenditures (see figure 2) shows a rough positive correlation between respective cycles in consumer spending.<sup>8</sup>

#### 4 An application of the HES – the house price and consumption relation

An example of how microeconomic data can enrich understanding of macroeconomic behaviour is in looking at the positive relationship between house prices and private consumption. This relationship is evident in a number of countries, including New Zealand.<sup>9</sup>

**Figure 3**  
Real per-capita consumption and real house prices in New Zealand



Sources: Statistics New Zealand, Quotable Value Limited.

There are a number of competing explanations for the close correlation observed between house price movements and consumption growth at the macro level. These include the following:

- Wealth effects. Increasing house prices lift household net worth, with owner-occupiers converting their stronger balance-sheet positions into additional consumer

spending. However, higher house prices also raise future housing costs, particularly for prospective first-home buyers and households who intend to trade up to more expensive houses.

- Easing of collateral constraints. Housing is an asset that can be used as collateral for borrowing. An increase in house prices may raise consumption not because of a wealth effect, but because it allows homeowners to borrow more to fund higher desired levels of consumption.
- Common influences. House prices may respond to factors to which current consumption also responds positively, such as future income prospects. Similarly, financial liberalisation may drive up house prices and stimulate consumption by relaxing borrowing constraints on all consumers.

While macroeconomic data can shed light on the magnitude of overall responsiveness of consumption spending to house prices, these data are generally unable to distinguish the importance of each particular channel. Household-level data can be used to identify the strength of the different channels for various household groups, and test hypotheses to explain these differences.

As these hypotheses suggest different behaviour according to the age of the adult members within the household and their dwelling tenure, an initial approach is to compare differences in the house price and consumption relationship for these particular groups:

- If there is a wealth effect from rising house prices, we might expect to see a stronger response of consumption spending from older homeowners, who are more likely to have owned their home for longer and have more housing equity, and are not as affected by higher implied future housing costs.
- If collateral constraints are relieved by rising house prices, we would expect to see a greater spending response of collaterally constrained households, who might be expected to be concentrated among young homeowners with low housing equity, or older homeowners with high housing equity and low incomes.

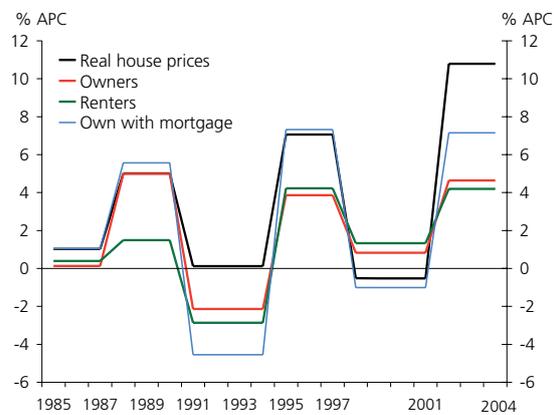
<sup>9</sup> Case et al. (2003) find a strong correlation between aggregate house prices and aggregate consumption in a panel of developed countries from the late 1970s through the late 1990s. Hull (2003) and Dunstan and De Veirman (forthcoming) provide New Zealand evidence.

- If expectations of higher future income growth were affecting both house prices and consumption, we would expect to see a greater spending response by younger households, including those living in rented accommodation.

Figures 4 and 5 compare phases of high growth in real consumption expenditures (excluding housing) with the corresponding average growth in real house prices over the 1984 to 2004 period for different housing tenure and age sub-groups.<sup>10</sup>

**Figure 4**

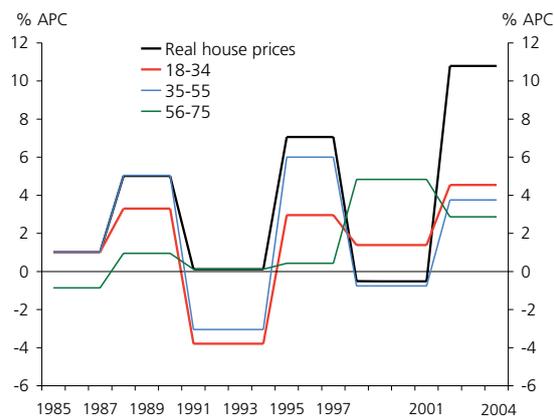
**Tenure of household**



Sources: HES, Quotable Value Limited, author's calculation.

**Figure 5**

**Age of main respondent**



Sources: HES, Quotable Value Limited, author's calculation.

<sup>10</sup> Electronic records of the HES are available since the 1984 survey. This analysis uses an ex-housing measure of household expenditures, as housing expenditures from the HES do not relate to measured consumption from the national accounts. High growth phases occur where annual real household expenditure growth averages above 1.5 percent.

Changes in real non-housing expenditures of renters and home-owners are both positively related to changes in house prices. Over the full sample period, the correlation appears to be slightly stronger for homeowners. Movements in real non-housing expenditures of households who own their own home with an outstanding mortgage appear most closely correlated with house price movements than expenditures of other groups.

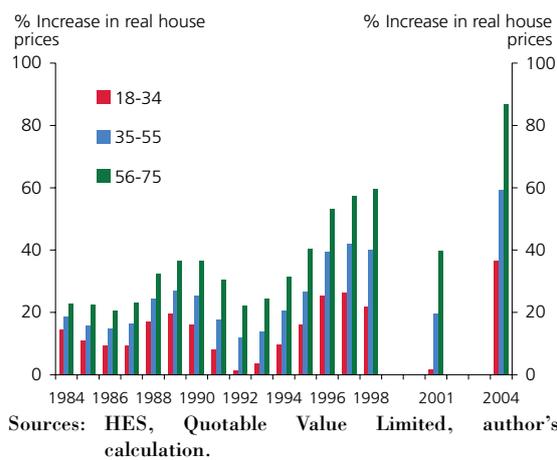
Real non-housing expenditure growth for households with the main respondent aged 35-55 (referred to as 'midage households') appear to be more closely correlated with average changes to real house prices. A positive correlation is also evident for young households (main respondent aged 18-34). Expenditure growth for older households (main respondent aged 56-75) appears the least correlated with house price movements compared to the other age groups. However, the rise in expenditures of older households since the late 1990s is particularly noticeable.

The analysis reported here suggests that the increase in expenditures of older households since the late 1990s could be linked to the sizeable gains in house prices experienced by older homeowners (see figure 6). These findings suggest that wealth effects have been an influential driver of expenditures of older households. As older households have relatively low levels of mortgage debt (figure 7), and higher levels of home ownership, and are more likely to trade down into cheaper housing when they sell their current dwelling, they are more likely to convert increases in housing equity into additional spending. Although housing equity of young and midage homeowners has also increased substantially in recent years, the dollar-for-dollar impact on consumer spending is likely to be smaller, as their future housing costs have also risen.

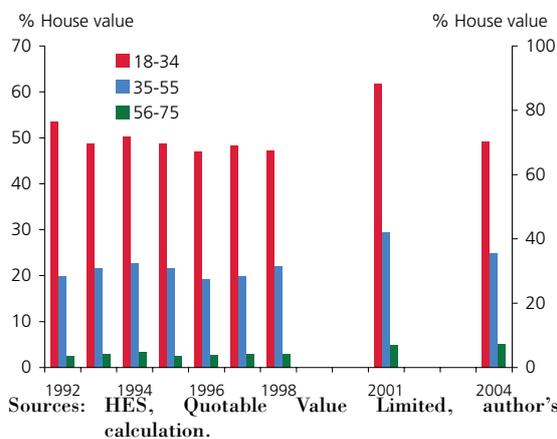
Wealth effects do not explain the positive correlation of the expenditures of renters with house price movements. We would expect a negative correlation for this group if wealth effects were the sole driver of their spending. Closer examination of the data shows that the positive correlation for renters is primarily driven by the spending of young households. It is possible that spending of young households living in rented accommodation may be responding to influences positively related to house prices (such as better

availability of credit or upward revisions to future income expectations). There could also be a discouraged home buyer effect, whereby spending by young renters on non-housing items increases as the chances of owning a house become more remote. Reserve Bank work on evaluating the influence of each of these particular channels is near completion, with results soon to be published.

**Figure 6**  
Gain since purchase by age



**Figure 7**  
Mortgage loans to housing value by age



## 5 Conclusion

There is a wide range of microeconomic information on the household sector. The HES provides a rich dataset of income, expenditure and partial balance sheet information as well as some social and demographic information at the household level.

Microeconomic data sources provide an opportunity to analyse and compare trends in different household groups,

which are sometimes hidden in macroeconomic aggregates. One application of the HES is to analyse the relationship between house prices and household expenditure. A positive correlation is evident across different age groups of household and across both owners and renters. Other analysis suggests that wealth effects have contributed to the pick-up in expenditures in older householders in recent years. For young households, the key drivers of the relation are less obvious.

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# Introducing the MONIAC: an early and innovative economic model

*Tim Ng, Economics, and Matthew Wright, Communications*

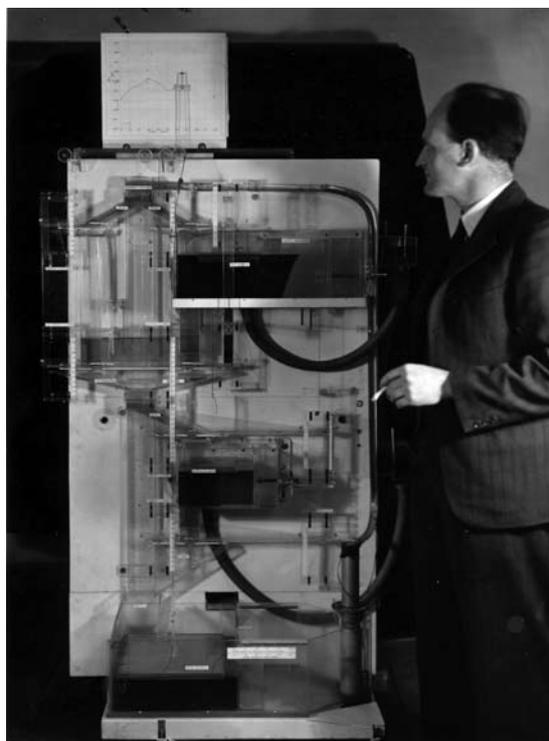
The MONIAC hydraulic computer is an example of a mechanical economic model dating to the 1940s. This article introduces the MONIAC and its creator, New Zealand economist Bill Phillips. Although the MONIAC is not used for policy analysis at the Reserve Bank, large-scale, practical macroeconomic modelling has long been part of our research and policy effort. Our modelling has evolved considerably in the nearly 40 years since macroeconomic modelling was introduced in the Bank, reflecting developments in economic theory and understanding of the New Zealand economy as it changes over time. In no small part, the improvement has been facilitated by the enormous increase in computing power in the decades since MONIAC was developed. The only working MONIAC in the southern hemisphere is on display in the Reserve Bank Museum, on long-term loan from the New Zealand Institute of Economic Research (NZIER).

## 1 Bill Phillips and the MONIAC

Alban William Housego (Bill) Phillips (1914-1975) was one of New Zealand's most accomplished economists. Born in New Zealand and brought up on a dairy farm, he moved to Australia soon after leaving school. In 1937 he went to China. He escaped ahead of the Japanese invasion, reached Britain via the Trans-Siberian Railway, and studied electrical engineering there.

When the Second World War broke out Phillips joined the Royal Air Force and was posted to Singapore. When the island fell to Japanese forces, he escaped to Java, but was then captured there by the Japanese. He quickly put his engineering skills to use in his POW camp, building a miniature radio hidden in a clog and creating an immersion element, run from the camp lighting, to boil water for hot drinks. At war's end, Phillips was awarded a New Zealand Forces scholarship. With these funds he attended the London School of Economics (LSE) from 1946, studying first sociology and then economics. It was here that he developed a machine for demonstrating and performing calculations on the workings of the macroeconomy – the broad relationships between income, employment, interest rates and other economic variables.

Phillips built his prototype machine for around £400 in the late 1940s, including parts scavenged from a Lancaster bomber. He thought of calling it the 'financephalograph', but it shortly gained the acronym MONIAC – 'Monetary National Income Analogue Computer'. Supposedly, this



*Bill Phillips with the prototype MONIAC (London School of Economics LSE/LSE History Photographs/6/2/P D).*

moniker was invented to echo the ENIAC ('Electronic Numerical Integrator and Computer') computer developed in the US in the mid-1940s by John Mauchly and J. Presper Eckert of the University of Pennsylvania.

By contrast with the ENIAC and the handful of other computing machines of that time based on early digital technology, the MONIAC operated wholly on analogue principles. The MONIAC was also one of the world's first computers designed to simulate economic phenomena. The



*Above and below: Dr Alan Bollard, Governor of the Reserve Bank of New Zealand, explains the MONIAC on display in the Reserve Bank Museum to staff (Stephen A'Court, RBNZ).*

prevailing mechanical computation application of the time was ballistics calculations for the military. The MONIAC could perform logical functions that no other computer of the day could match, due to a combination of its analogue calculation principles and the use of water flow as the calculating medium. The other analogue calculating machines of the same era, such as the differential analysers built by Vannevar Bush in the 1930s, were electro-mechanical, relying on cogs, gears and pulleys.

Phillips based the relationships represented in the MONIAC on Keynesian and classical economic principles, showing the circular flow of income, expressed mathematically as  $Y = C + I + G + (X-M)$  (income equals household expenditure plus business investment plus government expenditure plus export sales, less purchase of imports). Separate water tanks represent households, business, government, exporting and importing sectors of the economy. Coloured water pumped around the system measures income, spending and GDP. The system is programmable and capable of solving nine simultaneous equations in response to any change of the parameters, to reach a new equilibrium. A plotter can record changes in the trade balance, GDP and interest rates on



## MONIAC restoration

The MONIAC on display in the Reserve Bank Museum is the first production example, originally calibrated for the British economy, and is the only MONIAC known to be in working order in the southern hemisphere. In its use at the LSE, it was often paired with a second MONIAC calibrated to represent the 'rest of the world'.

In 1987 the LSE donated the machine to the NZIER, and it was restored to working order in 1991. It was refurbished again in 2003 before being displayed as part of a New Zealand display at the 50th Venice Biennale of Contemporary Art. The NZIER kindly offered the MONIAC to the Reserve Bank Museum in 2006, on long-term loan, and it underwent further restoration before being put on display in mid-2007.

Issues that had to be overcome included corrosion in pumps and re-sealing many of the tanks. The pictures highlight some of the steps required to bring the MONIAC to public display as a working museum exhibit.



*Geoff Bertram of Victoria University working on the MONIAC in the Reserve Bank's workshop, November 2006 (RBNZ).*



*New pump assemblies, on left, ready for replacement (RBNZ).*



*The MONIAC reassembled, May 2007 (RBNZ).*



*Robbie MacInarlin (back to camera) and others install the MONIAC in the Reserve Bank Museum (RBNZ).*



*The MONIAC in its display case in the Reserve Bank Museum. The MONIAC sits on a stainless steel tray designed to catch any leakages and allow the machine to be drained (Stephen A'Court, RBNZ).*

paper. Simulation experiments with fiscal policy, monetary policy and exchange rates can be carried out. Although the MONIAC was conceived as a teaching tool, it is also capable of generating economic forecasts. Phillips himself used the MONIAC as a teaching tool at the London School of Economics. Around 14 machines were built, selling for USD4,300 in 1952 – just over NZD293,000 today.

In addition to his contribution to early economic modelling through the MONIAC, Phillips made far-reaching theoretical contributions to economics, for which he is probably better remembered. His particular contribution was the concept of the Phillips Curve, an inverse relationship between unemployment and inflation, which he published in 1958.

The Phillips Curve relationship became a significant part of economic policy analysis in the developed world through the next decade. The theory struggled, however, to explain the persistent and strongly rising inflation from the mid-60s through the 1970s, which occurred without corresponding falls in unemployment. In another major theoretical advance in economics, the simple form of the Phillips Curve was augmented to account for the crucial influence of inflation

expectations. The result was a relationship that incorporated the 'monetarist' principle that the level of inflation and the level of unemployment are independent in the long run. This form of the Phillips Curve survives to this day as a core principle in macroeconomics.

In 1967, Phillips moved to Australia and took up a position in the Australian National University. He suffered a stroke two years later and retired to New Zealand, where he taught at the University of Auckland. Phillips died in March 1975.

## 2 Computer technology and economic modelling at the Reserve Bank

During the late twentieth century, computerised economic modelling and forecasting became an integral part of monetary policy formulation in virtually every central bank in the world. The technologies of economic modeling – and to some extent the models themselves – have inevitably reflected the nature of the computing systems on which

Figure 1

A simplified flow diagram of the MONIAC

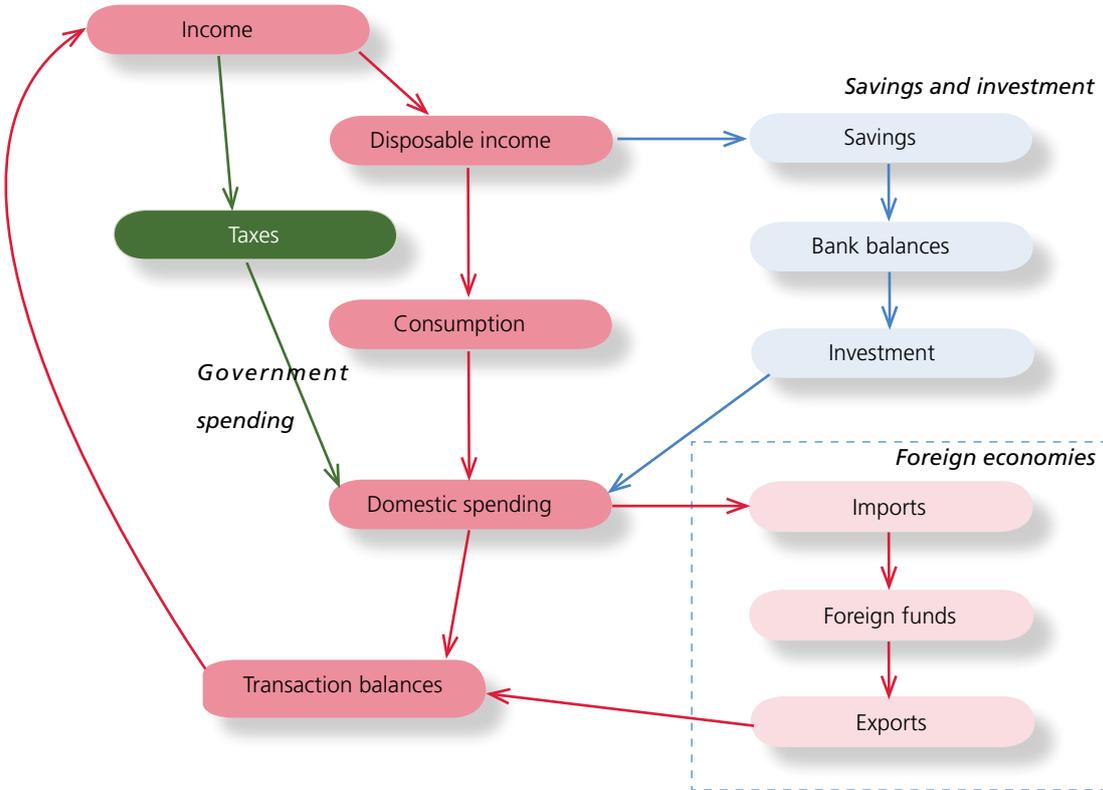


Figure 2

Stocks and flows as represented in the Forecasting and Policy System

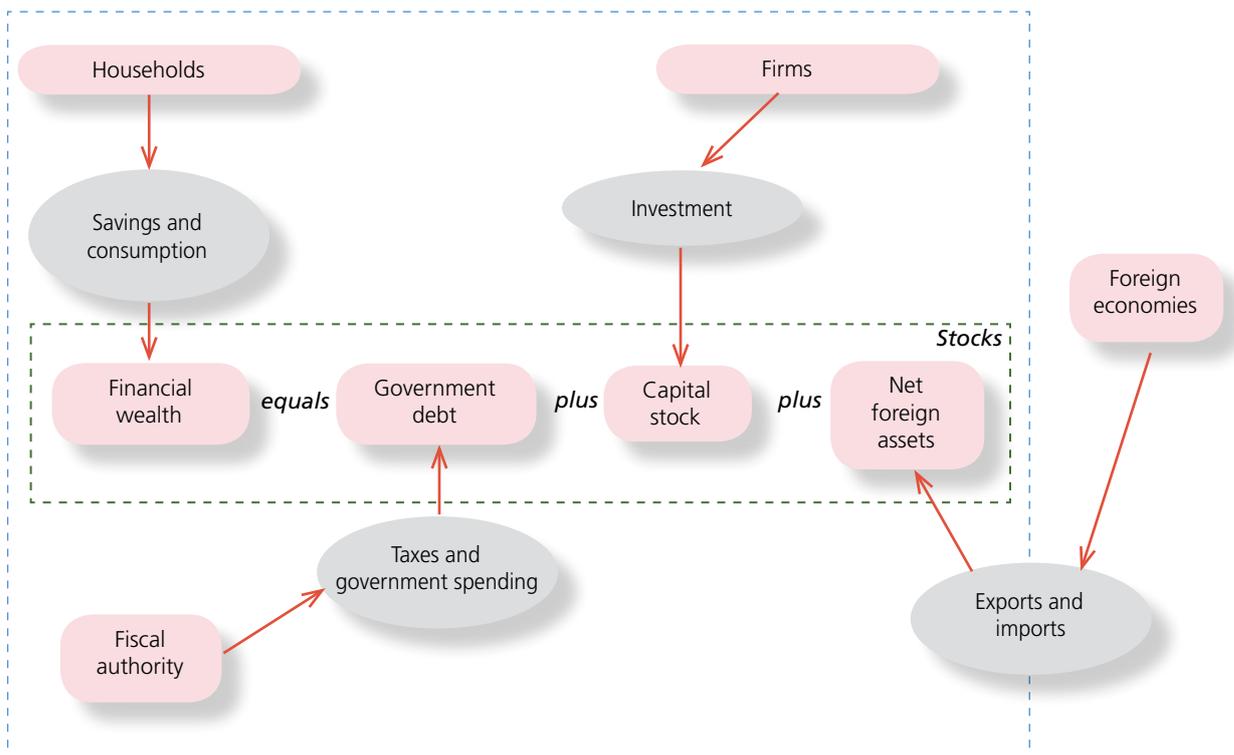


Figure 3

Sample FPS equations

*Consumption*

$$\begin{aligned}
 c: & \quad c = crt + cfl \\
 crt: & \quad crt = ydrt/pc \\
 cfl: & \quad cfl = (cfl\_eq + cv1*((ydf(-2)/pc(-2))/(ydf\_eq(-2)/pc\_eq(-2))-1) \\
 & \quad - cv2*(rsl(-2)-rsl\_eq(-2))*cfl\_eq(-2) \\
 & \quad + cv3*(nfa/pc-nfa\_eq/pc\_eq) - cfladj) \\
 \\
 c\_eq: & \quad c\_eq = cfl\_eq + crt\_eq \\
 crt\_eq: & \quad pc\_eq*crt\_eq = ydrt\_eq \\
 cfl\_eq: & \quad pc\_eq*cfl\_eq = mpcw\_eq*twfl\_eq + zeta*(fa\_eq-fa\_ss) \\
 mpcw\_eq: & \quad 1/mpcw\_eq = (1-gamma)*delta**sigma *(pc\_eq/pc\_eq(+1) \\
 & \quad *(1+rcon\_eq)**(sigma-1)/mpcw\_eq(1) + 1 \\
 twfl\_eq: & \quad twfl\_eq = hwfl\_eq + (1+rcon\_eq(-1))*fa\_eq(-1)/(1+ydot\_eq) \\
 hwfl\_eq: & \quad hwfl\_eq = ydf\_eq + risk\_eq + (1-gamma) * (1+qdot\_eq) *hwfl\_eq(1)/(1+rcon\_eq(1)) \\
 fa\_eq: & \quad fa\_eq + pc\_eq*cfl\_eq = ydf\_eq + risk\_eq + (1+rcon\_eq(-1)) *fa\_eq(-1)/(1+ydot\_eq) \\
 fa\_ss: & \quad fa\_ss = fa\_ss(1)
 \end{aligned}$$

**Key:**

|         |   |         |  |
|---------|---|---------|--|
| c       | Consumption   | sigma   | Consumers' coefficient of intertemporal substitution             |
| c_eq    | Equilibrium consumption   | twfl_eq | Equilibrium total wealth   |
| cfl     | Consumption by forward-looking consumers                        | ydf     | Real disposable income for forward-looking consumers             |
| cfl_eq  | Equilibrium consumption by forward-looking consumers            | ydf_eq  | Equilibrium real disposable income for forward-looking consumers |
| crt     | Consumption by rule-of-thumb consumers                          | ydot_eq | Equilibrium trend output growth rate                             |
| crt_eq  | Equilibrium consumption by rule-of-thumb consumers              | ydr     | Real disposable income for rule-of-thumb consumers               |
| delta   | Household discount rate   | ydr_eq  | Equilibrium real disposable income for rule-of-thumb consumers   |
| fa_eq   | Equilibrium real financial assets                               |         |  |
| fa_ss   | Steady-state real financial assets                              |         |  |
| gamma   | Probability of death  |         |  |
| hwfl_eq | Equilibrium human wealth  |         |  |
| mpcw_eq | Equilibrium marginal propensity to consume out of wealth        |         |  |
| nfa     | Real net foreign-asset ratio                                    |         |  |
| nfa_eq  | Equilibrium real net foreign-asset ratio                        |         |  |
| pc      | Relative price of consumption                                   |         |  |
| pc_eq   | Equilibrium relative price of consumption                       |         |  |
| qdot_eq | Equilibrium growth rate of labour-augmenting technical progress |         |  |
| rcon_eq | Equilibrium real interest rate for consumers                    |         |  |
| risk_eq | Equilibrium transfer to individuals from asset holders          |         |  |
| rsl     | Slope of the yield curve  |         |  |
| rsl_eq  | Equilibrium slope of the yield curve                            |         |  |

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they operate. The field has grown markedly since the MONIAC's time, taking advantage of enormous advances in computing power, and comparably large reductions in the price of computers. Over this period, computers made the transition from what we might call the 'white-coated scientist/engineer' world represented by the MONIAC – a mechanical hands-on environment in which the coat was a practical garb protecting the operator from grease and water splashes – to everyday desktop appliances present, in some form, in virtually every business and household.

The Reserve Bank began economic model-building for policy analysis in 1970. Since then, more than a dozen larger-scale models – that is, models with more than a handful of equations – have been used by the Reserve Bank for various purposes. The hardware has run the gamut from IBM mainframes to Digital VAX mini-computers, to the current Windows-based desktop computers, each generation radically more powerful and physically smaller than the last.

The Bank's current model, the Forecasting and Policy System (FPS), has been in active use for policy analysis and forecasting since 1997. The broad economic relationships represented in FPS bear a perhaps striking similarity to those in the MONIAC. The factors influencing the broad expenditure components in each model, for example, are illustrated in figures 1 and 2. Yet as a comparison between the circular-flow equation on p.47 and Figure 3 reveals, at a detailed level the mathematics of the newer model are very much more complex. This is in part because increased computing power has enabled much larger sets of numbers

to be crunched in many more ways. Advances in economic modelling and computing technology have shed light on many important questions in economics and policy – and yet other questions about the interactions between growth, employment, taxes, inflation, interest rates and the exchange rate, remain to be explored more deeply.

*Next year marks the 50th anniversary of the publication of Phillips' 1958 article about the Phillips Curve. To mark this event, Bill Phillips' life and work will be celebrated in July 2008 at an international economists' symposium in Wellington.*

## Further Reading

– "The forecasting and policy system: an introduction", Reserve Bank of New Zealand *Bulletin*, Vol. 60 (3), September 1997.

– "The Moniac, economics in thirty fascinating minutes", *Fortune*, March 1952.

Hawke, Gary, *Between Governments and Banks*, Government Print, Wellington, 1973.

*The Reserve Bank Museum is open to the public 9.30am-4.00pm weekdays, except for private functions. Entry is free.*

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## FOR THE RECORD

### DISCUSSION PAPERS

DP2007/15

#### RBCs and DSGEs: The computational approach to business cycle theory and evidence

*by Özer Karagedikli, Troy Matheson, Christie Smith  
and Shaun P Vahey, November 2007*

Real Business Cycle (RBC) and Dynamic Stochastic General Equilibrium (DSGE) methods have become essential components of the macroeconomist's toolkit. This literature review stresses recently developed (often Bayesian) techniques for computation and inference, providing a supplement to the Romer (2006) textbook treatment which stresses theoretical issues. Many computational aspects are illustrated with reference to the simple divisible labour RBC model familiar to graduate students from King, Plosser and Rebelo (1988), Christiano and Eichenbaum (1992), Campbell (1994) and Romer (2006). Code and US data to replicate the computations are provided on the Internet, together with a number of appendices providing background details.

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## NEWS RELEASES

### Foreign exchange and derivatives turnover survey

*26 September 2007*

New Zealand's foreign exchange market handled an average of US\$13 billion per day in April 2007 (relative to US\$7.5 and US\$4.2 billion per day in April 2004 and April 2001 respectively), according to a Reserve Bank survey released today.

These results are part of a triennial survey of 54 central banks and monetary authorities co-ordinated by the Bank for International Settlements (BIS) and reported in US dollars. In New Zealand the survey captures the activity of the four major banks participating in the local wholesale financial markets.

Commenting on the survey, Deputy Governor Grant Spencer said "Since 2004, foreign exchange turnover in New Zealand has increased by almost 75%. About 15% of this increase is due to a rise in the New Zealand dollar, with the remainder due to growth in transaction volume. International data show a 71% increase in global foreign exchange turnover (including spot transactions, outright forwards and foreign exchange swaps).

"The increase in foreign exchange derivatives turnover (cross-currency swaps and foreign exchange options) in New Zealand was particularly strong, with a 330% rise in turnover since 2004."

The survey also covers interest rate derivative products, such as forward rate agreements and interest rate swaps. Average daily turnover in these products was US\$2.9 billion – a 60% increase since 2004.

This press statement follows similar releases from the BIS and other central banks at 1500 GMT earlier today. More details of the results are contained in the information note published at <http://www.rbnz.govt.nz/news/2007/3112486.html>,

The BIS preliminary global report can be found at [www.bis.org/press/p070925.htm](http://www.bis.org/press/p070925.htm).

### September 2007 Reserve Bank *Bulletin* released

*28 September 2007*

The Reserve Bank today released the September 2007 issue of the Reserve Bank of New Zealand *Bulletin*.

Over recent years, a range of indicators and much anecdotal evidence has pointed to a significant increase in trading activity in the New Zealand dollar. The first article looks at trends in New Zealand's foreign exchange market for the period from 2001 to 2006. The article reveals a significant increase in trading volumes and a general increase in liquidity within the New Zealand dollar market. Two case studies in the article demonstrate the speed with which the foreign exchange market is able to absorb and reflect new information in pricing as it comes to hand.

The second article looks at New Zealand's firms pricing behaviour – the way firms alter their prices – and the driving factors behind those decisions. It presents some preliminary evidence gleaned from the New Zealand Institute of Economic Research's Quarterly Survey of Business Opinion. These results suggest that New Zealand firms tend to adjust prices more in response to cost changes than demand changes and prices appear to respond more in the face of negative demand changes than positive demand changes.

The final article briefly explores the concept of legal tender. The article explains and offers practical examples showing that without the safeguard of legal tender, cash transactions could not always take place with sufficient certainty to satisfy the needs of consumers and sellers.

### New bank registered

*1 October 2007*

The Reserve Bank of New Zealand today announced that JPMorgan Chase Bank NA has been registered as a bank in New Zealand.

JPMorgan Chase Bank NA is incorporated in New York and will operate as a branch in New Zealand. The bank intends to operate entirely in the wholesale markets in New Zealand, and will not provide retail banking services.

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There are now 17 registered banks in New Zealand, which are listed on the Reserve Bank's website.

### **OCR unchanged at 8.25 percent**

*25 October 2007*

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

Reserve Bank Governor Alan Bollard said: "The outlook for the New Zealand economy and interest rates remains broadly consistent with the view outlined in the September *Monetary Policy Statement*. The labour market remains tight, domestic income growth continues to expand on the back of strong commodity prices, and core inflationary pressures persist. On the other hand, there are signs the housing market is moderating.

"Despite ongoing surpluses in the government's operating balance, fiscal policy is contributing to inflationary pressure. Any further easing in fiscal policy beyond that already announced will add further upside risks to medium-term inflation.

"There are a number of other upside risks to inflation, including the direct effects of the proposed greenhouse emissions trading scheme and rising global food prices.

"While the turbulence in global financial markets has eased somewhat, considerable uncertainty remains. This poses a downside risk for our key trading partner economies. In addition, the New Zealand dollar remains relatively high, restraining the externally-focused sectors of the economy.

"We believe that the current level of the OCR remains consistent with future inflation outcomes of 1 to 3 percent on average over the medium term."

### **Reserve Bank restructures Financial Stability Department**

*1 November 2007*

The Reserve Bank today announced changes to its Financial Stability Department to enhance management of the Bank's expanding role in maintaining the stability of New Zealand's financial system.

Deputy Governor and Head of Financial Stability, Grant Spencer, said the changes follow the Government's recent decision that the Bank will become responsible for the regulation of non-bank deposit-taking institutions and insurance companies. Legislation enabling the Bank's expanded role is to be introduced over the next year.

"Financial stability is one of the Bank's core functions," Mr Spencer said. "There is a lot for us to work on and the new structure and teams will enable us to handle this effectively. We are looking forward to the challenge."

In preparation for the new role, the Financial Stability Department has been replaced by two new departments – the Prudential Supervision Department (PSD) and the Financial Markets Department (FMD).

PSD is in charge of bank supervision and will regulate non-bank deposit-takers and insurance companies. FMD is responsible for the Bank's domestic and foreign exchange markets activity, and for research and analysis on macro-financial stability.

Toby Fiennes has been appointed Head of Prudential Supervision, and Simon Tyler the Head of Financial Markets. They report to Mr Spencer as members of the Bank's Senior Management Group. Over the next three years around 25 people will join PSD as its regulatory role expands.

Toby Fiennes has been a Special Adviser with the Bank since 2005, engaged in banking supervision, and the reviews of the regulatory arrangements for non-bank deposit-takers, insurers and New Zealand's Anti-Money Laundering framework. He has worked at Barclays Bank, the Bank of England, and the UK's Financial Services Authority.

Simon Tyler joined the Bank in 2004 as Manager of Market Operations from the National Bank of New Zealand, where

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he had been Head of Treasury and prior to that was Manager Money Markets.

## **New Zealand's financial system resilient**

**7 November 2007**

The Reserve Bank today released its *Financial Stability Report*, a twice-yearly report assessing the health of the New Zealand financial system.

Reserve Bank Governor Alan Bollard said the financial system is sound and has been reasonably resilient against a back-drop of worldwide market volatility.

"In recent months global financial stability has been severely tested, with turmoil in financial markets," said Dr Bollard. "Failure by borrowers in the US sub-prime mortgage market to meet their payments led to more widespread financial market volatility. As a result, the cost of risk has increased and liquidity has reduced."

Liquidity in the New Zealand dollar foreign exchange and interbank markets was tightly stretched in August, and, like many other central banks, the Reserve Bank stepped in to ensure the interbank market could trade normally.

"Recent events highlight the importance of liquidity for institutions and the financial system as a whole, and there are important lessons to be learned," Dr Bollard said. "New Zealand is heavily reliant on foreign capital markets, given its large external debt. These markets may not be as secure and liquid as previously thought."

Dr Bollard said the Reserve Bank is commencing work on a specific liquidity policy for banks, which it expects to introduce in 2008.

Reserve Bank Deputy Governor, Grant Spencer, said banks' asset quality remains in good shape, and profits continue to increase in line with growth in bank lending. However, risks to financial stability still remain due to low household saving. Debt and debt-service ratios continue to rise, making households and the financial sector vulnerable to a housing market correction.

Mr Spencer said failures in the non-bank financial sector to date have been caused by underlying solvency problems related to asset quality, connected lending, and credit

management. However, recent liquidity pressures have been a trigger for closure in some cases, and many companies are under continued liquidity pressure because of reduced deposits by households.

"Despite the substantial impact of recent events on non-bank depositors, the failures are unlikely to have broader negative effects on the financial system and the economy," Mr Spencer concluded.

## **OCR unchanged at 8.25 percent**

**6 December 2007**

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

Reserve Bank Governor Alan Bollard said: "Economic activity has occurred largely as outlined in the September Monetary Policy Statement. Capacity pressures – particularly in the labour market – remain significant, while the housing market has clearly slowed. A substantial income boost is still expected to occur through 2008, as recent dairy price gains reach farmers.

"Nevertheless, the outlook has changed somewhat due to recent developments. Oil prices, which are nearly 30 percent higher than we assumed in September, and rapidly rising global food prices are likely to result in headline inflation above 3 percent for much of next year. In the medium term, despite ongoing fiscal surpluses, the likelihood of future personal tax cuts adds to the inflation outlook.

"There are considerable risks around our view. The price effects of the Government's proposed emissions trading scheme add upside risk to inflation. Global financial markets remain unusually turbulent, posing significant downside risk for some of our key trading partner economies.

"Overall, inflationary pressures have increased, and interest rates are now likely to remain around current levels for longer than previously thought. We believe that the current level of the OCR remains consistent with future inflation outcomes of 1 to 3 percent on average over the medium term, based on the information to hand at present."

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## PUBLICATIONS

### Regular publications

*Annual Report*

*Financial Stability Report*

*Monetary Policy Statement*

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

Published in October each year.

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

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

### Recent Reserve Bank Discussion Papers

2007

- |           |  |
|-----------|--|
| DP2007/01 | Open economy DSGE-VAR forecasting and policy analysis - head to head with the RBNZ published forecasts<br><i>Kirdan Lees, Troy Matheson and Christie Smith</i> |
| DP2007/02 | Nowcasting and predicting data revisions in real time using qualitative panel survey data<br><i>Troy Matheson, James Mitchell and Brian Silverstone</i>        |
| DP2007/03 | Satisficing Solutions for New Zealand Monetary Policy<br><i>Jacek Krawczyk and Rishab Sethi</i>  |
| DP2007/04 | Stylised facts about New Zealand business cycles<br><i>Sharon McCaw</i>  |
| DP2007/05 | A model of spatial arbitrage with transport capacity constraints and endogenous transport prices<br><i>Andrew Coleman</i>                                      |
| DP2007/06 | Conditioning and Hessians in analytical and numerical optimization - some illustrations<br><i>Christie Smith</i>   |
| DP2007/07 | The pitfalls of estimating transactions costs from price data: evidence from trans-Atlantic gold-point arbitrage, 1886-1905<br><i>Andrew Coleman</i>           |
| DP2007/08 | The McKenna Rule and UK World War I Finance<br><i>James M Nason and Shaun P Vahey</i>  |
| DP2007/09 | Local linear impulse responses for a small open economy<br><i>Alfred A Haug and Christie Smith</i>   |
| DP2007/10 | Understanding the New Zealand current account: a structural approach<br><i>Anella Munro and Rishab Sethi</i>   |
| DP2007/11 | Credit constraints and housing markets in New Zealand<br><i>Andrew Coleman</i>   |
| DP2007/12 | Housing markets and migration in New Zealand<br><i>Andrew Coleman and John Landon-Lane</i>   |
| DP2007/13 | An analysis of the informational content of New Zealand data releases: the importance of business opinion surveys<br><i>Troy Matheson</i>                      |
| DP2007/14 | Which nonlinearity in the Phillips curve? The absence of accelerating deflation in Japan<br><i>Emmanuel de Vierman</i>   |
| DP2007/15 | RBCs and DSGEs: The Computational Approach to Business Cycle Theory and Evidence<br><i>Özer Karagedikli, Troy Matheson, Christie Smith and Shaun P Vahey</i>   |

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

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### **Selected other publications**

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

### **Pamphlets**

*Explaining Currency*

*Explaining Monetary Policy*

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