### ACKNOWLEDGEMENTS

Norman Gemmell provided helpful guidance on indexing price effects. John Upfold, Manager of the Data Lab at Statistics NZ facilitated access to the data.

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[The table of contents and the text body follows.]
The views, opinions, findings, and conclusions or recommendations expressed in this paper are strictly those of the authors. They do not necessarily reflect the views of the New Zealand Treasury or the New Zealand Government. The New Zealand Treasury and the New Zealand Government take no responsibility for any errors or omissions in, or for the correctness of, the information contained in these working papers. The paper is presented not as policy, but with a view to inform and stimulate wider debate.

Access to the data used in this study was provided by Statistics New Zealand in a secure environment designed to give effect to the confidentiality provisions of the Statistics Act 1975. A portion of the analysis in this paper is based on data from the Survey of Family Income and Employment (SoFIE). Statistics New Zealand has initiated a systems review for SoFIE. Therefore data contained in this paper could be subject to change. However, any errors in the analysis are those of the authors, not Statistics New Zealand.
Abstract

Reliable estimates of actual household saving rates are an essential input into public policy formulation for retirement incomes. These have proved elusive as existing sources of data have given disparate estimates, making it difficult to reach a consensus of the real rate of household saving. However, for the first time in New Zealand, longitudinal data on the assets and liabilities of households at the unit record level are becoming available from SoFIE, a large national longitudinal survey undertaken by Statistics New Zealand.

In this paper we first update estimates from the Reserve Bank’s aggregate data on the household sector (a stock approach) and those from the national accounts (a flow approach). These continue to give widely different estimates of the overall household saving rate, although both were negative in 2008 and both below their long run trend values.

We then present initial estimates derived from SoFIE, by comparing individuals’ net wealth in 2004 with that in 2006 and computing the implied real saving rate on an annual basis. This yielded an overall median estimate of 16%. This is virtually the same as the long run average annual saving rate measured from the aggregate household balance sheet from RBNZ.

However, it must be stressed that the median estimate should be complemented with a measure of dispersion. There is a strikingly wide distribution of saving rates. For example across many categories of individuals around 40% are estimated to have had a decline in net wealth, implying a negative rate of saving. The reasons for this are not yet understood and remain a question for further research.

Finally we demonstrate that over the period 2004 to 2006, passive saving in the form of the revaluation of house prices constituted a major part of the total change in net wealth. However even after removing owner occupied property as an asset, the median saving rate remains positive at 5%, close to the long run average rate from the aggregate RBNZ data after correcting for changes in house prices.

JEL CLASSIFICATION D18 Personal Finance
D31 Personal Income, wealth
D91 Intertemporal choice, life-cycle models, saving
E21 Consumption, saving

KEYWORDS Net wealth; saving; saving rates; unit records; New Zealand
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Saving Rates of New Zealanders: A Net Wealth Approach

1 Introduction

A central and on-going question in pension and superannuation research relates to the saving behaviour of individuals or households. To what extent are they saving adequately for retirement? The question is important as it has potentially significant implications for public policy with respect to retirement income. Are current policy settings such that the living standards of retirees relative to the working age population acceptable? Will population ageing create greater fiscal pressures through the demands on public pension systems? The extent of retirement savings and hence the private provision of retirement income impinge very directly on these policy questions.

In assessing whether people are saving adequately, the researcher immediately confronts a series of methodological and practical issues. In the first place, one must decide on a measure of adequacy. Second, regardless of how an “adequate” savings rate is to be defined, one must be able to measure the rate at which people are actually saving. Only then can a judgement be made about whether the observed saving rates are adequate. This paper focuses on the second question; i.e. the measurement of actual saving rates. The paper is focussed on saving by individuals and households; it is not intended to address the broader question of national savings, the current account deficit and associated levels of foreign debt.

Savings can be measured either from “flow” data as the difference between income and consumption expenditure. Alternatively, a “stock” approach can measure saving from changes in the balance sheet. These approaches are discussed in Section 2. The pattern of New Zealand savings at the aggregate level is illustrated in Section 3. This is followed in Section 4 by a brief description of a major longitudinal survey which has allowed estimates of individual saving rates from detailed information on assets and liabilities. This is the first time that the stock approach has been applied to unit record data in New Zealand. Section 5 summarises the key findings and the paper concludes with future directions for this work.

The evidence to date for aggregate household savings has relied very largely on measures derived from the national accounts. These data have underpinned the debate on savings in New Zealand, and have influenced the formation of public policy. However

1 For a discussion of these macroeconomic aspects see Treasury (2007)
2 NATSEM are currently developing a dynamic simulation model to measure savings as the difference between the accumulation of assets and debt for Australian households (Kelly and Keegan 2008).
a number of limitations of this particular source of data on savings have been identified. In addition, such aggregate measures cannot address the distribution of saving rates and so identify particular segments of the population whose saving rates might be of concern. The present study draws on a new source of data and provides estimates of the level and distribution of saving rates.

Section 2 describes two fundamental approaches to the measurement of saving, while in Section 3 both these are applied to aggregate or macroeconomic data sources. The new source of household level data is described in Section 4, and some initial results from this source are sketched in Section 5. Concluding remarks are given in Section 6.

### 2 Measuring Savings

Saving can be measured in two fundamentally different ways. The first is a *flow measure* where savings is defined as the difference between income and current consumption. The second is a *stock measure*, based on the difference between the net wealth (assets minus liabilities) at the beginning and end of a period. While being cognizant of an extensive series of issues surrounding the definitions and measurement of savings under both approaches, it is not the purpose of this study to rehearse these here.

In broad terms, the flow measure of saving by households ($S^f$) is simply defined as:

$$ S^f = Y - C $$

the difference between income ($Y$) and current consumption ($C$). It is however important to note that this is related to the stock measure of saving ($S^s$):

$$ S^s = \Delta NW = S^f + Rev + Captfr + Other $$

where:

- $\Delta NW$ = the change in net wealth
- $Rev$ = the revaluation of real and financial assets and liabilities
- $Captfr$ = capital transfers to the household sector from other sectors including overseas (e.g. net migrant transfers)
- $Other$ = other changes in wealth holdings that may arise from loss or destruction, or discovery.

In short, once adjustments are made for the revaluations, transfers and any other exogenous changes to household wealth, it is conceptually straightforward to reconcile the two measures. In practice such reconciliation has proved difficult and is typically only partially achieved.

A further important distinction is whether the data is drawn from national aggregates, or from unit record data for individuals or households, based on survey data. Table 1 summarises the sources of data available in New Zealand for the measurement of saving.

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by both the flow and stock methods. In this paper we will examine flow measures from the national accounts. In addition we form estimates of saving rates based on the stock approach drawing on both the aggregate household sector data on assets and liabilities, and on a new source of unit record data based on a household survey.

**Table 1: Approaches and sources of data for measuring savings**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Flow Approach: Income less Consumption</th>
<th>Stock Approach: Change in net wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro economic data (e.g. household)</td>
<td>Household Economic Survey</td>
<td>SoFIE (Survey of Family Income and Employment: Asset and Liability modules)</td>
</tr>
</tbody>
</table>

3 The Aggregate Picture

This section reviews the evidence for both fundamental approaches to the measurement of saving (the flow and stock measures) using macroeconomic aggregates. The section concludes with a comparison of the two approaches.

3.1 Flow measures

The overall level of national savings derived from the System of National Accounts can be disaggregated into the savings of six economic sectors, including the household sector. For each sector a series of accounts can be developed including production, income and outlay, capital, financial, reconciliation and balance sheet. It is on the basis of the household income and outlay account (HIOA) that household savings is estimated as a residual between income and expenditures. Theoretically it is equivalent to summing the income and expenditure of every individual household and computing the difference. The HIOA is currently labelled “experimental” and is subject to on-going methodological enhancements.

Setting aside the relatively small amounts of saving from the non-profit and financial intermediaries, leaves the three major sectoral categories of saving depicted in Figure 1. The most striking result is the long downward trend in household savings and the apparent “dissaving” (i.e. negative saving) by the household sector since 2000.

There are well recognised “boundary” issues between the three categories of savings. Contributions made from tax revenues to pre-fund superannuation could well be classified as retirement savings by households. A similar issue arises on the boundary between household and business savings (Bascand *et al* 2006). To the extent for example that business earnings are retained rather than being distributed to the households that own the businesses, some of what is arguably household savings will be recorded as business savings.

Based on work at the Reserve Bank of Australia (Edey and Britten-Jones 1990), Claus (2002a) have shown that inflation affects the flow measure of household savings, to the
extent that inflation erodes the value of government debt held by households. The latter authors find that once the adjustment for inflation is made, there was no evident downward trend in private savings in the 1990s.

**Figure 1: Major sectoral trends in savings (flow measures): 1978-2008**

One way to overcome this problem is to consider the sum of household and business savings, denoted private savings. However it remains the case that this measure has also become significantly negative in recent years, leaving core government surpluses as the sector which has offset this apparent dissaving by households. As illustrated in Figure 2 there is a marked long run tendency for private savings to move inversely with government savings, as the private sector adjusts its saving rate in recognition of increased tax burdens needed to service and repay public debt.

**Figure 2: Private and government savings: 3 year moving averages**
While the so-called “Ricardian equivalence” phenomenon has been widely debated (Seater 1993), the evidence for New Zealand is not inconsistent with at least a partial relationship. An appreciation of this is important in assessing the extent of retirement savings by the household sector.

Finally we note that the marked decline in the household saving rate (as a percentage of household disposable incomes) has paralleled a rise in net housing wealth which itself rose unprecedentedly following 2001 (Figure 3). Referring to equation (2) it is quite consistent that an increase in house prices (revaluation) could be accompanied by a decline in the flow measure of savings. It is of interest that in the 2008, the last year of the available series, a decline in house prices (and hence net housing wealth) was matched by an increase in the household saving rate, although it is premature to predict whether this trend will continue.

**Figure 3: Net housing wealth and household saving: 1978-2008**

![Figure 3: Net housing wealth and household saving: 1978-2008](chart)

Sources: RBNZ; Statistics NZ National Accounts; authors’ calculations

Hodgetts (2006) notes that dissaving necessarily involves a drawing down on net equity. In other words some of the existing wealth can be used to fund consumption at a level greater than that which would be possible if households were constrained solely by current disposable income. Both Hodgetts (2006) and van Zijll de Jong (2006) provide evidence of equity withdrawal. This mechanism underlies the contemporaneous sharp rise in equity and the increasingly negative saving rates depicted in Figure 3.

### 3.2 Stock Measures

In this section we provide an overview of household balance sheets derived from aggregate data on assets and liabilities prepared by the Reserve Bank of New Zealand. Table 2 summaries the major trends over the last three decades. Net wealth has increased as a multiple of household disposable incomes as asset growth far outstripped the increase in liabilities (principally home mortgages). Since the deregulation of the financial sector in the late 1980s, households have had greater capacity to adjust their

---

4 Edwards (1995) estimates that a rise in government saving is partially offset by a corresponding decline in private saving. Similar findings are reported by Nicoletti (1988).

portfolios and have become more leveraged partly accounting for the concomitant rise in debt servicing.

*Table 2: Key elements of the balance sheet of the household sector: percentage of household disposable income*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Real assets (housing) (%)</td>
<td>227</td>
<td>250</td>
<td>327</td>
<td>498</td>
</tr>
<tr>
<td>Financial assets (%)</td>
<td>145</td>
<td>148</td>
<td>176</td>
<td>170</td>
</tr>
<tr>
<td>Total Assets (%)</td>
<td>373</td>
<td>398</td>
<td>503</td>
<td>668</td>
</tr>
<tr>
<td>Financial Liabilities (%)</td>
<td>45</td>
<td>50</td>
<td>95</td>
<td>155</td>
</tr>
<tr>
<td>Net Wealth (%)</td>
<td>327</td>
<td>348</td>
<td>403</td>
<td>504</td>
</tr>
<tr>
<td>Debt servicing (%)</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Gearing: ratio of liabilities to assets (%)</td>
<td>12</td>
<td>13</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Real Net Wealth (2008 constant prices) ($bn)</td>
<td>190</td>
<td>253</td>
<td>343</td>
<td>575</td>
</tr>
<tr>
<td>Real Net Wealth per capita ($000)</td>
<td>60</td>
<td>76</td>
<td>90</td>
<td>134</td>
</tr>
</tbody>
</table>

Sources: RBNZ; authors’ calculations

When measured in constant prices real wealth per capita has more than doubled over the 30 year period. The annual average growth rate of net wealth per capita of 1.5% corresponds closely the New Zealand’s long run rate of growth of labour productivity.

It should be stressed that these estimates of household wealth do not include a number of potentially important categories, and as such are almost certainly an underestimate of total net wealth. However, there is no presumption that this would necessarily result in the savings rate being underestimated.

It is immediately apparent from the data summarised in Table 2, that a significant part of the increase in net wealth has been driven by greater equity in housing. This increase can come about through increases in either the quantity of housing (new investment and renovation) or through revaluation of the existing stock of housing. The flow measures of saving presented in the previous section make no allowance for asset revaluation. Hence in order to increase comparability, saving rates from the stock measure need to be corrected for asset revaluations. Such correction should be applied to all asset classes held by households. However for simplicity we have chosen to focus solely on housing, which represents by far the greatest share of total assets.

Since the late 1970s the gross value of housing has risen substantially. The rise in this nominal value can be decomposed into that due to an increase in the physical housing stock and that arising from increased prices. The following procedure was used:

\[ V = P \times Q \]  

where

\[ V = \text{the gross value of housing} \]

---

6 The Reserve Banks notes that the estimates of household wealth do not include equity in farms, directly held in commercial or unincorporated businesses, shares in unlisted incorporated businesses, capitalisation of the NZ Alternative Market, direct ownership of some classes of assets (e.g. forestry), consumer durables, and overseas property owned by NZ residents. Of even greater importance (and not listed in the exclusions by the Reserve Bank) is the value of human capital. For estimates of the extent this contributes to net wealth see Scobie (2005).

7 For a discussion of other adjustments see Hodgetts (2006).
\[ P = \text{the price of housing} \]
\[ Q = \text{the quantity of housing} \]

then

\[ \% \Delta V = \% \Delta P + \% \Delta Q + \% \Delta P \times \% \Delta Q \] (2)

where \( \% \Delta V = \left[ \frac{V_i - V_{i-1}}{V_{i-1}} \right] \), and likewise for P and Q

i.e., the total change in the gross value of housing can be decomposed into price effect, a quantity effect and an interaction term.

Rearranging (2) yields:

\[ \% \Delta Q = \frac{\% \Delta V - \% \Delta P}{1 + \% \Delta P} \] (3)

Changes in gross value (\( \Delta V \)) are obtained directly from the housing wealth series. Changes in house prices (\( \Delta P \)) were based on the national residential house price index obtained from Quotable Value NZ. Once \( \Delta Q \) is found using equation (3), the decomposition shown in equation (4) can be computed:

\[ (V_i - V_{i-1}) = (\% \Delta P \times V_{i-1}) + (\% \Delta Q \times V_{i-1}) + (\% \Delta P \times \% \Delta Q) \times V_{i-1} \] (4)

= [Price effect] + [Quantity Effect] + [Interaction term]

In circumstances where the price and quantity changes are both very small, the interaction effect will be negligible and can be ignored. However, given the substantial price rises in housing this is not the case here and hence it is important to allow for an interaction term.

The results of this decomposition are depicted in Figure 4, from which it is strikingly evident that by far the major part of the growth in housing value is attributable to increases in prices. This underscores the importance of adjusting wealth measure for asset revaluations where comparisons are to be made between the stock and flow measures of household saving.

Having established the decomposition, we now turn to estimating wealth adjusted for house price changes. A decision has to be made as to the treatment of housing wealth and the associated liabilities (i.e. mortgages). Two approaches are possible. In the first gross housing wealth is deflated by the index of house prices, while in the second net housing wealth is deflated by the house price index. The critical difference is that in the first case, mortgage liabilities are deflated by the Consumer Price Index. This case is applicable where the house serves as collateral for a mortgage some or all of which can be used for consumption. In the second case the mortgage is viewed as strictly tied to the investment in the house.
In recent years there has been greater use made of housing equity for other purposes; witness the rise in equity withdrawals referred to in the previous section. So while it is likely that the majority of outstanding mortgages do in fact finance solely the investment in housing, the reality will be somewhere between these two positions. As there is no data which would allow us to compute a weighted average, we present the results of both cases and refer to them for convenience as adjustments based either on gross or net housing.

Equations (5) and (6) set out the method used:

**Gross:** \( \frac{V_h}{HPI} + \frac{(A_f - L_h - L_o)}{CPI} \) \hspace{1cm} (5)

**Net:** \( \frac{(V_h - L_h)}{HPI} + \frac{(A_f - L_o)}{CPI} \) \hspace{1cm} (6)

where:

- \( V_h \) = gross value of housing
- \( L_h \) = mortgage liabilities
- \( A_f \) = non-housing (financial) assets
- \( L_o \) = non-housing liabilities
- HPI, CPI = house price index and consumer price index

Both measures are shown in Figure 5 together with total net wealth, each expressed in constant prices based on 1978. There are four notable results. First, total real net worth has risen steadily but accelerated since 2001. Second, house prices clearly explain a large part of the recent rise. Third, all measures show a decline in real terms in 2008 with falling house prices. And fourth, until the latter part of the 1990s, measures of real wealth adjusted on the basis of gross or net tracked very closely. Since then there has been a
divergence as mortgage facilities were increasingly used to finance other investments and consumption.²

**Figure 5: Three measures of real net household wealth: constant 1978 prices**

![Figure 5](image)

Sources: RBNZ; QVNZ; authors' calculations

**Figure 6: Trend in house prices in excess of the CPI**

![Figure 6](image)

Sources: QVNZ; Statistics NZ National Accounts; authors' calculations

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² There are no data to indicate the split of equity withdrawals in New Zealand between investment and consumption. Australian evidence is that about two-thirds of the withdrawals in 2004 were used for investment in other assets or paying down loans (Reserve Bank of Australia 2005).
Until 1993 house prices rose approximately in line with the CPI. This was followed by an acceleration in the mid 1990s. After a slow down in the late 1990s, house prices rose at an unprecedented rate, and by 2007 were two and one half times higher than those that would have prevailed had the rate of increase been confined to the increases in the CPI. This trend was halted only with the onset of the global financial crisis in 2008 (see Figure 6).

We are now in a position to compute annual saving rates as:

\[
\hat{S}_t^z = \frac{[\tilde{NW}_t - \tilde{NW}_{t-1}]}{HDI_t} \tag{7}
\]

where:

\(\hat{S}_t^z\) = stock measure of saving in year \(t\) based on changes in new wealth adjusted for changes in house prices (either gross or net)

\(\tilde{NW}_t\) = net wealth in year \(t\) adjusted for changes in house prices

\(HDI_t\) = household disposal income in year \(t\)

Figure 7 shows saving rates as a percentage of household disposable incomes. There is a striking difference between the total rate and that adjusted for house price changes. Both are relevant measures depending on the question being addressed. Increases in total real wealth regardless of its source represent potentially greater command over goods and services in the future. Retirees may plan to “trade-down” and use some of their enhanced equity to support retirement consumption. In contrast, if retirees expect to remain in the principal residence, then the greater valuation of their housing asset may eventually translate into a higher bequest rather than high living standards during retirement.

**Figure 7: Stock measures for saving rates with and without adjustment for house prices (net housing wealth deflated by HPI)**

Sources: RBNZ; QVNZ; authors’ calculations
### 3.3 Comparing flow and stock measures

We conclude this section with a brief comparison of stock and flow measures of household saving rates. As the flow measures from the national accounts do not allow for changes in asset values, the relevant comparison is with stock measures of saving rates that have been adjusted for asset revaluations. As noted we have adjusted for house prices, the major source of asset revaluation. As shown in Figure 8 the adjusted stock measure (based on deflating net housing wealth by the HPI) is typically higher than the flow measure but at the same time quite volatile. While the flow measure has been consistently negative since 1993, the adjusted stock measure has had two episodes of negative rates. Of note is the fact that after adjusting for house price revaluations there is no long run declining trend.

Table 3 summarises all the measures on the saving rate based on aggregate data for the household sector. Even after adjusting for house prices the stock measures, while more volatile, are substantially higher on average than the flow measure.

We conclude this section by estimating what the level of net wealth would have been based on the flow measure of savings, and comparing this with the actual level of (net) adjusted wealth.

**Figure 8: Stock (adjusted) and flow measures of household saving: 1980-2008**

Sources: Statistics NZ National Accounts; RBNZ; QVNZ; authors’ calculations
Table 3: Measures of household saving rates as a share of household disposable income: 1978-2008

<table>
<thead>
<tr>
<th></th>
<th>Based on flow measure</th>
<th>Based on stock of net wealth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted</td>
<td>After removing change in house prices</td>
</tr>
<tr>
<td></td>
<td>Gross Value</td>
<td>Net Value</td>
</tr>
<tr>
<td>(1) Annual average rate (%)</td>
<td>-1.0</td>
<td>15.5</td>
</tr>
<tr>
<td>(2) Standard deviation (%)</td>
<td>4.7</td>
<td>29.8</td>
</tr>
<tr>
<td>(3) Coefficient of Variation = (2)/(1)</td>
<td>-4.7</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Sources: Statistics NZ National Accounts; RBNZ; QVNZ; authors’ calculations

The estimated level of net wealth based on the accumulated effects of the flow measure of saving is given by:

\[ \hat{NW}_{t+1} = \hat{NW}_t + S^f_t \]  

(8)

where

\( \hat{NW}_t \) = the estimate of net wealth in year \( t \) based on the accumulation of the flow measure of saving

\( S^f_t \) = flow measure if saving in year \( t \).

Both series were started from the same initial value of net wealth in 1978. The results portrayed in Figure 9 add weight to the case for treating with caution the flow measure of saving from the national accounts. Were it to accurately reflect household saving, net wealth would by now be negative, a clearly implausible result.

Figure 9: Adjusted net wealth compared to net wealth estimated on the basis of the accumulated flow measure of saving

Sources: Statistics NZ National Accounts; RBNZ; QVNZ; authors’ calculations
What conclusions can be drawn from this synopsis of the aggregate level data on household savings?

- Given the limitations of current data sources, a full reconciliation of the stock and flow approaches to measuring rates of saving remains elusive.

- Even after adjusting for changes in the valuation of housing, arguably the largest difference between the measures, the stock approach yields a significantly greater average level of household savings.

- The unadjusted stock measure of the saving rate exhibits less volatility than the flow measure.

- The flow measure of the saving rate declines over the period 1978 to 2008. In contrast, the adjusted stock measure of the saving rate (using net housing wealth) exhibits no long run trend and has a positive average rate of around 6% per annum.

- The trends in private savings are consistent with the hypothesis that they adjust to partially offset changes in government savings.

- The flow measure in the national accounts treats expenditure on durables and education as consumption, which will tend to understate the true flow measure of saving.

- The flow measure implies a substantial degree of continuous dissaving over the last 15 years. Based on this accumulated dissaving, the implication is that household wealth would have declined continuously since 1993 and by 2008 would have been negative. However there is irrefutable evidence that this is not the case, raising considerable doubt about the veracity of the flow measures stemming from the national accounts.

In addition to the uncertainty about the true rates of household saving which emerges from this overview, aggregate data reveal nothing of the distribution of saving among households. As a consequence, low or negative rates of aggregate household saving risk sending misleading signals that can evoke policy responses which may not necessarily be appropriate.

Consider an economy in which the working aged adults are saving at a high rate, while those who are retired are drawing down on past accumulations; i.e. they are dissaving. It is perfectly possible in such a case that the aggregate measure of household saving could be consistently low or even zero; in short aggregate measures of household saving, even if correctly measured, provide very limited insights into nothing about the accumulation of retirement wealth.

Furthermore, aggregate measures can conceal the fact that while both low and high income households may have adequate saving rates, there can be a significant number of middle income households whose current rates of saving would not permit them to sustain pre-retirement living standards once they leave the workforce (Le, Scobie and Gibson 2009).

For these reasons, individual data on assets and liabilities obtained from longitudinal household surveys represents an important additional source of insights into savings behaviour. Up until recently, unit record data has only allowed estimates of the flow
measure of savings based on the Household Economic Survey. Estimates of the saving rates by age and income based on these data are provided by Gibson (2001a). In the next section we briefly describe a new source of unit record data, and use these to form some initial estimates of household saving behaviour based on the stock measure.

4 Unit Record Data

4.1 Survey methodology

The analysis that follows in Section 5 is based on unit record data from the Survey of Family, Income and Employment (SoFIE). SoFIE is a longitudinal survey where the original sample members are tracked and surveyed each year. The target population for SoFIE is the usually resident population of New Zealand living in private dwellings.

The survey began in October 2002 with an original sample size of about 11,500 households, amounting to over 22,000 individuals 15 and over. Children younger than 15 who were living in households selected for the survey will also be tracked and will be surveyed from age 15. The survey will be run for a total of 8 years. The core survey collects information on family characteristics and labour market and income spells. An assets and liabilities module and a health module are included in alternate years. At the time of carrying out this analysis, the first four waves of the data were available to researchers. This includes the assets and liabilities modules at waves 2 and 4, which relate to the years ending 30 September 2004 and 30 September 2006 respectively.

SoFIE interviewers visit the respondent’s home and conduct the interview electronically using computer-assisted interviewing. Interviews for each wave are evenly spread over a 12 month period so that some households are interviewed in September and others are interviewed the following October.

The advantage of unit record data over aggregate data is that it enables analysis of associations between variables at the unit level. In particular, we have been able to examine the levels and variability of net wealth and savings across characteristics such as age and income. On the other hand, survey data can suffer from sampling error and potential bias.

Sampling error is a measure of the variability that we would expect to see in an estimate if it is computed from repeated samples of the population. If sufficient random samples are taken, we would expect the average estimate to be equal to the population estimate. Sampling error can be quantified as it is a function of the size of the sample (relative to the population) and survey design (e.g. the use of stratification).

Bias is more difficult to deal with and although it can be minimised with a good survey design and the minimisation of non-response, it is usually not able to be quantified. Bias can arise for a number of reasons, with non-response being the most likely cause. When non-response results in a sample with different characteristics than the target population of the survey, inferences based on analyses of the data may not be representative of the target population. The response rate for the first wave of SoFIE was 77% i.e. 11,500 of the randomly chosen 15,000 households agreed to participate. Further attrition bias may

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9 A sample is considered to be “random” if every individual in the target population has an equal chance of being selected.
enter as people drop out of the survey in subsequent waves e.g. 76% of those who responded to wave 1 also responded to wave 4.

To the extent that they can, Statistics NZ attempt to adjust for non-response bias by adjusting the weights so that the data matches targets for selected demographic characteristics of the New Zealand population. Statistics NZ provide two sets of weights for each wave so that the data can be analysed both cross-sectionally and longitudinally. Wave 4 longitudinal weights were used in our analysis of savings. Longitudinal weights are calibrated to population totals for age, gender and Maori ethnicity as at October 2002.\(^{10}\) Imputation is also carried out to fill in missing data for key variables such as income. More information about SoFIE is available on the Statistics NZ website.\(^{11}\)

### 4.2 Selection of sample for analysis

For the purpose of analysing changes in net wealth and savings rates we consider those who were Original Sample Members (OSMs) at wave 1, who were aged 15 and over at wave 2 and responded to both waves 2 and 4. Dependent children have been excluded from the analysis.\(^{12}\) Note that respondents to wave 2 who were institutionalised or die prior to wave 4 will be excluded from the analysis.\(^{13}\)

The number of OSMs who met these criteria was 16,585.\(^{14}\) This represents a total of 2,830,900 individuals at wave 4.\(^{15}\) This group can be thought of as representing individuals who lived in non-private dwellings on the main islands of NZ (including Waiheke Island) in October 2002, who were 15+ at 2003/04 and remained in the scope of the survey.

In order to calculate meaningful savings rates we restricted parts of our analysis to those who reported non-zero wealth in both waves and who had positive average income when calculated over three waves. Our sample for analysing savings rates reduced to 15,940 OSMs and represents a total of 2,707,700 individuals.

The results that follow in Section 5 are based on analysis at the individual level because this is the easiest unit to analyse longitudinally.\(^{16}\) With the exception of property assets,

\(^{10}\) However, it is not reasonable to expect calibration techniques to eliminate bias due to non-response. At best, we can expect them to restore estimates of the population totals chosen for benchmarking and other estimates that are directly correlated. This will not correct for bias due to non-respondents within these benchmark categories having different characteristics than respondents e.g. if females aged 35-40 who have low incomes are less likely to respond to the survey than females in this age group with higher incomes then calibration to age/sex totals will improve the estimate of the number of females aged 35-40 but estimates of income will remain upwardly biased.


\(^{12}\) SoFIE classified all individuals under 15 as dependent, as well as those aged 15-17 (inclusive) who are not employed more than 30 hours a week. The child does not need to be directly related to the respondent e.g. nieces, nephews, grandchildren, foster children can be included if the respondent is acting as their parent. Child dependency is only determined for children living in the same household as the respondent.

\(^{13}\) Note that the weights of OSMs who respond are adjusted for non-response, but are not adjusted for those who are institutionalised or die or move overseas (i.e. those who move out of scope). Those who move out of scope are assigned longitudinal weights but are explicitly marked as being out of scope. The total population represented at 2002 is the sum of the weights of respondents and the weights of those who have moved out of scope.

\(^{14}\) The response rate for OSMs who were adults at wave 2 and remained in scope of the survey was estimated at 74%. It is not possible to accurately determine dependency for those who are in scope but who don’t respond to the survey. Therefore this response rate is calculated including dependent children, provided they were 15+ at wave 2 and were in the scope of the survey.

\(^{15}\) At Statistics NZ’s request, all counts of respondents in this paper have been rounded to 5; all weighted counts have been rounded to 100.

\(^{16}\) Analysis at the family-unit and household level is complicated by changes in relationships between individuals in families and households.
individuals are asked to report their share of the value of any jointly-held assets or liabilities. For property assets, individuals are asked to report the rateable value and the number of other owners (if any). We have assumed that the value of the property is shared evenly among joint owners. Future work will repeat the analysis at the level of the family unit and the household.

4.3 Assets and liabilities in SoFIE

There are some key differences between the coverage of the Reserve Bank aggregate data and the SoFIE data. As noted in section 3.2, the RBNZ data exclude a range of assets that are covered by SoFIE. But on the other hand, RBNZ data include assets and liabilities held by non-residents and individuals living in non-private dwellings.

An important difference between the two data sources is the treatment of assets and liabilities held in family trusts. In SoFIE, the value of any outstanding assets owed to an individual by a trust is attributed to them (i.e. when an individual is in the process of gifting assets to a trust). SoFIE also asks for the total value of assets that have been gifted to a trust but these assets are treated as being owned by the trust and are not attributable to individuals. However, property assets and mortgages held by trusts will be picked up by the RBNZ estimates of property assets and liabilities held by households.

Ideally we would attempt adjust for this difference by adding the reported total value of assets held by trusts to our SoFIE estimates. However, the data is of poor quality with many of those reporting assets owed to them by a trust failing to report the total value of assets held by the trust. We have not pursued this further at this stage.

Assets in SoFIE are classified as follows:

- Property assets in 5 categories: owner-occupied housing; rental property, other residential property (including land), timeshare, overseas property;
- Bank account assets;
- Financial assets in 2 categories: financial investments in unit trusts or funds, financial investments not in unit trusts or funds;
- Life insurance assets in 3 categories: bonds or investment-linked policy, whole of life or endowment policy, other types of life insurance policy;
- Superannuation assets in 2 categories: employee-related super scheme, other personal super scheme;
- Business assets (although not broken down further, this includes business or business investment, equity in farms, orchards, vineyards, forests, commercial property);
- Outstanding assets owed by a trust to which assets were being gifted;
- Durables in 3 categories: household items, vehicles, leisure equipment;
- Other assets: cash, art or antiques and collectables, miscellaneous.

Liabilities in SoFIE are classified as follows:

- Mortgages;
- Personal bank or finance company loan;
- Student loan;
- Bank account liabilities;
- Credit card debt;
- Hire purchase debt;

17 See footnote 6
Other debt.

Our preliminary analysis of the raw assets and liabilities data revealed some inconsistencies and probable errors in the data. In a small number of cases it was relatively clear what the intended values were and in these cases we applied an edit. This had no material effect on the estimates of total assets and liabilities.

In Table 4 we summarise the RBNZ data and data from Waves 2 and 4 of SoFIE treated as independent cross sections which are more appropriate for making comparisons with the aggregate RBNZ data. We exploit the longitudinal richness of the SoFIE data in the analyses presented in Section 5.
Table 4: Comparisons of assets, liabilities and saving rates between SoFIE cross-sectional estimates and RBNZ aggregates

<table>
<thead>
<tr>
<th>Asset/liability category</th>
<th>2004 values indexed to March 2006</th>
<th>2006 values indexed to March 2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SoFIE $M</td>
<td>RBNZ $M</td>
</tr>
<tr>
<td>Housing</td>
<td>348,856</td>
<td>407,689</td>
</tr>
<tr>
<td>Financial</td>
<td>118,203</td>
<td>152,850</td>
</tr>
<tr>
<td>Subtotal</td>
<td>467,059</td>
<td>560,539</td>
</tr>
<tr>
<td>Business(^2)</td>
<td>111,420</td>
<td>na</td>
</tr>
<tr>
<td>Durables(^3)</td>
<td>119,922</td>
<td>na</td>
</tr>
<tr>
<td><strong>Total assets</strong></td>
<td>698,401</td>
<td>846,002</td>
</tr>
<tr>
<td>Housing</td>
<td>81,054</td>
<td>100,134</td>
</tr>
<tr>
<td>Financial</td>
<td>24,103</td>
<td>18,543</td>
</tr>
<tr>
<td><strong>Total liabilities</strong></td>
<td>105,157</td>
<td>118,678</td>
</tr>
<tr>
<td>Net housing</td>
<td>267,803</td>
<td>307,555</td>
</tr>
<tr>
<td>Net financial</td>
<td>94,100</td>
<td>134,307</td>
</tr>
<tr>
<td><strong>Net wealth</strong>(^4)</td>
<td>361,902</td>
<td>441,862</td>
</tr>
<tr>
<td>Total gross income(^5)</td>
<td>108,846</td>
<td>109,541</td>
</tr>
<tr>
<td>Aggregate annual savings rate(^6,7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level; RBNZ

Notes:
1. The RBNZ publishes totals for the household sector as at December. Based on these totals, we estimate totals for March by using a three-quarter/one-quarter split e.g. a total for March 2006 is estimated as three-quarters of the December 2005 value plus one-quarter of the December 2006 value.
2. Business assets in SoFIE include farms, orchards, commercial property such as a factory or shop. Business assets are not included in the RBNZ totals for the household sector.
3. Durables consist of motor vehicles, leisure equipment, household items and other miscellaneous assets such as art. Durables are not included in the RBNZ totals.
4. In this table, business assets and durables have been excluded from the SoFIE estimates of net wealth and savings for better comparability with RBNZ.
5. Total gross income used in the calculation of the RBNZ savings rate is taken from Statistics NZ’s Household Income and Outlay Account. It is estimated as total income receivable minus gross operating surplus on owner-occupied dwellings (i.e. imputed rent). Total gross income used in the calculation of the SoFIE savings rate is aggregate total personal income as reported by respondents.
6. The Aggregate savings rate is defined as change in aggregate real net wealth divided by the average of 2004 and 2006 real income, divided by 2 to convert to an annual rate.
7. The RBNZ totals include assets and liabilities that are held by Trusts, whereas the SoFIE totals do not. It is not possible to exclude the value of these assets from the RBNZ totals.
8. The RBNZ data will include assets and liabilities held by non-residents. Non-residents are not included in the SoFIE population.

It is recognised that high wealth individuals are under-represented in the SoFIE sample, and this in part explains why the estimates of total assets, liabilities and net wealth are lower than those reported by the RBNZ. While we have endeavoured to place the two sources on as common a footing as possible inevitable differences will remain. Further
work is needed to explore these. However, it is striking that the initial estimates of the aggregate household saving rate between 2004 and 2006 are remarkably similar when using the stock method applied to two totally independent data sources; one at the sector level and the other based on unit record data from a large national survey.

4.4 Adjusting for differences in the timing of valuations

4.4.1 Residential property assets

For residential property assets, respondents in SoFIE were asked to provide the most recent rateable valuation. In most cases respondents reported rateable valuations that were a year or two old (sometimes more). Further, there is variation in the length of time between reported valuations.

Given the rapid growth in house prices since 2000 there is reason to expect that the reported valuations will tend to be underestimates of market value for the years ending September 2004 and September 2006. In order to take into account house price trends between the time of valuation and the interview date, and to ensure that the time period between wave 2 and wave 4 values is consistent across individuals, we adjusted the reported values by applying separate house price indices for each of 73 Territorial Local Authorities (TLA), obtained from Quotable Value New Zealand. This required identifying in which of the TLAs each of the approximately 16,000 households used in this study was located.

The valuations reported for wave 2 were indexed to approximately 31 March 2004; the valuations reported for wave 4 were indexed to approximately 31 March 2006. These adjustments tended to reduce estimates of the change in wealth between 2004 and 2006 because the property adjustments for wave 2 tended to be larger than for wave 4. There are two reasons for this:

1. House price growth between valuation date and interview date tended to be stronger over the two years leading up to wave 2 than for the two years leading up to wave 4. At the national level, house prices grew by 41% between March 2002 and March 2004 compared with 27% between March 2004 and March 2006;

2. Valuations provided for wave 2 tended to be slightly older (relative to the interview date) than those provided for wave 4. For wave 2, 21% were more than 2 years old compared with 9% for wave 4.

4.4.2 Other assets

As explained in section 4.1, interviews for SoFIE were conducted throughout the year with the sample spread evenly over the 12 month period between 1 October and 30 September. Although Statistics NZ makes an effort to keep interviews 12 months apart, inevitably time between wave 2 and wave 4 interviews was not always exactly two years. Further, individuals’ experiences may be expected to be different depending on the two year period between their wave 2 and wave 4 interviews; In particular, differences in economic conditions may lead to differences in asset price growth. Therefore there is

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18 An average of the indices for the March and June quarters was used as a proxy for 31 March, which is the centre of the reference period (1 October to 30 September).
scope for timing inconsistencies to have an effect on comparisons of the change in other asset values.

Ideally, we would reduce the effect of timing inconsistencies by indexing all other classes of assets to a common point within waves. However, we have not attempted to do this because the data requirements are too high to carry out adjustments that we can be confident about. Unlike our property adjustments where we were able to apply detailed price indices at the TLA level, it will not be possible for us to apply asset price indices specific enough to the respondent to make indexing worthwhile. Furthermore, the SoFIE categories of assets are quite broad: for example, it is impossible to distinguish finance company assets from shares if a respondent reports holdings of both. For these reasons, even if we could obtain broad enough asset price indices on a quarterly basis, assuming that these “average” indices accurately represent changes in asset prices for all assets in the category and for all individuals reporting them is likely to be false. Applying “average” indices to reported values is not a satisfactory solution as it may well bias the distribution of changes in asset values and net wealth.

However, the effect of timing inconsistencies on the comparison of changes in non-property asset values should be small in comparison to the timing effects for property. There are two reasons for this: First, property assets are a much larger component in household wealth; second, the difference in the time between reported values for non-property assets between individuals within a wave is at most one year. Therefore we feel that our results based on using reported values of non-property assets are likely to be robust.

4.4.3 CPI Adjustment

Our analysis of changes in wealth and savings rates is carried out in real terms. This has the advantage of allowing estimates of change in net wealth to be interpreted in terms of a change in the command over goods and services experienced between waves 2 and 4.

All asset, liability and income variables for both waves were indexed to 31 March 2006, which was the centre of the wave 4 reference period. For non-property assets and income, the indexing was carried out with respect to interview dates. As the CPI increased over the period, values reported at the beginning of October 2003 faced the largest adjustment with a factor of about 7.8% applied; values reported at the end of September 2006 had a factor of about -1.3% applied. No adjustment was necessary for values reported at around 31 March 2006. The property asset price adjustment outlined in section 4.4.1 aligned property values within each wave. The CPI adjustment for wave 2 adjusted property values inflated them to 31 March 2006; no CPI adjustment was applied to wave 4 property values, which were already expressed in 31 March 2006 dollars.

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19 31 March has been proxied by an average of March and June quarter CPI values.
5 Initial Results

In this section we present some initial results of the changes in net wealth and the implied savings rates based on Waves 2 and 4 of SoFIE. At this stage these should be regarded as preliminary findings, and further analyses are planned.

5.1 Change in wealth by category

We start by summarising the changes in median values of assets, liabilities and net wealth between waves 2 and 4 of SoFIE. For each component, the comparison is restricted to individuals who recorded the item in both waves. For example a renter in 2004 who by 2006 had purchased an owner occupied property would not be included in the first row of Table 5. However they could appear in any of the other rows where appropriate. For this reason the population counts in the first column vary with the item being analysed.

<table>
<thead>
<tr>
<th>Asset/liability item</th>
<th>Number with item in both waves</th>
<th>Median 2004 value (expressed in 2006 dollars)</th>
<th>Median 2006 value</th>
<th>Median change (real)</th>
<th>Median percentage change (real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner occupied property</td>
<td>1,267,800</td>
<td>146,870</td>
<td>175,535</td>
<td>23,693</td>
<td>18%</td>
</tr>
<tr>
<td>Investment property</td>
<td>208,200</td>
<td>132,147</td>
<td>161,866</td>
<td>23,155</td>
<td>17%</td>
</tr>
<tr>
<td>Financial assets</td>
<td>2,314,900</td>
<td>9,105</td>
<td>10,025</td>
<td>178</td>
<td>15%</td>
</tr>
<tr>
<td>Other assets</td>
<td>2,719,600</td>
<td>34,265</td>
<td>35,505</td>
<td>954</td>
<td>5%</td>
</tr>
<tr>
<td>Total assets</td>
<td>2,736,800</td>
<td>142,331</td>
<td>169,290</td>
<td>8,250</td>
<td>17%</td>
</tr>
<tr>
<td>Mortgages</td>
<td>726,300</td>
<td>62,762</td>
<td>65,754</td>
<td>-2,458</td>
<td>-6%</td>
</tr>
<tr>
<td>Student loans</td>
<td>211,100</td>
<td>11,738</td>
<td>14,819</td>
<td>-228</td>
<td>-2%</td>
</tr>
<tr>
<td>Other liabilities</td>
<td>1,214,600</td>
<td>2,140</td>
<td>2,055</td>
<td>-79</td>
<td>-3%</td>
</tr>
<tr>
<td>Total liabilities</td>
<td>1,647,600</td>
<td>22,828</td>
<td>25,250</td>
<td>-79</td>
<td>-3%</td>
</tr>
<tr>
<td>Net wealth</td>
<td>2,739,500</td>
<td>102,925</td>
<td>121,754</td>
<td>7,338</td>
<td>12%</td>
</tr>
<tr>
<td>Net property wealth</td>
<td>1,383,000</td>
<td>113,872</td>
<td>142,333</td>
<td>23,969</td>
<td>19%</td>
</tr>
</tbody>
</table>

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Notes:
1. The number of individuals in each category has been individually rounded to the nearest 100.
2. All values have been indexed to 31 March 2006, which is the centre of the wave 4 reference period. See footnote 18.

Key features to emerge from this comparison are that median asset values increased in real terms over the period, including financial assets. Median levels of liabilities including mortgages all declined, so net wealth in property and in total both increased.
5.2 Basic descriptive analysis of savings rates

Table 6 summarises the median saving rates based on real changes in net wealth by income deciles. Estimated saving rates are positive for all levels of income, unsurprisingly rising substantially among the upper income deciles.

### Table 6: Change in wealth and savings rates by income decile of individuals

<table>
<thead>
<tr>
<th>Income decile¹</th>
<th>Income cut off for decile</th>
<th>Number of individuals²</th>
<th>Median change in wealth (real)³</th>
<th>Median savings rate (real)⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>less than $8,523</td>
<td>261,200</td>
<td>$744</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>$13,399</td>
<td>266,900</td>
<td>$1,316</td>
<td>6%</td>
</tr>
<tr>
<td>3</td>
<td>$17,399</td>
<td>272,600</td>
<td>$4,842</td>
<td>15%</td>
</tr>
<tr>
<td>4</td>
<td>$22,172</td>
<td>270,500</td>
<td>$5,665</td>
<td>14%</td>
</tr>
<tr>
<td>5</td>
<td>$28,056</td>
<td>273,100</td>
<td>$6,052</td>
<td>12%</td>
</tr>
<tr>
<td>6</td>
<td>$34,858</td>
<td>271,700</td>
<td>$8,487</td>
<td>14%</td>
</tr>
<tr>
<td>7</td>
<td>$42,702</td>
<td>271,200</td>
<td>$13,953</td>
<td>18%</td>
</tr>
<tr>
<td>8</td>
<td>$53,560</td>
<td>274,400</td>
<td>$16,452</td>
<td>18%</td>
</tr>
<tr>
<td>9</td>
<td>$71,624</td>
<td>273,700</td>
<td>$26,609</td>
<td>22%</td>
</tr>
<tr>
<td>10</td>
<td>greater than $71,624</td>
<td>272,600</td>
<td>$59,141</td>
<td>28%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2,707,700</td>
<td>$7,571</td>
<td>16%</td>
</tr>
</tbody>
</table>

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Notes:

1. Income deciles are constructed based on average real income over waves 2, 3 and 4, excluding those with negative average income for whom a savings rate was not meaningful.
2. The number of individuals in each category has been individually rounded to the nearest 100.
3. Median change in wealth calculated for those with non-missing savings rate for consistency of sample. Excludes a small number of respondents that have wealth in both waves but negative average income.
4. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.

The median saving rates by income decile are plotted in Figure 10. In addition the median rates by wealth deciles (based on net wealth in wave 2) are also shown. These show a marked decline in saving rates at the upper levels of wealth. Further work is required to explain why the median saving rates are negative for individuals in the highest two deciles of net wealth.
Figure 10: Median real savings rate by income and wave 2 wealth deciles for individuals

Previous work based on flow estimates has confirmed that New Zealand households follow a widely recognised inverted U-shaped pattern of saving over the life cycle (Gibson and Scobie 2001b). Table 7 confirms that a similar pattern for individuals is found using stock estimates. Median saving rates are low for the youngest age groups where the acquisition of human capital and property dominate their portfolios. Median saving rates peak in the 45-55 age group and then fall as retirees start to consume previous accumulations. It should be noted that while the results are based on longitudinal data they do not correct for cohort effects. Clearly a very much longer survey period would be needed to achieve this.

Table 7: Change in wealth and savings rates by age group for individuals

<table>
<thead>
<tr>
<th>Age at wave 2</th>
<th>Number of individuals</th>
<th>Median change in wealth (real)</th>
<th>Median savings rate (real)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-&lt;25</td>
<td>419,200</td>
<td>$1,828</td>
<td>6%</td>
</tr>
<tr>
<td>25-&lt;35</td>
<td>464,400</td>
<td>$8,923</td>
<td>14%</td>
</tr>
<tr>
<td>35-&lt;45</td>
<td>565,200</td>
<td>$15,810</td>
<td>23%</td>
</tr>
<tr>
<td>45-&lt;55</td>
<td>492,800</td>
<td>$19,318</td>
<td>27%</td>
</tr>
<tr>
<td>55-&lt;65</td>
<td>366,700</td>
<td>$10,088</td>
<td>21%</td>
</tr>
<tr>
<td>65+</td>
<td>399,300</td>
<td>$8,431</td>
<td>22%</td>
</tr>
<tr>
<td>Total</td>
<td>2,707,700</td>
<td>$7,571</td>
<td>16%</td>
</tr>
</tbody>
</table>

The life cycle pattern of saving rates is clearly illustrated in Figure 11. As the age groups have been further disaggregated, in addition to the inverted U pattern one observes the widely recognised sharp upturn in median saving rates by the elderly. Long lived individuals tend to have higher stocks of wealth and typically consumption spending declines at older ages. The net effect is for these individuals to continue accumulating net wealth rather than decumulating.
Notes for figures 10 and 11:

1. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.

2. Income deciles are constructed based on average real income over waves 2, 3 and 4, excluding those with negative average income for whom a savings rate was not meaningful.

Figure 11: Median real savings rate by age at wave 2 for individuals

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Figure 12: Real savings rates: dispersion by age group for individuals

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Note:

1. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.
Table 8: Characteristics of low, medium and high saving individuals

<table>
<thead>
<tr>
<th>Income decile¹</th>
<th>“low” savers (savings rate² &lt;0)</th>
<th>“medium” savers (savings rate 0-1)</th>
<th>“high” savers (savings rate &gt;1)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>47%</td>
<td>18%</td>
<td>35%</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>45%</td>
<td>29%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>41%</td>
<td>32%</td>
<td>27%</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>41%</td>
<td>33%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>5</td>
<td>38%</td>
<td>38%</td>
<td>24%</td>
<td>100%</td>
</tr>
<tr>
<td>6</td>
<td>38%</td>
<td>40%</td>
<td>22%</td>
<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>36%</td>
<td>43%</td>
<td>21%</td>
<td>100%</td>
</tr>
<tr>
<td>8</td>
<td>37%</td>
<td>44%</td>
<td>19%</td>
<td>100%</td>
</tr>
<tr>
<td>9</td>
<td>36%</td>
<td>42%</td>
<td>22%</td>
<td>100%</td>
</tr>
<tr>
<td>10</td>
<td>36%</td>
<td>39%</td>
<td>25%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>“low” savers (savings rate² &lt;0)</th>
<th>“medium” savers (savings rate 0-1)</th>
<th>“high” savers (savings rate &gt;1)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-&lt;25</td>
<td>41%</td>
<td>49%</td>
<td>9%</td>
<td>100%</td>
</tr>
<tr>
<td>25-&lt;35</td>
<td>37%</td>
<td>43%</td>
<td>19%</td>
<td>100%</td>
</tr>
<tr>
<td>35-&lt;45</td>
<td>37%</td>
<td>37%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>45-&lt;55</td>
<td>37%</td>
<td>32%</td>
<td>30%</td>
<td>100%</td>
</tr>
<tr>
<td>55-&lt;65</td>
<td>42%</td>
<td>27%</td>
<td>31%</td>
<td>100%</td>
</tr>
<tr>
<td>65+</td>
<td>42%</td>
<td>25%</td>
<td>33%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Labour market activity</th>
<th>“low” savers (savings rate² &lt;0)</th>
<th>“medium” savers (savings rate 0-1)</th>
<th>“high” savers (savings rate &gt;1)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td>37%</td>
<td>39%</td>
<td>23%</td>
<td>100%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>39%</td>
<td>44%</td>
<td>17%</td>
<td>100%</td>
</tr>
<tr>
<td>Not in the labour force</td>
<td>44%</td>
<td>28%</td>
<td>29%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health status</th>
<th>“low” savers (savings rate² &lt;0)</th>
<th>“medium” savers (savings rate 0-1)</th>
<th>“high” savers (savings rate &gt;1)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>38%</td>
<td>38%</td>
<td>24%</td>
<td>100%</td>
</tr>
<tr>
<td>Very good</td>
<td>39%</td>
<td>36%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>Good</td>
<td>41%</td>
<td>33%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>Fair</td>
<td>41%</td>
<td>34%</td>
<td>25%</td>
<td>100%</td>
</tr>
<tr>
<td>Poor</td>
<td>45%</td>
<td>35%</td>
<td>20%</td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>39%</td>
<td>36%</td>
<td>25%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Note:
1. Income deciles are constructed based on average real income over waves 2, 3 and 4, excluding those with negative average income for whom a savings rate was not meaningful.
2. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.

To this point the estimates of saving rates have been based on median rates. While these are arguably better measures than average rates which are strongly influenced by outliers, they convey nothing of the dispersion of saving rates across individuals. One of the key strengths of unit record data relative to aggregate sector-wide data is that
measures of dispersion can be derived. As shown in Figure 12 the dispersion is very wide.

It is clear that at every age level there is a wide distribution of saving rates with a significant portion of the distribution having negative saving rates. As a first step to gaining some insight into the wide dispersion of saving rates the patterns of saving by income, age, labour market affiliation and health status are summarised in Table 8. What is striking is that regardless of the characteristic of the individuals examined, the proportion with negative savings between 2004 and 2006 is consistently of the order of 40%. There are predictable patterns in the proportion of individuals with negative savings. The share is higher among low income individuals, among the youngest and oldest age groups, for those not in the labour force, and those in poor health. However it remains for further work to uncover more insights into the wide dispersion of rates apparently across all household types.

5.3 Effect of owner-occupied housing on savings rates

In this section we examine the effect of changes in owner occupied housing on median saving rates. The results are summarised in Table 9, and illustrated in Figure 13.
Table 9: Effect on estimated saving rates of removing owner-occupied housing from assets for individuals reporting owner-occupied housing in both waves

<table>
<thead>
<tr>
<th>Income decile^1</th>
<th>Number with owner occupied housing in both waves^2</th>
<th>Median change in wealth excl. owner occupied housing (real)</th>
<th>Median change due to owner occupied housing (real)</th>
<th>Median percent of change due to owner occupied housing</th>
<th>Median savings rate (real)^3</th>
<th>Median savings rate excl. owner occupied housing (real)^4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70,900</td>
<td>-280</td>
<td>23,092</td>
<td>62%</td>
<td>263%</td>
<td>-5%</td>
</tr>
<tr>
<td>2</td>
<td>114,000</td>
<td>709</td>
<td>17,851</td>
<td>73%</td>
<td>72%</td>
<td>3%</td>
</tr>
<tr>
<td>3</td>
<td>128,700</td>
<td>-747</td>
<td>20,536</td>
<td>82%</td>
<td>53%</td>
<td>-2%</td>
</tr>
<tr>
<td>4</td>
<td>120,800</td>
<td>-851</td>
<td>25,228</td>
<td>70%</td>
<td>63%</td>
<td>-2%</td>
</tr>
<tr>
<td>5</td>
<td>110,000</td>
<td>460</td>
<td>27,739</td>
<td>66%</td>
<td>57%</td>
<td>1%</td>
</tr>
<tr>
<td>6</td>
<td>117,800</td>
<td>2,543</td>
<td>22,565</td>
<td>54%</td>
<td>37%</td>
<td>4%</td>
</tr>
<tr>
<td>7</td>
<td>132,700</td>
<td>5,715</td>
<td>22,065</td>
<td>51%</td>
<td>37%</td>
<td>7%</td>
</tr>
<tr>
<td>8</td>
<td>148,800</td>
<td>7,770</td>
<td>22,065</td>
<td>47%</td>
<td>31%</td>
<td>8%</td>
</tr>
<tr>
<td>9</td>
<td>163,200</td>
<td>6,407</td>
<td>28,362</td>
<td>41%</td>
<td>29%</td>
<td>5%</td>
</tr>
<tr>
<td>10</td>
<td>152,100</td>
<td>22,599</td>
<td>32,260</td>
<td>28%</td>
<td>32%</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>1,259,000</td>
<td>3,056</td>
<td>23,693</td>
<td>55%</td>
<td>42%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Notes:

1. Income deciles are constructed based on average real income over waves 2, 3 and 4, excluding those with negative average income for whom a savings rate was not meaningful.
2. The number of individuals in each category has been individually rounded to the nearest 100.
3. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.
4. Savings rate excluding owner-occupied housing is calculated after removing owner-occupied housing assets from wealth in both waves.

Whether or not owner occupied housing should be included as a measure of net wealth is a mute question. The answer will depend in part on the purpose to which the measure is put. If the purpose is to measure the total stock of household wealth then changes in the valuation of all assets including housing are legitimate elements of wealth. On the other hand if one is interested in retirement saving and one is prepared to start from the assumption that many retirees remain in their preretirement home, or even if changing homes buy a smaller newer one of equivalent value, then one might well wish to exclude the value of the principal residence. This notion presumably lay behind the quote from Mervyn King, Governor of the Bank of England when he is reported to have asserted that “housing wealth isn’t wealth” Buiter (2008). Furthermore if one wishes to measure the “active” rather than the “passive” rate of household saving, one would exclude asset revaluations.
Figure 13: Median real savings rates by income decile for individuals reporting owner-occupied housing in both waves

Source: SoFIE waves 2 and 4, with adjustments to property assets based on QVNZ data at TLA level

Notes:
1. The median savings rate including owner-occupied housing for decile 1 was 263%. This was excluded from the graph in order to better reveal the underlying trends.
2. Income deciles are constructed based on average real income over waves 2, 3 and 4, excluding those with negative average income for whom a savings rate was not meaningful.
3. Savings rate is defined as change in real net wealth divided by average real income, divided by 2 to convert to an annual rate. A rate is calculated for those who have net wealth in both waves and positive average income.
4. Savings rate excluding owner-occupied housing is calculated after removing owner-occupied housing assets from wealth in both waves.

Given that there is no one “correct” way to measure the saving rate, we have chosen to report two rates: one includes owner occupied housing assets, the other excludes it completely. In order for a valid comparison we have restricted the sample to individuals who reported a value for owner occupied housing in both waves 2 and 4.

In every income decile the median saving rate is positive and relatively high. The overall median saving rate for all individuals who were continuous owner occupiers was 42%. Once we exclude owner occupied property, the median saving rate for the same sample of individuals falls to 5%, confirming the significant contribution that housing made to net wealth over the period. It should also be noted that the median rate for those in the lower income deciles becomes marginally negative when we exclude their principal residence.

6 Conclusions and Future Directions

Household saving rates are an important piece of evidence needed for informed policy debate particularly but not solely, in relation to retirement income policies. Conceptually, estimates of saving rates can be based on a flow measure (income less consumption) or a stock measure (changes in net wealth). However their measurement has proved less than straightforward.
Existing measures for New Zealand have become increasingly disparate, making it difficult to obtain a clear picture. Attempts at reconciling differences arising from different data sources have only partly narrowed the gaps. However, for the first time in New Zealand, longitudinal data on the assets and liabilities of households at the unit record level are becoming available from SoFIE, a large national longitudinal survey undertaken by Statistics New Zealand.

Updated estimates from the Reserve Bank’s aggregate data on the household sector (a stock approach) and those from the national accounts (a flow approach) continue to give widely different estimates of the overall household saving rate, although both were negative in 2008 and both below their long run trend values.

After updating estimates from two the existing sources, this paper presents initial estimates derived from SoFIE. While this paper reports results from SoFIE at the individual level, future work will extend this analysis to the level of the family unit and the household. The estimates were made by comparing net wealth in 2004 with that in 2006 at the individual level and computing the implied real saving rate on an annual basis. This yielded an overall median estimate of 16% of gross income. This is of the same order of magnitude as the long run average annual saving rate measured from the aggregate household balance sheet from RBNZ, which was 16% of disposable income, equivalent to about 12% of gross income.

However, it must be stressed that the median estimate should be complemented with a measure of dispersion. There is a strikingly wide distribution of saving rates. For example across many categories of individuals around 40% are estimated to have had a decline in net wealth implying a negative rate of saving. Some of this is to be expected as for example, when young individuals invest in education and acquire student loans, and older people draw on past savings in retirement. However much remains to be done to develop a fuller insight into magnitude and extent of low saving individuals.

Clearly, changes in the value of assets influence the change in net wealth. Ideally, we would want to decompose the change in the gross value of all assets into that due to prices and that due to a real change in quantity (together with an interaction effect). The price effect constitutes “passive” saving, while changes in the quantity reflect “active” saving. A full decomposition is planned as part of further research on this subject.

As an initial step at this stage, we have examined the effect of owner occupied property on our estimates of the saving rates. For many households this represents the single biggest asset (after their human capital) and changes in the value of the principal residence would constitute the major source of passive saving. For making the comparison we restricted the sample to individuals reporting a value for an owner occupied house in both waves. We find that for this sample of home owners, the median saving rate was 42% when all assets were included. When we removed the value of the owner occupied property the median rate fell to 5% underscoring the wide difference between the passive and active measures of saving at a time of rapid asset revaluations.

Finally this initial study underscores the value of longitudinal data. The ability to hold constant many unobservable characteristics of individuals by observing them at repeated points in time, offers the opportunity to address a wide range of social policy questions in manner not previously possible. As additional waves of data from SoFIE become available, the real value of a major longitudinal study will grow markedly. The evidence from long standing surveys of this type in other countries bears testimony to their value.
References


