Household Wealth and Saving in New Zealand: Evidence from the Longitudinal Survey of Family, Income and Employment

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Abstract

This paper uses data from the Survey of Family, Income and Employment (SoFIE) to estimate household saving in New Zealand between 2004-2006. Comprehensive data on wealth is collected biannually in SoFIE and we calculate household saving by examining how wealth has changed over time. We find that even the most conservative estimate of household saving was at least 14% of gross income during this time period. On the other hand, the indirectly derived Household Income and Outlay Accounts (HIOA) indicate (net) household saving was -12.5% per year over the same period. We also find no evidence that capital gains in housing during this time period crowded out saving or that the composition of household wealth in New Zealand differed from that in other developed countries.

JEL codes

Keywords

1. Introduction

There has been a strong debate in recent years on whether New Zealanders save enough with many commentators arguing that they are not and that what little saving that does occur is mostly through (untaxed) capital gains in housing. These commentators have further claimed that this lack of saving and reliance on capital gains increases people's vulnerability to having lower wellbeing during retirement, distorts investment choices, and depresses investment and economic growth in New Zealand.[1] This belief has given rise to a series of distortionary pro-savings policies, including the State Sector Retirement Savings Scheme, KiwiSaver, and lower tax rates for Portfolio Investment Entities (PIEs) than for top incomes.[2]

Sound debates and policies have to be based on good data. Even though the theoretical definition of saving is straightforward, in practice data imperfections make saving notoriously difficult to measure. There are four approaches to measuring saving: i) the micro flow approach based on unit-record data on flows of income and expenditure; ii) the macro flow approach based on aggregate data on flows of income and expenditure; iii) the micro stock approach based on unit-record data on stocks of assets and liabilities; iv) and the macro stock approach based on aggregate data on stocks of assets and liabilities.

When these methods and the New Zealand data available for applying them were last reviewed (Le, 2007), the micro stock approach was infeasible due to the lack of data. However, with the release of the fourth wave of the Survey of Family, Income and Employment (SoFIE), the first longitudinal survey in New Zealand to contain data on households' assets and liabilities, it is now possible to calculate individual and household saving by examining changes in households' assets and liabilities over time. In particular, data on assets and liabilities are collected from all sample adults in SoFIE in wave 2 (which ran from 1 October 2003 to 30 September 2004) and wave 4 (1 October 2005 to 30 September 2006).[3]

Calculating saving using a stock approach requires observation of assets and liabilities at two points in time. While an attempt is made to interview all original survey members (OSMs) in each wave of SoFIE, if a household is say created in wave 2 when an OSM partners with an outsider, but then dissolves in wave 3, the outsider will only be interviewed in wave 2, hence making it impossible to follow households over time. Hence, since households are not tracked longitudinally, our unit of analysis in this paper is the individual.[4] This is a simplifying approach that also has its limitations. For example, since all the figures we present are attributable to individuals it is not straightforward to compare the distribution of net worth or saving of singles to married couples. Furthermore, outcomes that are typically measured at the household level, such as the home ownership rate, look quite different when the focus is on individuals.

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[1] See, for example, Cullen (2007), Whitehead (2007, 2010), Treasury (2007), Bollard (2009), Mercer New Zealand (2009), and Tax Working Group (2010).

[2] At the time of writing, the top tax rate for incomes was 38% while the highest prescribed investor rate for income from Portfolio Investment Entities (PIEs) was only 30%. From 1 October, 2010 these rates changed to 33% for incomes and 28% for income from PIEs. Hence a tax advantage for certain portfolio savings products remains.

[3] A detailed description of SoFIE and our analysis sample can be found in Appendix A.

[4] The term 'household' saving is used to reflect the fact that this saving is made in the household sector, as opposed to the business or government sectors.

This paper first examines the distribution of assets, liabilities and net worth in each wave. Then, it presents mean and median saving under various assumptions and compares these to the saving levels calculated using different methods, which are typically focused on by policymakers. Next, taking advantage of the availability of unit-record data, we examine the distribution of saving across the population. We finish our analysis by examining the characteristics of individuals that are correlated with having different levels of saving.

Recent research by Scobie and Henderson (2009) uses the same data to examine the savings rates of New Zealanders.[5] Their paper is complementary to ours. Both examine the distribution of assets, liabilities and net worth in each wave of SoFIE and calculate the level and distribution of saving under various assumptions. Scobie and Henderson (2009) also provide updated estimates from the Reserve Bank's aggregate data on the household sector (a stock approach) and those from Statistics New Zealand's national accounts (a flow approach) to which they compare their estimate of saving rates from SoFIE. While our descriptive analysis is less detailed than theirs, we extend upon their work by including a regression analysis of the characteristics of households that are correlated with having different levels of saving and the relationship between capital gains in housing and net saving. We also include a comparison of net worth holdings in New Zealand to those in other OECD countries.

The paper proceeds as follows. Sections 2 and 3, respectively, present estimates of net worth and saving. Section 3 also examines the characteristics of individuals that are correlated with having different amounts of saving. Section 4 compares estimates of saving from SoFIE with those from other data sources. Section 5 concludes with some policy implications.

2. Net Worth

2.1. Distribution

Before measuring saving, we start by examining the distribution of net worth across individuals in SoFIE in both 2004 and 2006. Table 1 reports mean and median values for each class of asset and liability. The corresponding ownership rates can be found in Appendix Table 3 in Appendix B.

In 2004 (wave 2), 49% of the adult population owned a home, 73% owned a vehicle and 31% had a mortgage. Virtually everyone had an asset while only 68% had any debt.[6] These figures are almost exactly the same two years later, with home ownership rates declining by 2 percentage points and car ownership rates increasing by 1 percentage point. Over the two-year period, ownership of workplace pension schemes, farms and businesses, vehicles and household items increased. In both waves, the median value is zero for assets other than bank accounts, vehicles and household items, because less than half of the population own those assets.

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[5] In related work, Henderson and Scobie (2009) use wave 2 of SoFIE to describe the level and composition of household debt and to examine the distribution of debt and the factors associated with high levels of debt to income ratios.

[6] It should be noted that these ownership rates pertain to individuals. Ownership rates across households would be higher, because a household is said to have an asset/ liability if at least one member has that asset/ liability.

Table 1: Means and Medians of Assets and Liabilities

|	2004 (wave 2)		2006 (wave 4)		2006 (2004 prices)	
	Mean	Median	Mean	Median	Mean	Median
Assets						
Home	85,764	0	103,838	0	97,032	0
Investment property	20,948	0	29,075	0	27,169	0
Workplace pension	2,490	0	3,167	0	2,959	0
Personal pension	1,411	0	1,521	0	1,421	0
Bank accounts	9,783	590	11,163	580	10,431	542
Life insurance	4,533	0	4,271	0	3,991	0
Mutual funds	4,240	0	4,571	0	4,271	0
Other financial assets	5,530	0	6,915	0	6,462	0
Farms and businesses	37,816	0	49,548	0	46,301	0
Trusts	6,717	0	5,024	0	4,695	0
Vehicles	6,512	3,500	6,529	3,500	6,101	3,271
Leisure equipment	2,060	0	2,346	0	2,192	0
Household items	26,446	23,000	29,727	25,000	27,779	23,361
Other assets	1,277	0	1,610	0	1,504	0
Total assets	215,528	122,617	259,305	140,000	242,310	130,824
Liabilities						
Mortgage	24,662	0	29,793	0	27,840	0
Bank accounts	1,033	0	924	0	863	0
Credit cards	811	0	825	0	771	0
Student loans	1,423	0	1,661	0	1,552	0
Other liabilities	3,407	0	3,080	0	2,878	0
Total liabilities	31,336	2,700	36,283	3,000	33,905	2,803
Net worth	184,192	86,929	223,022	96,978	208,405	90,622
Loan to value ratio		0.42		0.39		

Note: $ current prices unless otherwise indicated. Loan to value ratio is the ratio of mortgages to the value of properties. The ratio is considerably larger than 1 for a few individuals. We suspect these are data errors, hence we do not report mean ratios.

Most of people's assets are in their homes. In 2004, the average home asset value was $85,800 per adult, accounting for 40% of average value of total assets ($215,500). By 2006, the average home asset value increased in real terms by 13% to $97,000 per adult, but remained 40% of the average value of total assets. Other major asset classes include farms and businesses, investment properties and household items. Symmetrically, mortgages are the largest debt, accounting for 79% of total liabilities in 2004, rising to 82% of total liabilities in 2006. The median loan to value ratio (for individuals who owned properties) declined from 0.42 in 2004 to 0.39 in 2006.

While debts increased by 8.2% in real terms between 2004 and 2006, assets increase at a faster rate. Thus, while in 2004, average assets were 6.9 times the size of average debts, this rose to 7.1 in 2006. Net worth is calculated as the difference between assets and liabilities.[7] The distribution of net worth is skewed, as evident by the fact that the mean is considerably larger than the median in both waves. Between 2004 and 2006, mean real net worth increased by 13.1% in real terms, while median real net worth increased by 4.2%.

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[7] In this paper, the terms net worth and wealth are used interchangeably.

Figure 1: Inequality in Personal Net Worth
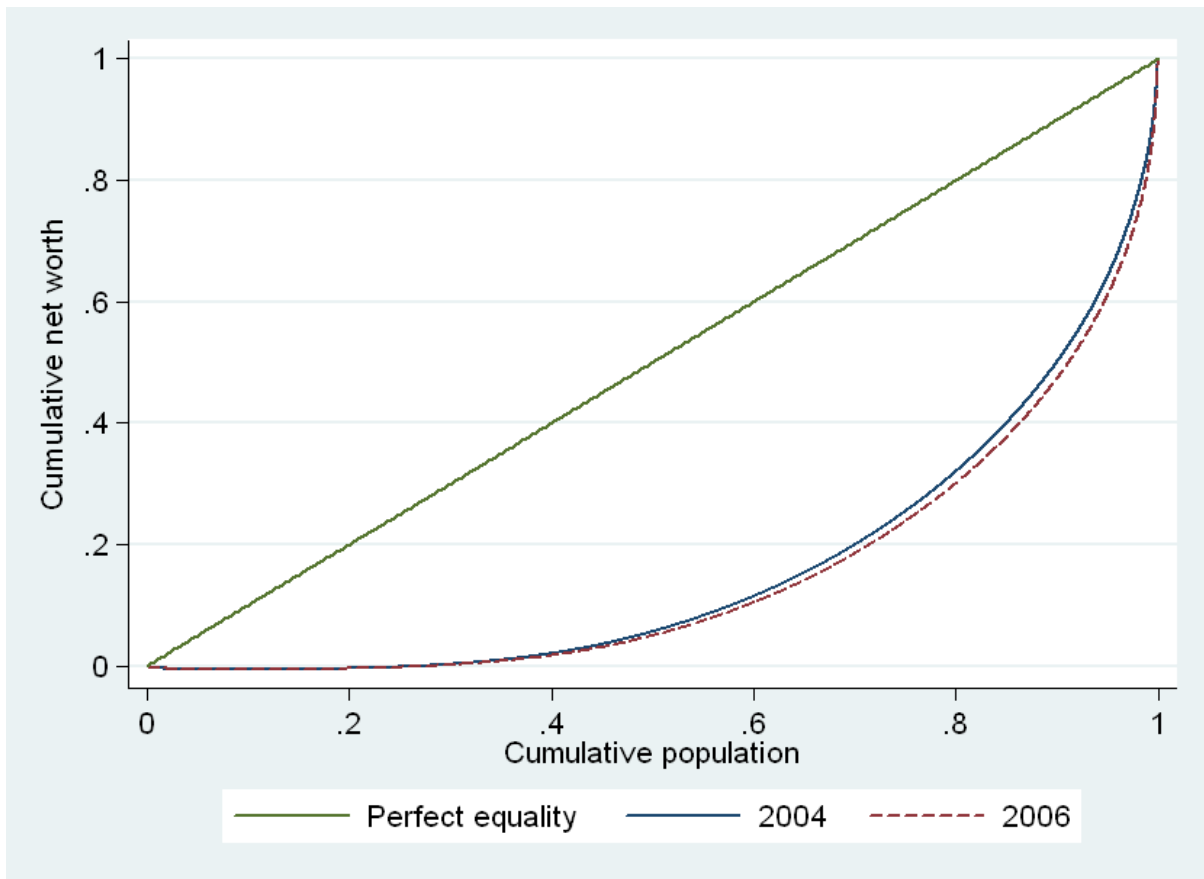
The distribution of net worth is displayed in Figure 1. This figure shows the share of overall net worth owned by different shares of the population ranked by their place in the wealth distribution. The poorest 30% of the population have almost no wealth. Only 20% of total wealth is shared by the bottom 70% of the population. By contrast, the top 20% of the population own around 70% of total wealth. These distributional figures are largely unchanged between 2004 and 2006. It is worth noting that these figures likely underestimate the concentration in wealth in the richest household, as household survey data is typically assumed to under-represent the wealthiest members of society (Groves and Couper, 1998). In comparison, similar figures from SoFIE indicate that the top 20% of the population in terms of household income earn over half of all income earned by New Zealanders.

Figure 2 presents average net worth for individuals in each decile of the wealth distribution in 2006. Individuals in the bottom 30% of the wealth distribution have few assets beyond cars, household items and bank accounts. The value of one's home becomes an increasingly larger share of net worth from the 5th decile to the 9th decile of the wealth distribution. Only among individuals in the top decile of the wealth distribution are other asset classes such as investment properties, farms and businesses and financial assets important components of overall wealth.

Figure 2: Average Net Worth across Deciles (2006)
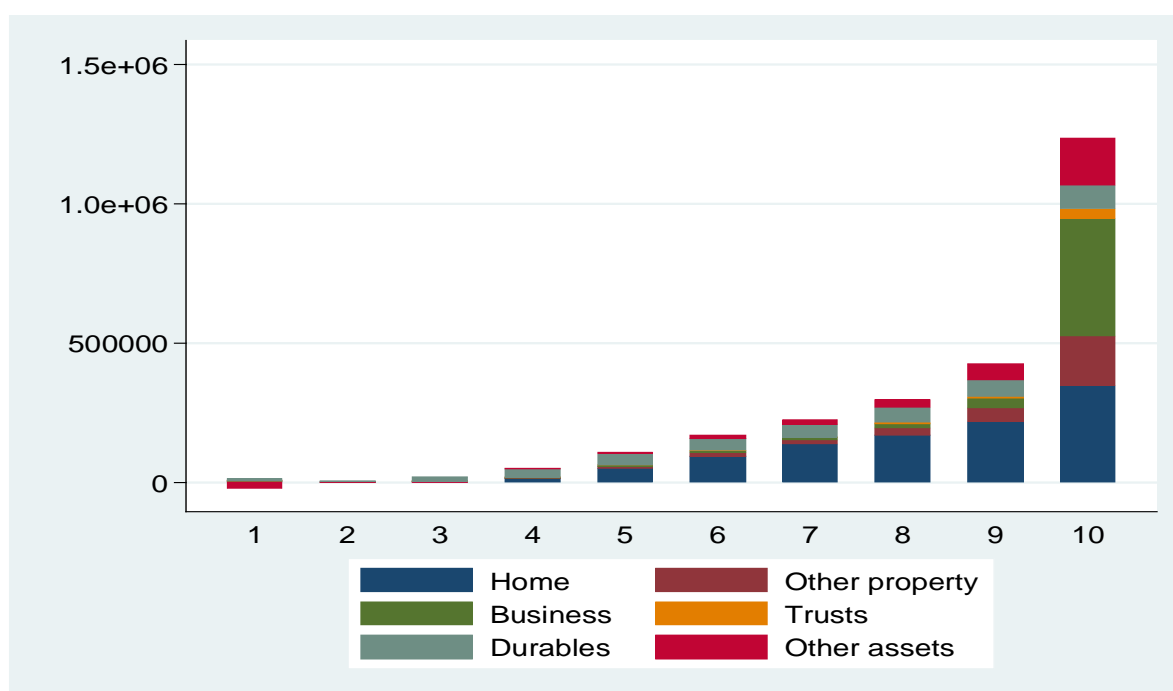
Table 2 reports various measures of the real net worth distribution. The mean to median ratio, inter-quartile ratio and Gini coefficient of net worth are all higher in 2006 than in 2004. The Lorenz curve (eg, the curve plotted in Figure 1) for 2006 lies below that for 2004. This evidence indicates that inequality in net worth has increased between 2004 and 2006. Inequality appears to be increasing throughout the wealth distribution, except below the 25th percentile. In fact, the ratio of median net worth to 10th percentile of the net worth distribution has declined over this two-year period.

Table 2: Net Worth Distribution

	2004 (current prices)	2006 (current prices)	2006 (2004 prices)
Mean	184,192	223,022	208,405
5th percentile	-3,150	-4,000	-3,738
10th percentile	800	902	843
25th percentile	12,000	12,974	12,124
50th percentile (median)	86,929	96,978	90,622
75th percentile	220,905	257,500	240,623
90th percentile	422,643	495,800	463,305
95th percentile	659,611	761,971	712,030
99th percentile	1,553,100	2,025,000	1,892,279
Mean to median ratio	2.1	2.3	
P50/ p25 ratio	7.2	7.5	
P50/ p10 ratio	108.7	107.5	
P75/ p50 ratio	2.5	2.7	
P90/ p10 ratio	528.3	549.7	
P90/ p50 ratio	4.9	5.1	
Share with zero/negative net worth	6.9%	7.0%	
Gini coefficient	0.68	0.70	

Note: $ current prices unless otherwise indicated.

Table 3 examines average real net worth for different socio-demographic groups based on their characteristics in 2004. Net worth rises with age, peaking in the 55-64 age bracket, and then declines. The age gradient has become stronger in 2006 compared to 2004, with the largest increases in wealth found among 55-64 and 65-74 year-olds, while mean real wealth actually declined for 15-24 year-olds. This likely reflects that much of the increase in net worth occurred because of increased house prices and home ownership is more prevalent among older households. Males have higher average net worth than females, but the opposite is true among single individuals. The increase in average wealth between 2004 and 2006 was the same for men and women and for singles and couples.

Table 3: Average Net Worth for Different Groups

	2004 (current prices)	2006 (current prices)	2006 (2004 prices)	% change (real terms)
Age group				
15-24	13,348	11,121	10,392	-22.1
25-34	78,953	91,485	85,489	8.3
35-44	189,288	219,268	204,897	8.2
45-54	296,097	349,504	326,597	10.3
55-64	321,563	409,259	382,436	18.9
65-74	273,221	346,904	324,167	18.6
75+	257,436	294,416	275,120	6.9
Gender				
Male	197,588	239,284	223,601	13.2
Female	171,611	207,799	194,180	13.2
Partnering status				
Single	110,682	134,622	125,799	13.7
Partnered	229,727	278,453	260,203	13.3
Single male	104,411	130,602	122,042	16.9
Single female	115,989	138,002	128,957	11.2
Prioritised ethnicity				
Pakeha	212,805	256,531	239,718	12.6
Maori	78,482	90,380	84,456	7.6
Pacific Islander	53,307	46,347	43,309	-18.8
Asian	111,992	126,390	118,106	5.5
Other	110,327	205,741	192,256	74.3
Migrant status				
Born in NZ	190,402	232,244	217,022	14.0
In NZ 0-4 years	84,361	93,280	87,166	3.3
In NZ 5+ years	188,357	206,150	192,639	2.3
Years in NZ unknown	149,307	215,185	201,082	34.7
Education				
No qualifications	154,197	176,657	165,079	7.1
School Certificate or less	169,443	181,955	170,029	0.3
Non-degrees	186,596	237,181	221,636	18.8
Degrees	242,017	282,859	264,320	9.2
Home ownership				
Non-owners	83,390	107,398	100,359	20.3
Owners	288,887	348,304	325,476	12.7
Total	185,275	223,406	208,764	12.7

Note: $ current prices unless otherwise indicated.

Partnered people have over twice as much net worth as single individuals. Unlike the Household Savings Survey, which collected information on assets and liabilities from the couple

as a unit, SoFIE collects this information from each individual, regardless of their partnering status. It is possible that when asked for the value of some asset/liability, each partner in a couple reports its total without adjusting for their respective ownership share. So while the large wealth gap between single and partnered people is evidence of assortative mating, as well as a greater propensity for home ownership, we suspect that the net worth of partnered people may be overstated.

Across ethnic groups, average wealth is the highest among Pakeha and lowest among Pacific Islanders.[8] Average real wealth has also declined among Pacific Islanders between 2004 and 2006, which may reflect compositional change in the sample (such as the addition of recent migrants). Recent migrants who have been in New Zealand less than five years have less than half the wealth of the New Zealand-born, while longer established migrants have similar levels of wealth as the New Zealand-born. Interestingly, growth in average wealth was much lower for both groups of migrants than for the New Zealand-born.

Net worth is higher among individuals with higher educational status, particular among individuals with university degrees. Home owners have higher net worth than renters, which is hardly surprising given the significance of homes in people's asset portfolios. However, average net worth increased more among non-homeowners between 2004 and 2006, which could reflect an increased proportion of new home owners with low asset to debt ratios.

2.2. Changes over Time

For the longitudinal sample, the correlation of net worth in the two waves is 0.58, indicating considerable changes in net worth for individuals between 2004-2006. Table 4 tabulates the share of individuals in each wealth quintile in 2004 versus their position in the wealth distribution in 2006. While 54% (10.8% out of 20%) of people who were in quintile 1 in 2004 remained in that quintile in 2006, 81% of the top quintile in 2004 remained so in 2006. Only 1% who were in quintile 1 in 2004 moved to quintile 5 in 2006 and vice versa. Most individuals who change wealth quintile typically move either up or down one quintile in the distribution.

Table 4: Net Worth Transition Matrix

Quintile in 2004	Quintile in 2006				
	1	2	3	4	5
1	**10.8**	4.4	0.8	0.3	0.1
2	2.9	**10.3**	3.9	0.8	0.4
3	0.6	2.5	**11.4**	5.3	1.4
4	0.3	0.9	4.1	**11.9**	4.7
5	0.1	0.5	1.4	4.1	**16.1**

Note: Each cell is the percent of the total population. Cells are bolded when there is no transition between the two waves

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[8] Where respondents report multiple ethnicities, ethnicity is defined according to the old Statistics New Zealand's prioritisation rule. Accordingly, a person is defined as Maori if at least one of their ethnicities is Maori. All non-Maori with at least one Pacific Island ethnicity are defined as Pacific Islanders.

2.3. International Comparison

We draw on the Luxembourg Wealth Study (LWS)[9] to make cross-country comparisons of household net worth. To be consistent with the LWS, for these comparisons the unit of analysis is households and assets are restricted to property and financial assets. Such 'restricted' assets account for about 60% of total assets (which also include farms and businesses, trusts, pension schemes, durables and other assets).

Table 5 shows that the distribution of household net worth in New Zealand is broadly similar to that in most other countries for which comparable data are available. In most countries, households in the bottom quartile have negative net worth. The Gini coefficient indicates that net worth is more unequally distributed in New Zealand than in the UK and Italy, but less so than in the US and Sweden. While the top decile hold 42% of total wealth in Italy, they hold around 50% of wealth in New Zealand and up to 71% in the US.

Table 5: Household Net Worth Distribution: International Comparison

	Canada 1999	Finland 1998	Germany 2002	Italy 2002	Sweden 2002	UK 2000	US 2001[1]	US 2001[2]	NZ 2004	NZ 2006
Share with										
Positive net worth	77	83	63	89	68	82	77	77	76	74
Nil net worth	3	2	29	7	5	6	8	4	1	2
Negative net worth	20	15	9	3	27	11	16	19	23	24
Quantile/median ratios										
p10/p50	-17	-6	0	0	-84	0	-11	-15	-14	-15
p25/p50	0	1	0	8	-1	2	0	0	0	0
p75/p50	350	218	886	209	447	238	378	368	277	300
p90/p50	708	390	1,818	359	972	482	925	980	532	584
Wealth shares										
Top 10%	53	45	54	42	58	45	64	71	49	52
Top 5%	37	31	36	29	41	30	49	58	34	37
Top 1%	15	13	14	11	18	10	25	33	13	16
Gini coefficient	75	68	78	61	89	66	81	84	73	73

Notes: (1) Data from the Panel Study of Income Dynamics. (2) Data from the Survey of Consumer Finances.

A number of commentators have raised concerns that New Zealanders hold an unusually large share of their wealth in property (see, for example, Bollard (2005) and Hargreaves (2009)). As reported in Table 6, while over 80% of household wealth in New Zealand is in property assets, this is not dramatically different in comparable OECD countries. The US is the main outlier here, with households investing relatively more in financial instruments than in real estate.

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[9] See www.lisproject.org.

	Canada 1999	Finland 1998	Germany 2002	Italy 2002	Sweden 2002	UK 2000	US 2001[1]	US 2001[2]	NZ 2004	NZ 2006
Property assets	78	84	87	85	72	83	67	62	85	85
Principal residence	64	64	64	68	61	74	52	45	68	67
Investment property	13	20	23	17	11	9	14	17	17	19
Financial assets	22	16	13	15	28	17	33	38	16	15
Deposit accounts	9	10	-	8	11	9	10	10	8	7
Mutual funds	1	0	-	3	2	-	-	4	3	3
Stocks	7	6	-	1	6	-	23	15	}4	}4
Bonds	5	1	-	3	9	-	-	9		
Total debt	26	16	18	4	35	21	22	21	25	23
Home mortgage	22	11	-	2		18	-	18	20	19
Net worth	74	84	82	96	65	79	78	79	75	77

Notes: All figures are the percent of total assets. (1) Data from the Panel Study of Income Dynamics. (2) Data from the Survey of Consumer Finances.

3. Saving

3.1. Measurement

Saving is defined as deferred consumption and can be calculated as current income less current expenditure. This is often referred to as the *flow* approach.

$$\text{Saving (\textit{flow method})} = \text{Current income} - \text{Current expenditure} \qquad (1)$$

Alternatively, saving can be inferred from change in wealth, which is referred to as a *stock* measure. This is the approach relied on in this paper as SoFIE does not collect comprehensive data on current expenditure.[10]

$$\text{Saving (stock method)} = \text{Current wealth} - \text{Wealth in previous period} \qquad (2)$$

This simple stock measure arguably exaggerates saving because it includes capital gains, which during the sample period are sizeable because of the housing boom that was occuring. Thus, we compute a second stock saving measure which excludes real capital gains and losses in properties.[11] This measure is often termed *active* saving, while capital gains are *passive* saving. We also consider two even more conservative measures, which further exclude all saving in the form of properties and durables.

We use the Consumer Price Index to deflate 2006 wealth values to 2004 prices. The Quotable Value Housing Price Index (HPI) measured at the Territorial Local Authority (TLA) level is then used to estimate capital gains (losses) in properties. As reported in Table 7, gross saving averaged $29,900 per person between 2004 and 2006. Over half of this was from capital gains in properties; the average active saving was only $12,600. Average active saving is reduced to $11,700 when saving in properties is entirely excluded and $9,700 when saving in durables (vehicles, household items and leisure equipment) is further excluded. On average, people in the

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[10] Appendix C has a brief discussion of potential biases in measuring saving using SoFIE.
[11] Capital gains (losses) can apply to all types of assets but in this paper are confined to properties due to data constraints.

45-64 age bracket, the group for whom retirement saving is critical, save more than the rest of the population.

Table 7: Household Saving over 2004-2006

	All Individuals		Ages 45-64 only	
	Mean	Median	Mean	Median
Gross saving	29,894	5,098	50,072	9,942
Active saving (2)	12,618	1,248	22,859	-863
(2) excl saving in property (3)	11,682	1,239	24,593	997
(3) excl saving in durables (4)	9,738	0	23,569	8

Note: All amounts are in $2004 prices.

The rest of the paper focuses on active saving, which is more conservative than gross saving and is closer in spirit to saving estimated using the flow approach.

3.2. Distribution

Table 8 presents the distribution of saving across the longitudinal sample. Nearly half of the adult population had negative or zero saving between 2004 and 2006. On the other hand, individuals in the top 25% of the distribution saved large sums of money. One noticeable feature of the saving distribution is that values are very skewed in the tails of the distribution. In other words, the largest dissavers have large declines in net worth between wave 2 and 4 of SoFIE while the largest savers have large increases in net worth. It is quite likely that many of these large changes reflect measurement error in the data on net worth since assets do not typically disappear or double in value over a short time period. For this reason, we always present median, as well as mean values in our descriptive results, since the median of any distribution is not sensitive to outliers, and use a regression modelling technique, median regression, which is also robust to outliers.

Table 8: Distribution of Active Saving

Mean	12,618
5th percentile	-217,727
10th percentile	-109,759
25th percentile	-24,289
50th percentile (median)	1,248
75th percentile	32,221
90th percentile	121,881
95th percentile	239,111
99th percentile	924,291
Mean to median ratio	10.1
Share of population with zero/negative saving	47.1%

Note: All amounts are in $2004 prices.

This information on the distribution of saving on its own is uninformative as to whether individuals are saving enough for their future. Saving is deferred consumption – people save now to spend later in life. According to the life-cycle model of consumption and saving originated by Modigliani and Brumberg (1954), individuals seek to smooth their marginal utility of consumption over their entire lifetime. Thus, younger people typically should borrow so they can have higher consumption than their current earnings, middle-aged people should typically save because their incomes are typically at their highest level, while older people who are no longer

working should typically draw down on their saving. In this paper, we do not attempt to evaluate whether individuals are saving enough for retirement, leaving this for future work.

We next, in Table 9, examine saving for different socio-demographic groups. Across age-groups, the results are generally consistent with the life-cycle model, with the highest average saving found for individuals in the 45-54 age-group; averaging $38,800 per person. Average saving is lower for individuals aged 35-44 than for those aged 25-34, but this is probably due to the costs of child rearing. Median saving for individuals aged 55-74 is negative, and both mean and median saving for those aged 75+ are negative. On average, partnered people save over twice as much as single people, again consistent with the life-cycle model since most single people are either young or old. Men and women save, on average, the same amount, partly because wealth is more or less equally split between two partners in a couple. Among single individuals, men save over twice as much as women do. While home owners have higher net worth, their active saving is considerably lower than that of non-owners.

Table 9: Mean and Median Active Saving for Different Groups

|	Mean	Median
Age group		
15-24	2,338	1,103
25-34	21,141	6,383
35-44	9,312	3,812
45-54	38,757	1,869
55-64	1,456	-3,292
65-74	1,574	-5,538
75+	-8,848	-5,814
Gender		
Male	12,860	1,445
Female	12,397	1,056
Partnering status		
Single	6,202	675
Partnered	16,190	2,390
Single male	9,375	1,296
Single female	3,741	189
Education		
No qualifications	15,713	2,667
School Certificate or less	10,582	3,186
Non-degrees	41,385	6,419
Degrees	34,870	14,509
Home ownership		
Non-owners	24,262	1,849
Owners	1,579	-1,924
Total	12,618	1,248

Note: All amounts are in $2004 prices and all characteristics are measured in 2004.

Figure 3: Mean and Median Active Saving by Decile of Income and Net Worth

a) Net worth decile
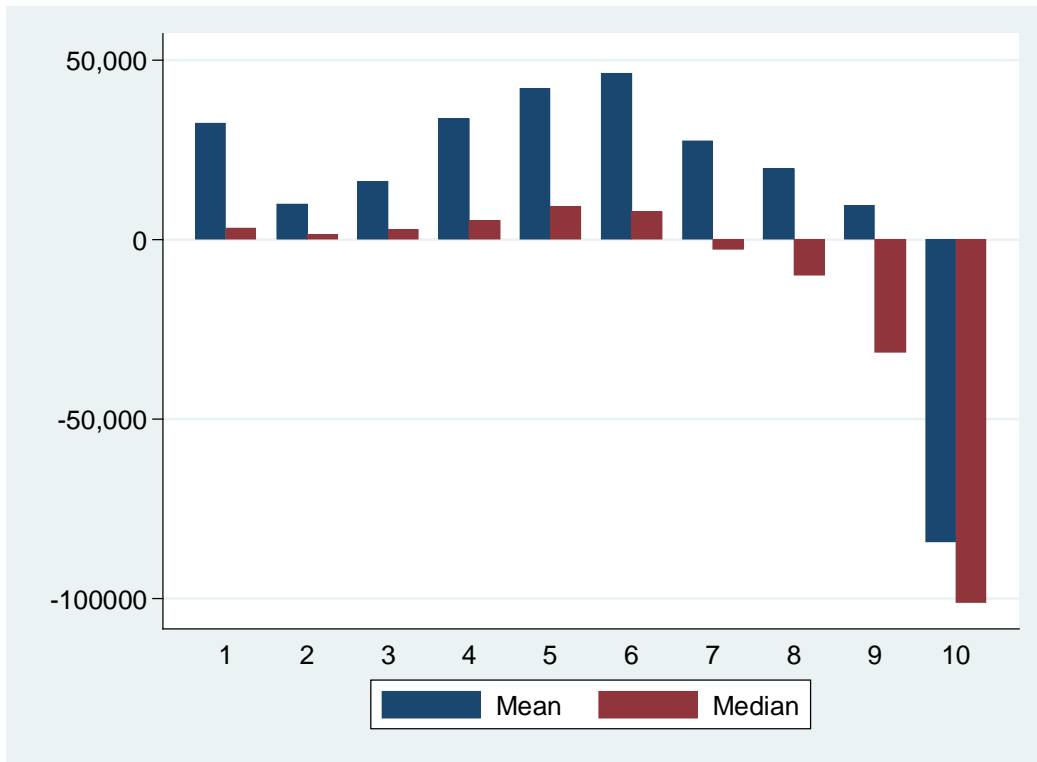
b) Income decile
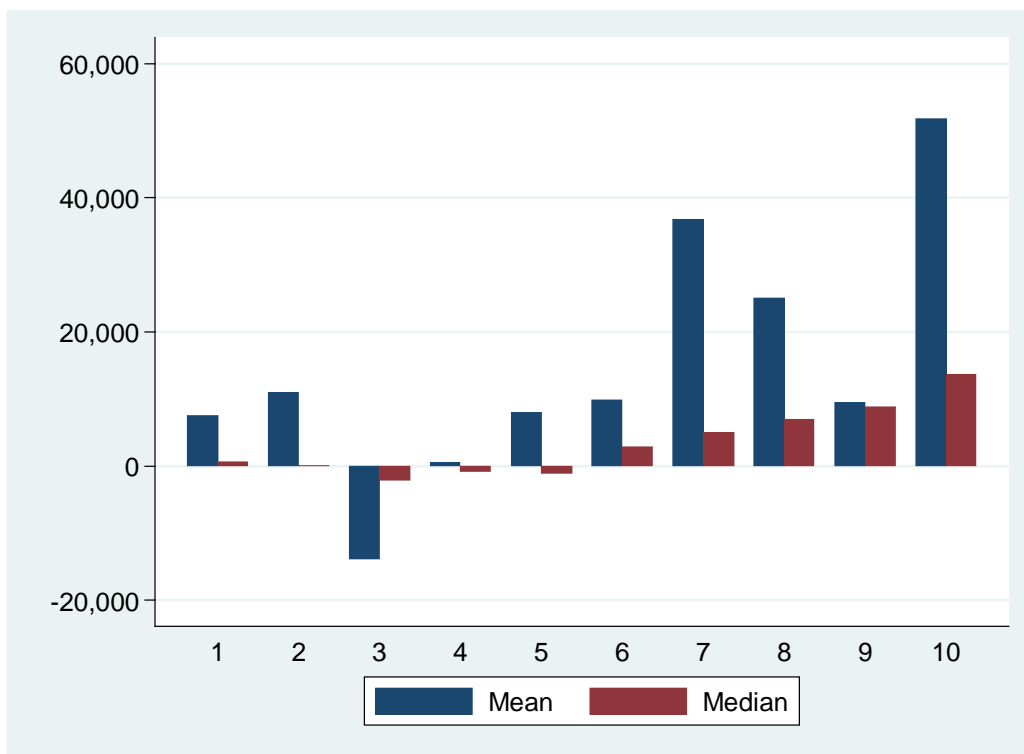
Note: Net worth and income as measured at wave 2 and are $2004 prices.

We next examine how saving between waves 2 and 4 relates to each individual's level of wealth in wave 2. Across the wealth distribution, the top decile dissaved greatly during the sample period. Median saving was negative for the wealthiest 40% (see Figure 3). One explanation for this is that wealthier people are, on average, older and thus are more likely to be drawing down their wealth for consumption. On average, the largest saving are for decile 1 (possibly younger people saving for their first home) and deciles 4-6 (possibly middle-aged people who no longer face high costs of child rearing and who can start saving seriously for retirement). These findings also likely reflect substantial measurement error in net worth. If measurement error is classical then individuals who have over-reported net worth in wave 2 will, on average, have lower reported net worth in the future regardless of whether their true net worth has declined. A similar reversion to the mean will also occur for people whose net worth is under-reported in wave 2.

Saving is more strongly correlated with income than with wealth. Across the income distribution, saving is largest for the top four deciles, while median saving for the bottom 50% centres around zero.

Figure 4 displays median saving rates as a share of gross income by age-group. The age pattern in active saving rates is consistent with the life cycle theory. The highest median saving rate is for the 25-34 age-group (10%). The median saving rate is negative for individuals aged 55-64 and highly negative for those aged 65 and over.[12]

Figure 4: Median Annual Saving Rate by Age Group
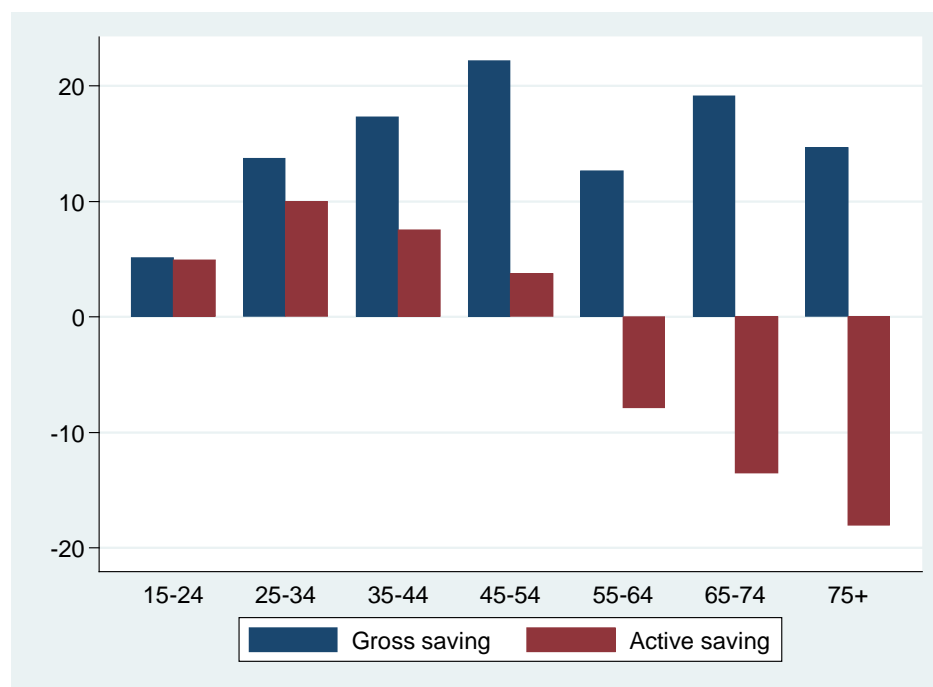
Note: All figures are the percent of gross income for each age group.

3.3. Regression Estimates of Correlates with Saving

We next examine active saving between wave 2 and 4 in a multivariate regression framework. This allows us to examine the relationship between various socioeconomic

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[12] The average saving rate is quite sensitive to how it is calculated, see Appendix D for details.

characteristics and saving, holding all other characteristics constant. Because there are large negative and positive outliers in saving, we estimate median regression models. This approach estimates the relationship between characteristics and saving at the median in the conditional outcome distribution and thus is robust to outliers that likely result from measurement error in the net worth data. Our focus is on examining the relationship between characteristics in wave 2 and saving between waves 2 and 4, which is essentially a descriptive exercise. We do this because an in-depth examination of the relationship between changes in characteristics and saving requires a number of assumptions to reveal causal relationships and further assumptions to allow for one to interpret the results in regards to economic theory. While this is the case, we do also provide some preliminary evidence on the marginal propensity of saving and the relationship between passive and active saving.

We consider five regression specifications. The first specification examines the relationship between median saving and various socioeconomic characteristics measured at wave 2. This is analogous to the results presented in Table 9, but in a multivariate framework which indicates which variables are related to household wealth controlling for the remaining characteristics. The second specification then adds a control for each individual's total income in waves 3 and 4. The coefficient on this variable indicates the average marginal propensity to save out of current income. The third specification adds controls for net worth and whether an individual owns a home or investment property in wave 2. This specification allows for there to be a relationship between an individual's level and composition of net worth and future saving. The fourth specification replaces the indicator variables for whether an individual owns a home or has an investment property in the previous specification with controls for how much passive saving they received between waves 2 and 4 in home and investment property. This specification allows us to evaluate the extent to which passive saving displaces active saving. One concern with this specification is that the coefficient on passive saving is merely reflecting the strong correlation between passive and active saving in properties. Thus, in the last specification, we now change the dependent variable to be non-property active saving. The results from these regressions are presented in Table 10, along with bootstrapped t-statistics that account for that for couples we have two observations from the same household and hence highly correlated error terms.

Interestingly, we find that few individual characteristics in wave 2 are correlated with saving between wave 2 and 4, once we control for a comprehensive list of sociodemographic characteristics, and that overall the fit of the model in the first specification is quite poor. The significant findings are as follows: individuals who were partnered saved $1,800 more than those that were single; older individuals saved $50-150 less for each year of age (the quadratic term dominates the linear term here); individuals with a university degree saved nearly $4,000 more than those with less qualifications; individuals who were out of the labour force saved $1,800 less than those who were employed or unemployed; and individuals who were in average health saved less than those who were in other health statuses (the lack of results for fair and poor health likely reflect the small number of people reporting these levels of health).

Table 10: Median Regression Estimates of the Correlates of Active Saving

	(1)	(2)	(3)	(4)	(5)
Partnered	1,821	1,736	645	4,261	2,059
	[2.04]*	[2.09]*	[0.43]	[2.67]**	[2.22]*
Age	109.2	-26.9	-130.5	-133.0	-90.7
	[0.76]	[0.22]	[1.00]	[0.17]	[0.75]
Age squared	-2.81	-1.66	2.97	1.80	1.54
	[1.65]+	[1.29]	[2.01]*	[0.20]	[1.24]
Female	355	1,085	3,568	2,722	1,397
	[0.77]	[2.08]*	[5.00]**	[0.37]	[1.56]
Maori	169	143	-3,940	-4,043	-1,718
	[0.20]	[0.28]	[1.12]	[0.85]	[1.38]
Pacific Islander	-700	-592	-5,308	-5,833	-3,327
	[0.68]	[0.29]	[1.53]	[0.91]	[1.75]+
Asian	-1,344	-228	-1,715	-2,175	-3,130
	[1.12]	[0.13]	[0.26]	[0.26]	[1.63]
School qualifications	-227	-513	1,228	1,046	-56
	[0.30]	[0.20]	[0.23]	[0.12]	[0.08]
Post-school quals	43	-955	131	-243	-253
	[0.06]	[1.46]	[0.05]	[0.09]	[0.28]
University degree	3,935	-204	997	297	344
	[2.82]**	[0.05]	[0.37]	[0.07]	[0.07]
In NZ 0-4 years	685	954	-1,610	-465	-818
	[0.51]	[0.23]	[0.75]	[0.03]	[0.52]
In NZ 5+ years	84	466	-2	1,638	917
	[0.08]	[0.43]	[0.00]	[0.65]	[0.90]
Unemployed	-1,629	389	2,023	2,855	-220
	[1.18]	[0.29]	[0.45]	[0.49]	[0.13]
Out of labour force	-1,796	832	3,140	3,625	1,244
	[2.00]*	[0.71]	[3.09]**	[0.93]	[1.41]
Self-employed	504	-273	14,580	15,193	5,221
	[0.20]	[0.05]	[3.48]**	[1.29]	[1.52]
Very good health	-823	-751	-1,828	-1,317	-151
	[1.25]	[0.31]	[0.28]	[0.77]	[0.10]
Average health	-1,302	-924	-4,700	-3,725	-1,415
	[1.97]*	[0.40]	[1.50]	[0.49]	[1.59]
Fair health	-401	-146	-6,186	-4,179	-1,660
	[0.31]	[0.05]	[1.21]	[1.91]+	[1.10]
Poor health	607	1,416	-7,679	-4,253	-1,846
	[0.42]	[0.49]	[2.05]*	[1.42]	[0.63]
Income in at wave 2	0.05	-0.11	0.06	0.08	-0.02
	[1.36]	[1.24]	[1.53]	[0.46]	[0.63]
Income in wave 3 & 4		0.17	0.24	0.25	0.14
			[9.22]**	[1.56]	[3.63]**
Own a home			27,532		
			[8.37]**		
Own an investment property			23,356		
			[4.18]**		
Net worth (wave 2)			-0.30	-0.46	-0.11
			[10.52]**	[13.35]**	[5.22]**
Passive saving (home)				2.78	0.43
				[14.30]**	[3.27]**
Passive saving (inv. property)				2.93	0.20
				[6.31]**	[1.58]
Observations	16,207	16,207	16,207	16,207	16,207
Pseudo R-squared	0.0023	0.0056	0.0603	0.1715	0.0235

Note: Bootstrapped t-statistics that are robust to intrahousehold correlation are in brackets. + significant at 10%, * at 5%, ** at 1%. Characteristics are measured at wave 2 unless otherwise stated. We also control for years in NZ being missing and Other ethnicity. Specification (5) excludes property from dependent variable.

The results in the second specification indicate most of the observed association between wave 2 characteristics and saving in wave 3 and 4 occurs because these characteristics are related to the income earned by individuals in these waves and this is directly related to saving. For example, once controlling for the income earned in waves 3 and 4, the only wave 2 characteristics that are correlated with saving between waves 2 and 4 are being partnered and being female. Individuals who were partnered are still found to have saved around $1,800 more than those that were single, while women are found to have saved nearly $1,100 more than men with the same income levels and other characteristics.

Examining the coefficient on total income in waves 3 and 4 indicates that for every dollar earned in these two years, the median household saved $0.17, or in other words the median marginal propensity of saving was 0.17. It is important to note that this is just indicating the average cross-sectional relationship between income and saving and is not equivalent to saying that increasing a particular household's income by $1 would lead to a $0.17 increase in saving.

Including additional controls for the level of individual wealth at wave 2 and whether the individual owns a home or investment property has a large impact on the results. Controlling for prior wealth, we now find that saving is strongly related to gender, age, labour force status and health (and no longer related to whether someone is partnered). Conditional on prior wealth and contemporaneous income, women saved $3,600 more than men between waves 2 and 4 of SoFIE, and saving increased by $20-140 for each year of age. We also find that individuals who are out of the labour force save more than those that are working and that the self-employed saved a good deal more. This might reflect that these individuals face greater uncertain in their income streams and thus are more likely to save for precautionary reasons. We now find a negative health-saving gradient, with individuals in poor health saving less than those in better health with the same level of prior wealth.

Further examining the variables on income and wealth shows that individuals with higher levels of prior wealth save less than those with less wealth but the same contemporaneous income. The estimated coefficient indicates that for each dollar in prior net worth, an individual saves $0.30 less between waves 2 and 4 of SoFIE. At the same time, we now find that for every dollar earned between wave 2 and 4, $0.24 is saved on average. We also find that individuals who owned either a home or investment property saved $23,400-27,500 more than other individuals with similar levels of income and wealth in wave 2 and income earned between wave 2 and 4, but who did not own a home or investment property (so, individuals who owned a home and an investment property saved nearly $51,000 more than those who owned neither).

Since the impact of house price inflation in creating passive saving has been removed from our estimates, the main role of the property market in the form of saving studied here is through individuals purchasing newer, more expensive, homes and/or the upgrading of existing ones. In particular, it does not appear that individuals who already owned homes, on average, reduced their other saving in response to these unexpected gains (or sold their appreciated properties and used the proceeds for consumption).

In the fourth specification, we examine the relationship between passive saving in property and overall active saving more directly by controlling separately for the passive saving that each individual experienced between waves 2 and 4 of SoFIE. In other words, we control for the average level of property value appreciation in the TLA in which each home owner lives, including individuals who became home owners between the two waves. This has little impact on the other results, except that the positive relationship between being partnered and saving is now stronger and none of the other relationships between wave 2 covariates and saving are now significant. The negative relationship between prior wealth and saving is now stronger, with each dollar in prior wealth associated with $0.46 less current saving. Our main finding is that for every dollar in passive saving an individual had in either their home or investment property, total active saving increased by $2.78-$2.93. In other words, there is a large positive relationship between experiencing capital gains and having active saving in properties and other investments.

One possible reason for this strong relationship between passive saving and active saving is that active saving in property is directly related to passive saving in property because not all capital gains are captured using a TLA housing price index. Furthermore, individuals who experiencing capital gains in their home might upsell to more valuable properties instead of saving in other assets. Hence, in our final specification, we re-run the forth specification but instead examine as our dependent variables non-property active saving.

This reveals a number of interesting findings. First, the relationship between sociodemographic characteristics and non-property active saving is weaker than that between these characteristics and total active saving. This indicates that these characteristics are more strongly related to active saving in property (predominately the purchasing and upgrading of homes) than with other forms of active saving. Second, there is a much weaker relationship between prior net worth and non-property saving, with a dollar increase in net worth in wave 2 now associated with $0.11 less saving. This suggests that the main reason for the strong correlation between prior wealth and total active saving is that individuals with high levels of net worth are more likely to already own homes in wave 2 and hence have less opportunities to increase their active saving between wave 2 and 4. Third, we still find a strong positive relationship between income earned in waves 3 and 4 and saving during this time period, with a dollar increase in income associated with $0.14 higher non-property active saving.

Finally, turning to the coefficients on passive saving, we find that a dollar increase in passive saving in one's home is associated with $0.43 higher active saving in non-property assets, while a dollar increase in passive saving in an investment property is associated with $0.20 (but insignificant) higher active saving in non-property assets. In neither case do we find any evidence that large capital gains are related to individuals having lower active saving. If anything, it appears that these capital gains are used to finance additional saving in other assets. However, further work needs to be done to allow these results to have a causal interpretation as they do not currently account for the fact that individuals who own property are also more likely to have other assets which also likely experienced passive appreciation during this time period.

4. Comparison with Other Saving Measures

The final section of our paper compares our measures of saving calculated in SoFIE to those estimated using alternative measures. This is done more comprehensively in Scobie and Henderson (2009), but is included here as well as we want to assure readers that the data and results present here are unbiased estimates of saving in the household sector of the economy.

4.1. Macro Flow Measures

At the aggregate level, saving can be estimated as the difference between household disposable income and expenditures from the Household Income and Outlay Account (HIOA). The HIOA can be viewed as the household account for the nation or the sum of all individual household accounts.

The HIOA is the only institutional sector account published by Statistics New Zealand. It is labelled 'experimental,' because in the absence of a full suite of institutional sector accounts, there is insufficient confidence in the treatment and allocation of certain transactions between households and the other sectors (Statistics New Zealand, 2006). Despite its 'experimental' status, HIOA is the source of most frequently-cited household saving statistics. For example, the Minister of Finance who introduced KiwiSaver often claimed that "for every dollar households earn, they spend $1.15 on average" (Cullen, 2007). This figure comes from HIOA data. HIOA data are also popular for international comparisons, because they are based on an international standard (System of National Accounts 1993) and because macro stock data are rarely available for most countries.

Two measures of saving can be computed from the HIOA data, the difference lies in the treatment of consumption of fixed capital (ie. depreciation). When depreciation is deducted from household disposable income and saving, the household saving rate drops by 2-4 percentage points. There is a clear downward trend in the household saving rate based on these data. Net saving peaked at 6.2% of disposable income in 1988. It became negative in 1994 and worsened rapidly, reaching -14% in 2006. The average saving rate was -12.5% over 2004-2006 and -2.1% over 1986-2006.

4.2. Micro Flow Measures

At the micro level, saving flows can be calculated using the Household Economic Survey (HES). The HES collects information on household income and expenditure, as well as demographic information on individuals and households. The survey was run annually from 1973 to 1998 (March year) and thereafter three-yearly. Between 2,000 and 3,000 households are interviewed each year. Even though the survey is not designed for measuring saving, it is the only source of micro data on income and expenditure in New Zealand. Therefore, HES data have been widely used for estimating saving flows.[13]

Contrary to HIOA data, HES displays a rising trend in the household saving rate. The net saving rate, where expenditures on durables, health and education are treated as current consumption,

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[13] Some examples are Coleman (2006), Gibson and Scobie (2001), Scobie et al. (2005), Claus and Scobie (2002).

has been positive since 1991.[14] For example, the saving rate was -9.8% in 1985, rising to 0.3% in 1991 and 7.5% in 2001. Estimates of saving based on the HES for 2004-2006 are not available because the survey was not carried out in 2005 and 2006.

4.3. Macro Stock Measure

Aggregate data on household assets and liabilities are constructed by the Reserve Bank of New Zealand (RBNZ). These data are sourced from financial institutions and exclude many components of the household balance sheet such as equity in farms, commercial real estate, unincorporated businesses and unlisted incorporated businesses, consumer durables and overseas assets.

The saving rate can be calculated as the change in net wealth relative to household disposable income. These data also show a highly positve saving rate. The only record of dissaving was for 1998, when a saving rate of -3% was observed. The average saving rate for 2004-2006 was 66.5% per annum. Between September 2004 and September 2006, the national House Price Index increased by 25.1%, thus even when housing capital gains are removed, the average saving rate derived from RBNZ data exceed 50% per year between 2004 and 2006.

4.4. Comparison

Data from SoFIE suggest that, on average, people *actively* saved $12,600 between 2004 and 2006. Average gross income for the period was $35,700 per person per year, so the estimated average saving rate was 18%. The saving rate as a percentage of disposable income is higher at 23%. Even the most conservative measure, which excludes saving in the form of properties and durables, indicates that average saving was 14% of gross income.

Table 11: Household Saving Rate over 2004-2006

Measurement approach	Data source	Saving rate	Note
Macro flow	HIOA	-12.5%	Net (excluding depreciation)
Micro flow	HES		Not available, see text for detail
Macro stock	RBNZ	66.5%	Including capital gains in properties
Micro stock	SoFIE	23.0%	Excluding capital gains in properties

Note: Figures are annual averages. The figure for SoFIE is based on gross income, while HIOA and RBNZ figures are based on disposable income.

Table 11 reports the average saving rate between 2004 and 2006 measured in the three data sources discussed above. When housing capital gains are removed from the RBNZ measure and disposable income is used for the SoFIE measure, these two saving measures are broadly similar. An estimate for the HES is not available for this time period, but the saving rate based on these data was 7.5% in 2001 and has been positive and rising since 1991. Hence, the large negative saving rate from HIOA data is not consistent with the saving rate calculated using micro data or using the macro stock approach suggesting that this measure is the least reliable.

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[14] Expenses on health and education are arguably investments in human capital, hence treating them as consumption produces very conservative saving estimates. Outlays on durables are similar to the cost of depreciation in HIOA data. This is because in the long run total acquisition costs of durables should be the same as total depreciation costs. If purchases are evenly distributed across time, then total acquisition costs and total depreciation costs for each year should also be equal. Hence, the HES 'net' saving rate is conceptually similar to the HIOA 'net' saving rate.

Le (2007) discusses the different biases that impact each saving rate measure. Here, we focus our discussion on the weakness in measuring saving using the HIOA data. While there is often a presumption that survey data is potentially biased by non-sampling error, such as respondents having a tendency to under-report income (Ravallion, 2003), income and expenditure are also likely to be underestimated by aggregate data due to difficulties in accounting for the 'informal' economy. Deaton (2005) also notes that there is generally no reason why national accounts should be favoured over surveys. While surveys can be faulty, national accounts estimates are also subject to many errors since they typically aggregate up information from a wdie variety of sources each subject to some degree of measurement error.

One important issue affecting the quality of the HIOA data is the difficulty in separately economic activity in the household and business sectors at the aggregate level. For example, Bascand et al. (2006) discusses how unincorporated enterprises should belong to the business sector, but in New Zealand their net income is transferred to the owners and hence appear in the household sector income and saving. Another example is in balance sheet data, Here, household liabilities are overstated because some households borrow against their home for use in small businesses. Thorp and Ung (2000) estimate that 10-20% of household debt in New Zealand falls in this category. The HIOA saving statistics also suffer from the difficulties in estimating depreciation. These conceptual and practical problems add up to aggravate measurement error issues. HIOA draws on various surveys, so error in the data is inevitable. Furthermore, because of the complex nature of the creation of this data there is little transparency and hence no ability to investigate the various assumptions underlying the data or adjust the data to say better represent the household sector.

5. Conclusions and Policy Implications

This paper reports estimates of the level, composition and distribution of net worth in 2004 and 2006 based on data on assets and liabilities from waves 2 and 4 of the longitudinal Survey of Family, Income and Employment (SoFIE). Net worth averaged $223,000 per adult in 2006, a third of which was in owner-occupied homes. Wealth varied considerably across age-groups, gender, partnering status and ethnicity. The paper also estimates saving as the change in net wealth for each individual between the two waves. We found average saving to be $29,900 per adult over the two years. Excluding housing capital gains, average saving was $12,600, or 18% of gross income per year. The most conservative measure, which excluded saving in the form of properties and durables, was $9,700.

On the other hand, the indirectly derived HIOAs indicate (net) household saving was -12.5% per year over the same period. Policymakers have typically relied on the HIOA figure to measure saving and thus have expressed concern over the lack of household saving in New Zealand. Our findings suggest that these concerns are strongly overstated. Further supporting this conclusion, our results using unit record data from SoFIE are consistent with estimates of saving calculated from changes in aggregate wealth stocks by RBNZ and by using micro data on income and expenditures from the Household Economic Survey (HES).

Policies such as the State Sector Retirement Savings Scheme (SSRSS) and KiwiSaver, and the introduction of other tax-favoured savings vehicles, including Portfolio Investment Entities (PIEs), were developed by policymakers because of the belief that New Zealand currently has

negative levels of household saving. However, our results indicate that, on average, people were already saving one-eighth to one-sixth of their income prior to the introduction of KiwiSaver and PIEs.[15] While we do not attempt to ascertain whether the level of household saving we estimate is 'optimal', the fact that actual saving appears to be strongly positive while policymakers have (wrongly) perceived it to be negative likely undermines some of the rationale for why these distortionary pro-savings policies were needed.

Clear evidence is needed in the area of public policy settings towards household savings because decisions based on incorrect evidence can be very costly for individuals and society. For example, direct government expenditure on KiwiSaver and foregone tax-revenue on income earned in SSRSS, KiwiSaver and PIEs comes at the cost of other publicly provided goods and services. Given that the government operating balance, which was strongly positive until 2008 ($2.38 billion in 2008), was -$10.5 billion in 2009 and is forecast to remain negative for a decade (Treasury, 2009) and that larger than anticipated KiwiSaver costs are an important contributor to these anticipated deficits (Treasury, 2008, Table 2.5, p. 30), these pro-savings policies may be at best unnecessary and at worst counterproductive for promoting future economic growth.

It has also been argued that New Zealanders hold too high of a proportion of their wealth in property and that the property boom that was occurring in the 2000s potentially distorted saving decisions. In particular, it is believed by some that a potential negative side-effect of this boom was that high levels of passive saving may have crowd out active saving. For example, Hull (2003) and De Veirman and Dunstan (2008) both report evidence of a negative correlation between passive and active saving and argue that this evidence is consistent with the "target saver" theory where people save to achieve a target dollar amount and hence different forms of saving are substitutes for one another.

However, our preliminary results using SoFIE provide no support for this hypothesis. Not only do individuals with higher passive saving between 2004 and 2006 have higher total active saving, but they also have higher active non-property saving. While further work needs to be done to allow these results to have a causal interpretion, they strongly suggest that passive saving from the property boom did not crowd out other forms of saving. In other words, journalistic stereotypes about irresponsible New Zealanders cashing in on their rising house values to go and buy big screen TVs appear have little basis in statistical fact.[16] Furthermore, an international comparison shows that New Zealanders hold a similar proportion of their net worth in property as do individuals in other OECD countries.

In economic downturns, as in the past two years, policies that distort saving decisions actually work against the desire to stimulate consumption. In particular, while KiwiSaver is voluntary, once enrolled, individuals cannot withdraw contributions and can only take contribution holidays under restricted circumstances. Including 'lock-in' devices in KiwiSaver was done intentionally in response to arguments from behavioural economics about people lacking commitment to save. To the extent that such lock-in makes it harder for households in

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[15] Wave 4 finished in September 2006, while KiwiSaver came into force in July 2007.

[16] From the microeconomic point of view, increasing ownership of big-screen TVs is more plausibly attributed to the law of demand – dramatic falls in real prices stimulate consumption. Hence, there is no need for recourse to macroeconomic stories about consuming rising equity during a house price boom to explain this particular phenomenon.

future to access their savings in times of need there may be a considerable welfare cost to this misreading of the evidence about lack of household saving in New Zealand.

The saving estimates in this study should be useful for further research on the causes and consequences of saving. For example, future studies could examine how changes in circumstances influence people's saving behaviour. They can also be used for analyses of saving adequacy, where these 'actual' saving rates can be compared with 'required' saving rates to assess if an individual is saving 'adequately'.[17] Estimating household saving using the micro stock approach requires longitudinal data on assets and liabilities, which are available in few countries. Our results thus are also a useful addition to the existing evidence on worldwide saving rates and hopefully will help inform future debates on whether New Zealand has adequate saving and help promote evidence based policymaking.

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[17] In a previous study of saving adequacy, Le et al. (2009) imputed 'actual' saving rates because estimates of those rates were not available.

6. References

Bascand, Geoff, Jeff Cope and Diane Ramsay (2006). Selected issues in the measurement of New Zealand's saving(s). Paper presented at Workshop on 'Housing, savings, and the household balance sheet' at the Reserve Bank of New Zealand, Wellington, 14 November.

Bollard, Allan (2005). Housing debt, inflation and the exchange rate. Address to the Employers and Manufacturers Association (Northern) AGM, Wellington, 2 November.

Bollard, Alan (2009). Economic recovery. An address to the Hawke's Bay Chamber of Commerce, 14 July.

Carter, Kristie N, Matt Cronin, Tony Blakely, Michael Hayward and Ken Richardson (2009). Cohort profile: Survey of Families, Income and Employment (SoFIE) and Health Extension (SoFIE-health). *International Journal of Epidemiology*, 1–7.

Claus, Iris and Grant Scobie (2002). Saving in New Zealand: measurements and trends. Working Paper 02/02, New Zealand Treasury.

Coleman, Andrew (2006). Income and saving in New Zealand: an age cohort analysis. Paper presented at Workshop on 'Housing, savings, and the household balance sheet' at the Reserve Bank of New Zealand, Wellington, 14 November.

Cullen, Michael (2007). Budget gives $40 a week to support saving. http://www.beehive.govt.nz. Budget speech (May 17).

De Veirman, Emmanuel and Ashley Dunstan (2008). How do housing wealth, financial wealth and consumption interact? Evidence from New Zealand. Discussion Paper DP2008/05, Reserve Bank of New Zealand.

Deaton, Angus (2005). Measuring poverty in a growing world (or measuring growth in a poor world). *Review of Economics and Statistics*, 87(1):1–19.

Dynan, K. E., Skinner, J., and Zeldes, S. P. (2004). Do the rich save more? *Journal of Political Economy*, 112(2):397–444.

Gibson, John and Grant Scobie (2001). A cohort analysis of household income, consumption and saving. *New Zealand Economic Papers*, 35(2):196–217.

Groves, R. M. and Couper, M. P. (1998). *Nonresponse in household interview surveys*. Wiley, New York.

Hargreaves, David (2009). Everything's on the house. *The Independent*, May 21.

Henderson, Katherine and Grant Scobie (2009). Household Debt in New Zealand. Working Paper 09/03, New Zealand Treasury.

Hull, Leslie (2003). Financial deregulation and household indebtedness. Discussion Paper DP2003/01, Reserve Bank of New Zealand.

Le, Trinh (2007). Does New Zealand have a household saving crisis? Working paper 2007/1, New Zealand Institue of Economic Research.

Le, Trinh, Grant Scobie and John Gibson (2009). Are kiwis saving enough for retirement? *New Zealand Economic Papers*, 43(1): 3-19.

Mercer New Zealand Limited (2009). Securing retirement incomes: Risks, challenges and opportunties with New Zealand's retirement income system.

Modigliani, Franco and Richard Brumberg (1954). Utility analysis and the consumption function: An interpretation of cross-section data. In Kenneth K. Kurihara (ed.), *Post-Keynesian Economics*, Rutgers University Press.

Ravallion, Martin (2003). Measuring aggregate welfare in developing countries: how well do national accounts and surveys agree? *Review of Economics and Statistics*, 85(3):645–652.

Scobie, Grant and Katherine Henderson (2009). Saving Rates of New Zealanders: A Net Wealth Approach. Working Paper 09/04, New Zealand Treasury.

Scobie, Grant, John Gibson and Trinh Le (2005). *Household Wealth in New Zealand*. Institute of Policy Studies, Wellington.

Statistics New Zealand (2006). National Accounts, year ended March 2006.

Statistics New Zealand (2008). Survey of Family, Income and Employment: Wave Four – September 2006.

Tax Working Group (2010). A tax system for New Zealand's future. http://www.victoria.ac.nz/sacl/cagtr/twg/Report.aspx

The Treasury (2007). A synopsis of theory, evidence and recent Treasury analysis on saving. Treasury Report, T2007/654.

The Treasury (2008). Pre-election economic and fiscal update.

The Treasury (2009). Half year economic and fiscal update.

Thorp, Clive and Bun Ung (2000). Trends in household assets and liabilities since 1978. *Reserve Bank of New Zealand Bulletin*, 63(2):17–37.

Whitehead, John (2007). Better saved than sorry: the Treasury's position on New Zealand's saving performance. http://www.treasury.govt.nz/publications/media-speeches/speeches/savingperformance. Speech to Chapman Tripp, Wellington, 13 August.

Whitehead, John (2010). Raising living standards: the role of tax policy. http://www.treasury.govt.nz/publications/media-speeches/speeches/livingstandardstaxpolicy. Speech to New Zealand Institute of Management, 31 March.

Appendix A - Data Description

A.1 The survey

The primary data source used in this study is the Survey of Family, Income and Employment (SoFIE), a longitudinal survey which started in October 2002 and will run annually for eight years (hence 8 'waves' of data). SoFIE collects data on levels, sources and changes in income for New Zealand individuals and families. It also reports on major influences on income, such as employment and education experiences, household and family status and changes, demographic factors and health status. Every two years in even number waves, information on assets and liabilities is collected to monitor net worth and saving. A health module is included instead in waves 3, 5 and 7.

The target longitudinal population for SoFIE is the usually resident population of New Zealand living in permanent, private dwellings on the main islands in the North and South Islands, including Waiheke Island as at the first wave of the panel (Statistics New Zealand, 2008). The survey covers over 29,000 individuals (22,000 aged 15 or over, hereafter 'adults' for short) from more than 11,500 households. The longitudinal sample represents 3.94 million people in the population.[18]

The main strength of SoFIE is the large representative sample of the population living in private residences. However, this is a potential limitation as people living in non-private residences are not included in the initial sample and these people may have different saving patterns from the rest of the population.

A.2 The Sample

The data on assets and liabilities used in this study come from wave 2 (which ran from 1 October 2003 to 30 September 2004) and wave 4 (1 October 2005 to 30 September 2006). These data are only collected from adults.

Calculating saving using a stock approach requires observation of assets and liabilities at two points in time. While an attempt is made to interview all original survey members (OSMs) in each wave, if a household is say created in wave 2 when an OSM partners with an outsider, but then dissolves in wave 3, the outsider will only be interviewed in wave 2, hence making it impossible to follow households over time. Hence, since households are not tracked longitudinally, our unit of analysis in this paper is the individual.[19]

Since individuals who join OSM households or form new household with OSMs are interviewed in all waves in which they remain in these household, SoFIE can be used to produce cross-sectional estimates that are representative of the New Zealand population in any particular wave. However, non-OSMs are only interviewed while they reside in the same households as OSMs and thus cannot be followed longitudinally. Reflecting this, Statistics New Zealand provides researchers with two sets of weighting variables for each household, a longitudinal weight and a cross-sectional weight.[20] Weights are adjusted each wave to account for changes in

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[18] Carter et al (2009) provide a more detailed description about the survey.

[19] The term 'household' saving is used to reflect the fact that this saving is made in the household sector, as opposed to the business or government sectors.

[20] Individuals in the same household have the same weight. Each weight variable has 100 replicate values, from which we compute an average weight value.

the sample (eg. attrition or the additions of respondents due to old household splitting). Only 75% of OSMs remain in the sample in wave 4. For each wave, the longitudinal weight is only positive for OSMs. Hence, the extent of zero longitudinal weight increases over time. In wave 4, 14% of all eligible respondents carry zero longitudinal weights.

In this paper, we use cross-sectional weights for the net worth analysis and wave 4 longitudinal weights for the saving analysis. This is because net worth can be analysed as snapshots while saving is a temporal measure. Our longitudinal sample includes over 16,300 OSMs who remained in the survey in waves 2 and 4 (see Appendix Table 1).

Appendix Table 1: Sample Size

Cross-sectional	Wave 2	Wave 4
Sample size	21,274	19,943
Sample with positive weight	19,457	18,270
Represented population	3,113,700	3,214,500
Longitudinal		
Sample size	16,809	
Sample with OSMs only	16,335	
Represented population	2,780,400	

Note: These samples cover ages 15+ only.

Descriptive statistics for this sample is presented in Appendix Table 2. Longitudinal sample respondents are slightly more likely to be partnered, Pakeha and employed. Nevertheless, on average the demographic characteristics of the two samples are broadly similar.

A.3 Assumptions

The data on assets and liabilities contain several limitations that affect the measurement of individual net worth. We make the following assumptions.

• Individuals were asked for the total value of each property and the number of other people who also own that property. We assume equal ownership shares among owners. For example, if a house worth $200,000 is owned by two people, each person is recorded as having a $100,000 asset in the house.

• The total value of all mortgages is known, but there is no information on the number of mortgages or to which property the mortgages correspond. Since investment properties usually have a high loan-to-value ratio (for tax benefits), we allocate mortgage to investment properties up to their asset value, with any remaining mortgage value then allocated to the owner-occupied property.

• The values for properties are based on self-reported rateable values (RVs). Some RVs date as far back as 1990.[21] We bring all RVs to current prices (September 2004 prices for wave 2 and September 2006 prices for wave 4) using the House Price Index for each Territorial Local Authority (TLA) produced by Quotable Value New Zealand.

• Due to wording errors in the questionnaire, there is evidence that the reported participation rates in pension schemes and values of schemes are markedly lower than indicated by other

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[21] Even though valuation is now conducted every three years, 1.62% of the properties in the data reported RVs that were at least 4 years old.

sources. Since the errors are complex and difficult to remedy, we accept the data as is, acknowledging that these errors understate total net worth by an estimated 2%.

Appendix B – Supplemental Descriptive Tables

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Appendix Table 2: Descriptive Statistics

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	Wave 2 sample	Longitudinal sample
Average age (years)	43.4	43.8
Age group		
15-24	18.2	17.0
25-34	17.5	16.9
35-44	20.0	20.5
45-54	17.1	17.9
55-64	12.7	13.3
65-74	8.2	8.4
75+	6.4	6.0
Male	48.4	47.8
Partnered	61.7	64.2
Prioritised ethnicity		
Pakeha	77.8	79.3
Maori	10.2	9.8
Pacific Islander	4.1	3.7
Asian	6.1	5.5
Other	1.8	1.7
Migrant status		
Born in NZ	78.1	79.3
In NZ 0-4 years	5.2	4.3
In NZ 5+ years	15.8	15.6
Years in NZ unknown	0.8	0.8
Education		
No qualifications	23.3	22.9
School qualifications	15.5	15.3
Post-school qualifications	47.0	47.9
University degree	14.1	14.0
Labour market status		
Employed	65.8	66.7
Unemployed	2.0	1.8
Not in labour force	32.2	31.5

Note: Figures are the percent of the population in each category. Variables refer to respondents' characteristics as of wave 2.

Appendix Table 3: Ownership of Assets and Liabilities

	2004 (wave 2)	2006 (wave 4)
Home	49.1	46.9
Investment property	12.2	11.3
Workplace pension	5.9	7.0
Personal pension	6.1	5.4
Bank accounts	76.0	73.7
Life insurance	15.1	12.6
Mutual funds	7.6	6.7
Other financial assets	20.0	18.9
Farms and businesses	15.0	15.4
Trusts	2.5	1.5
Vehicles	73.4	74.5
Leisure equipment	42.0	41.6
Household items	98.2	99.0
Other assets	13.7	13.4
Any asset	**99.6**	**99.8**
Mortgage	31.3	31.2
Bank accounts	9.9	7.9
Credit cards	40.6	41.6
Student loans	10.6	11.4
Other liabilities	26.7	24.4
Any liability		
	67.9	**68.1**

Note: Figures are the percent of population having each type of asset/ liability

Appendix Table 4: Means of Assets and Liabilities: Cross-Sectional and Longitudinal Samples Compared

	2004, cross-sectional	2006, cross-sectional	2004, longitudinal	2006, longitudinal
Home	85,764	103,838	89,656	110,488
Investment property	20,948	29,075	21,745	30,823
Workplace pension	2,490	3,167	2,930	3,361
Personal pension	1,411	1,521	1,387	1,589
Bank accounts	9,783	11,163	9,751	12,218
Life insurance	4,533	4,271	4,808	4,327
Mutual funds	4,240	4,571	4,336	4,838
Other financial assets	5,530	6,915	5,901	7,456
Farms and businesses	37,816	49,548	40,294	52,245
Trusts	6,717	5,024	7,291	5,538
Vehicles	6,512	6,529	6,620	6,820
Leisure equipment	2,060	2,346	2,164	2,452
Household items	26,446	29,727	27,486	31,430
Other assets	1,277	1,610	1,315	1,645
Total assets	215,528	259,305	225,683	275,231
Mortgage	24,662	29,793	25,740	30,683
Bank accounts	1,033	924	1,156	1,057
Credit cards	811	825	817	848
Student loans	1,423	1,661	1,305	1,642
Other liabilities	3,407	3,080	3,364	3,267
Total liabilities	31,336	36,283	32,382	37,497
Net worth	85,764	103,838	193,301	237,734
Sample size	21,274	19,943	16,335	16,335
Population ('000)	3,113.7	3,214.5	2,780.4	2,780.4

Note: All values are in $ current prices

Appendix C - How Reliable are Saving Estimates from SoFIE?

There are a number of potential reasons why saving estimates from SoFIE might not be representative of the true level of saving in the New Zealand population. First, SoFIE only surveys people in private residences and institutional residents (such as those living in rest homes) tend to be less healthy and older, and thus are more likely to be dissavers. Second, as shown in Appendix Table 4, the longitudinal sample which is used to estimate saving over-represents households which tend to have higher saving. While these two reasons suggest that SoFIE might overstate saving in the full population, as a household survey, it is likely to under-represent the wealthiest members of society, leading to a potential downward bias in measures of saving (Dynan et al., 2004). Thus, the overall effect of the sampling biases is unclear.

Another potential issue is the revaluation of assets that is done to separately identify active and passive saving. Revaluation of housing assets is done using the HPI for each TLA. Since the HPI tends to understate improvement in housing quality, this calculation overstates passive saving and understates active saving. While the use of the HPI by TLA should not affect the average results, individual results are subject to substantial measurement error since not all properties in a TLA change value at the rate indicated by the HPI for that TLA. Also, we cannot revalue other assets because asset specific indexes are unavailable for these asset classes. In a period of strong economic growth, asset revaluation tends to be positive, so failure to exclude this component exaggerates active saving.[22] Again, the combined effect of all of the above factors is ambiguous.

Appendix D - Note on Calculating Saving Rates

Let S be saving, Y be income, s=S/Y be saving rate, and $\overline{}$ denote averages. Some values of S and Y could cause s to have extreme values which would unduly affect the average.

For example, in the example contained in Appendix Table 5 below, person 1 has Y=-1, S=-100, s = 10,000%. Across the population, $\overline{s}$ =1,675%. This is unreasonable, given that total saving in the population is lower than total income. A more accurate measure of the saving is $\overline{S}/\overline{Y} = 18\%$ (or equivalently $\sum S / \sum Y$, where $\sum$ denotes total). This measure is consistent with the saving rate derived from aggregate data.

Appendix Table 5: Calculating Average Saving Rates

	Saving ($)	Income ($)	Saving rate
Person 1	-100	-1	10,000%
Person 2	-50	1	-5,000%
Person 3	500	2,000	25%
Average	117	667	1,675%
$\overline{S}/\overline{Y}$	18%		

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[22] During 2004-2006, New Zealand's real GDP averaged 2.7% per year.

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