Saving for Retirement: New Evidence for New Zealand

Grant Scobie, John Gibson and Trinh Le

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AUTHORS

Grant M Scobie
The Treasury
PO Box 3724
Wellington
NEW ZEALAND

Email grant.scobie@treasury.govt.nz
Telephone +64 4 471-5005
Fax +64 4 473-0982

John Gibson
Department of Economics
University of Waikato
Private Bag
Hamilton
New Zealand

Email jkgibson@waikato.ac.nz
Telephone 64 7 838-4466
Fax 64 7 838-4331

Trinh Le
Department of Economics
University of Canterbury
Christchurch
NEW ZEALAND

Email trinh.le@canterbury.ac.nz
Telephone +64 3 364-2987 ext 7622

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N Z T R E A S U R Y

New Zealand Treasury
PO Box 3724
Wellington 6008
NEW ZEALAND

Email information@treasury.govt.nz

Telephone 64-4-472 2733

Website www.treasury.govt.nz

Abstract

There is an on-going debate about the level of savings in New Zealand. A fundamental question pervades the debate: namely, are we saving enough? This question arises at two levels: for the economy as a whole and for individual households. At the macroeconomic level, the concern is whether our aggregate level of saving as a nation is "adequate". At the micro level, the same question arises in relation to the saving for retirement: are New Zealanders adequately preparing for retirement? This paper addresses the second of these questions. It develops a model of retirement wealth accumulation based on the findings from the Household Savings Survey. The evidence we present, tentative though it is, does suggest that there may not be widespread under-saving for retirement. The results are consistent with overseas findings.

We have chosen conservative assumptions: excluding equity in the primary residence from estimates of retirement wealth, providing for full survivor benefits and assuming that consumption spending would be maintained at pre-retirement levels throughout retirement rather than the typical pattern of falling consumption spending as people age.

It must be stressed that there is limited information about the rate at which individuals are actually saving, making it difficult to establish a solid benchmark against which to measure adequacy. We have used the Household Economic Survey as a basis for estimating actual saving rates for different age groups. The estimates are affected by definitions of consumption, in particular how the expenditure on durables is treated. We conduct sensitivity tests where durables are both included and excluded as an item of current consumption. Typically we find that the actual saving rates do in fact exceed the rates needed for maintaining living standards in retirement. This reinforces our tentative conclusion that there is no apparent gross under-saving for retirement especially in the older age cohorts.

The results apply to broad groups within which there will be a distribution of people some of whom would likely not be saving at a rate to maintain their real standard of living in retirement. The results in no way imply that every individual is saving "adequately".

While we present results for younger age cohorts, the fact they still have many years to retirement implies that estimates made today inevitably carry much wider margins of error. More unequivocal results must await better data and methodologies; improved measures of household saving levels, and the application of micro-simulation models which are more suited to capturing uncertainty about health status, employment, incomes and life expectancies will improve our understanding of household saving behaviour.

New Zealand superannuation (NZS) provides the floor under the income for the lowest 40 percent of the income distribution, and for many in this group additional saving for retirement would not be a preferred strategy, assuming they were to be aiming to smooth their consumption over the life cycle. In other words our finding that there is no strong evidence of widespread under-saving is not inconsistent with a significant share of individuals not saving for retirement. This follows from the critical role played by NZS in providing those on low incomes with a standard of living in retirement which matched or exceeds that which their pre-retirement incomes can support. For these people the issue is the level of income rather than their level of saving.

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Saving for Retirement: New Evidence for New Zealand

1 Introduction

The topic of saving continues to demand widespread attention. At the aggregate or economy wide level there are questions about the rate of saving and its implications for investment, long term growth and the sustainability of the external balances a country has with the rest of the world. At the household level there are concerns about the ability of households to save for retirement.[1] These concerns have become heightened globally, as populations age (Heller, 2003).

This paper is concerned solely with the second of these questions: the accumulation of retirement wealth by New Zealand households. Our analysis is based on the findings of the Household Savings Survey (HSS). This survey, conducted in 2001 is the first comprehensive view of the assets and liabilities of New Zealand households, and provides detailed estimates of the net worth of households. We can estimate the amount that people had accumulated by the time of the survey. As this survey is for one year only it does not provide information on the rate of saving as such.[2] However, based on this information we can make an initial attempt to address the question: are New Zealanders adequately preparing for retirement? Given the particular criterion of adequacy that we adopt, we find little evidence of widespread under-saving for retirement. We emphasise the important role the New Zealand Superannuation plays in placing a floor under the incomes of retirees. As NZS represents such a significant part of the retirement wealth for some 40% of the population, the life cycle approach we adopt in this paper predicts that a significant proportion of this group, typically in the lower quintiles of the income distribution, would not be expected to reduce their present consumption in order to save further for their retirement. In this sense, the finding from surveys that many New Zealanders are not saving for retirement is unsurprising.

[1] See The Treasury (2003).

[2] Information on the assets and liabilities of individuals will be collected in future every two years in the Survey of Family Income and Employment (SOFIE). The sampling for SOFIE will cover all individuals in the household. In the first instance this will mean that the estimates of net worth from Wave 2 of SOFIE will not be strictly comparable to those from the HSS which sampled individuals within a selected household. However once Wave 4 of SOFIE is released, it should be possible to form more accurate estimates of savings rates.

2 Adequacy of retirement saving

2.1 Introduction

To address this question of whether or not individuals are saving adequately for retirement we build on the results of the Household Saving Survey.[3] The survey covered those over 18 years old living in private dwellings and usually resident in New Zealand.[4] The survey population covered about 98% of the resident adult population. For the core sample a total of 6,600 households were approached. One person from those qualifying in the household was chosen at random, and information was collected from and about that individual. In the case they had a partner, information was collected for the couple. In order to improve the accuracy of estimates for Maori, a booster sample was used. In total the response rate was 74% and the final number in the sample was 5,374 households. There were 2,392 individual interviews and 2,982 for couples. It is important to stress that the term household refers to the unit of selection. The results are for individuals (living as individuals or partnered) and not for households or families.

In the next section (2.2) we expand on the concept of adequacy. We then outline the model that we use (2.3) and present the results from the survey (2.4) and the modelling of retirement incomes (2.5). A comparison with the actual saving rates is given in Section 2.6 while Section 2.7 provides a comparison with some international estimates. Conclusions are presented in Section 3.

2.2 What is meant by adequacy?

Any attempt to assess how adequately New Zealanders are preparing for retirement through saving immediately must confront the question: how is "adequate" to be measured? By what criterion would we assess savings and the associated level of wealth accumulation for retirement to be adequate? What is seen as adequate may differ whether we have an individual or a collective perspective. From a public policy perspective we might focus on adequacy as it applies to the average of some group in the population; eg, would, on average, those aged between 55-60 with no dependants and having accumulated retirement wealth of $20,000 and having current income of $25,000 be considered to have saved "adequately"? Or should we recognise that within each group there will be wide variation and conclude that adequacy can only be addressed at the individual level? In that case our measure of adequacy might be say, that at least 90 percent of the group have retirement wealth deemed to be adequate; or perhaps 100%?

There is a range of measures that one might adopt to measure adequacy. They include:

(i) Post-retirement income as a proportion of pre-retirement income (typically referred to as a replacement rate);

(ii) Income in retirement should be at least at a level deemed necessary to attain an acceptable minimum standard of living (an absolute poverty line approach);

(iii) Income in retirement should be no lower than say 60 percent of the median income of some reference group of retirees (a relative poverty line approach);

[3] No attempt is made to present a full range of results from this survey. For further details see Statistics New Zealand (2002a and b) and Gibson and Scobie (2003).

[4] Those living in non-private dwellings such as institutions, motels, rest homes or hostels were excluded, as were those on offshore islands (except Waiheke Island).

(iv) Incomes in retirement should be at least equal to some fraction of the average pre-retirement incomes of the current working population (a variant of a relative measure);

(v) Incomes in retirement should be at a level that people can sustain their pre-retirement level of consumption thereby avoiding a drop in their living standards (a consumption smoothing approach);

(vi) Incomes in retirement should be such that it permits an individual to have the same marginal utility of consumption over time (ie, the last unit of consumption has the same value to the individual before and after retirement).

There are undoubtedly other measures that could be proposed. For example once uncertainty is allowed, then we can ask whether an "adequate" retirement income is one which would be capable of covering any possible eventuality, such as unanticipated health expenses, or extended life expectancy. Or should it cover say 80% of the expected costs of such occurrences? In the face of planning under uncertainty, one would want to consider the role of insurance markets to reduce the costs of uncertainty. In the absence of insurance instruments (either a private policy or a social programme that addresses emergency needs or catastrophic events), one might well expect the level of precautionary saving to be higher. In short, the level of uncertainty, an individual's attitude to risk, the cultural patterns of extended family support, the labour force participation patterns of the retirees and the scope of private markets and social insurance would all shape what we might consider as an "adequate" level of retirement wealth. Adequacy cannot be determined without reference to the social and economic context.

Clearly, preferences differ widely and that factor alone can help explain a considerable amount of the variation in retirement accumulation across individuals. The fact that wealth is typically much more unevenly distributed than income is solid testimony to the fact that individuals, similar in all major observable aspects, will choose to accumulate different amounts, quite apart from the influence of any windfall gains or losses. Venti and Wise (2000) based on an analysis of households in the USA report:

> …"at all levels of lifetime earnings there is an enormous dispersion in the accumulated wealth of families approaching retirement. We find that very little of this dispersion can be explained by chance differences in individual circumstances. We conclude that the bulk of the dispersion must be attributed to differences in the amount that households choose to save. The differences in saving choices among households with similar lifetime earnings lead to vastly different levels of asset accumulation by the time retirement age approaches".

Some individuals will have a more risk averse attitude than others, while some will attach different probabilities to possible adverse events. These differences will influence the level of precautionary savings that we observe across individuals. Both the actual level of saving and the "adequate" level of saving will be the resolution of a complex set of factors involving the preferences and perceptions of individuals together with their health and capabilities, the public policies that are in place, and opportunities in labour markets. Any consideration of adequacy cannot be divorced from these influences.

We have chosen to approach the matter of retirement income and saving by asking what level of post-retirement income could individuals expect to have based on their current and projected wealth? We estimate the saving rates and the replacement rates that are implied if individuals attempt to sustain an equal level of consumption before and after retirement; ie, we invoke *consumption smoothing as the aim of retirement saving*. This approach has theoretical appeal and has been widely used in the literature. In addition

we analyse the distribution of the predicted retirement incomes and calculate how many people would have incomes in retirement below 60% of the median income of that cohort (ie, a relative poverty line approach).

Housing wealth represents some particular challenges. In the first place we assume no real capital appreciation in housing values; they are simply assumed to remain constant in real terms. This is a conservative assumption that could understate projected retirement wealth. A somewhat typical pattern is for those owning a primary residence to retain this, partly as a precautionary investment and partly as a potential bequest. In such cases it would not be appropriate to include the net value of housing assets as part of retirement wealth and thereby available to be converted into an annuity along with other accumulated assets. In the empirical analysis we have excluded entirely the value of net worth in housing as a source of retirement income.[5]

2.3 The basic model: jointly determining replacement and saving rates[6]

In this section we develop a basic model built on the life cycle approach to consumption and saving.[7] This underpins our use of consumption smoothing as a basis for assessing accuracy. In the absence of uncertainty, the life cycle saving and consumption patterns can be simply illustrated as in Figure 1. Income rises through working life reaching a peak (typically at around 55 years) and declining somewhat in later life. In this simple model the household chooses a level of consumption that can be financed from income over the working life, and then from savings during retirement. This implies (ignoring interest for the moment) that savings (the area ABC) is equal to consumption needs in retirement (depicted as the rectangle CDEF).

As shown, consumption typically exceeds income during the early years (eg during tertiary education) implying the need to finance consumption by borrowing against future income. This simple life cycle pattern of income consumption and savings is modified when we allow for uncertainty. As shown by Moore and Mitchell (1997) when life expectancy is uncertain consumption will tend to rise until retirement and fall subsequently, rather than remaining uniform throughout (see Figure 1, part (b)). However, the basic pattern of earnings and savings reaching a peak prior to retirement and wealth decumulation throughout retirement to finance consumption is left unaltered.[8]

In the case of complete certainty a person may or may not plan to leave a bequest. However, in the face of uncertainty, some precautionary savings may be accumulated, which if not needed (because of lower than expected costs or premature death) may, by default, lead to bequests. Conversely, if accumulated savings prove inadequate due to

[5] For details of cases allowing for differing amounts of housing equity to enter the estimation of retirement wealth see Scobie and Gibson (2003).

[6] The approach adopted follows that of Moore and Mitchell (1997).

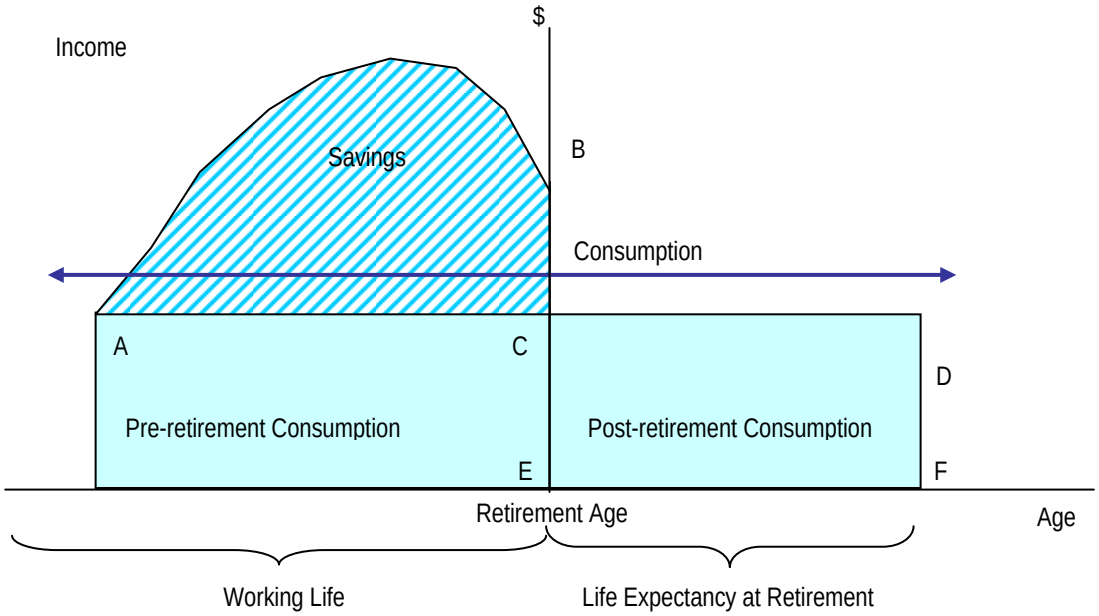
[7] Studies such as Bernheim (1992), Engen, Gale and Uccello (2004) and Scholz, Seshadri and Khitatrakun (2004) use a formal optimisation approach based on maximising consumer utility subject to an intertemporal budget constraint. We follow Moore and Mitchell who note in relation to their choice of a simpler framework: "From a theoretical perspective, this is less appealing than a true life cycle-dynamic programming approach as it ignores utility theory and behavioural responses to uncertainty. However it is a popular model among retirement planning practioners and can be seen as a relatively tractable approximation or rule of thumb to the life cycle model". For a comparison of a utility maximising approach and the model used here see Scobie and Gibson (2003) who find that the results from both models are remarkably similar.

[8] For patterns of life-time income, consumption and savings derived from the Household Economic Survey see Gibson and Scobie (2001). Their results show a pattern of lifetime consumption which is captured by the stylised line ACD in Figure 1(b).

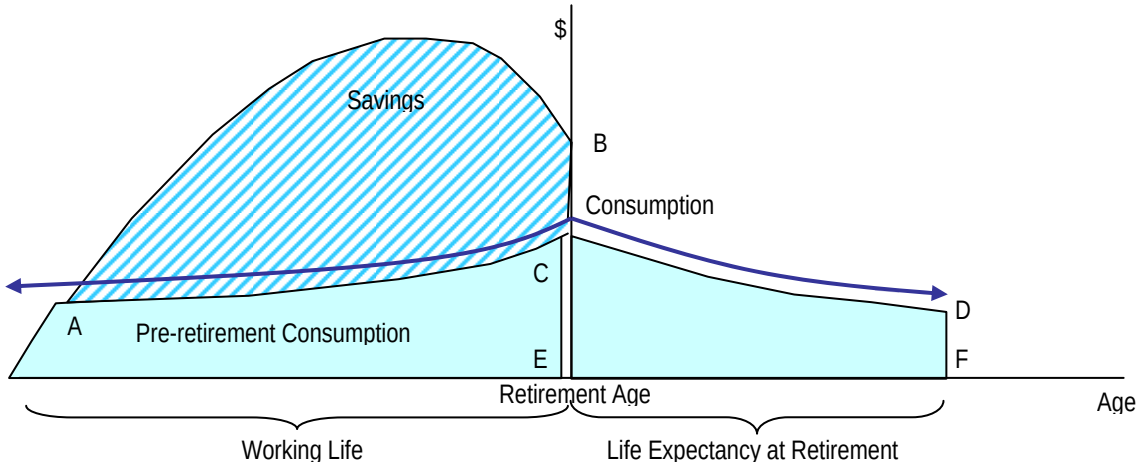
unforeseen events, some other source of income in retirement would be required (typically either from family, the state or charitable agencies).

Figure 1 – A simple life-cycle model of income, savings and consumption

(a) No Uncertainty



(b) With Uncertainty



Source: Adapted from Moore and Mitchell (1997)

In the model we apply here we assume there are no sources of uncertainty.[9] Specifically this means that an individual of a given age plans to retire at a certain age (and does so); does not engage in the work force after retirement; knows exactly what their income until retirement will be; can accurately project the rate of return on investments; has a known life expectancy at the age of retirement (and lives for exactly that number of years); knows with certainty the amount of NZ Superannuation (NZS) that they will receive; plans and executes whatever bequests they wish to make; has no unexpected changes in health status that would affect income or expenditures and assumes tax rates and other policies

[9] The incorporation of uncertainty including such sources as sickness, disability, employment, earnings, inheritances and life expectancy can best be introduced using micro-simulation models. See for example Statistics Canada (2004).

remain unchanged. We further assume that the retirement phase for couples begins when the older partner reaches the NZS qualifying age (the younger partner is assumed to continue earning an income, which may affect the value of NZS received by the qualifying spouse).

Abstracting from uncertainty has the advantage of significantly simplifying the analysis. Clearly the results cannot be interpreted as applying to a particular individual whose incomes, expenditures, returns on assets and life expectancy are all subject to shocks. However in the case that these shocks are both unanticipated and distributed equally among both positive and negative changes, then the outcomes illustrated here can be interpreted as expected values for any given population group. For example, in our empirical analysis (Section 2.5) we use life expectancies at retirement age by ethnic group and gender. Other things equal, our results will show the income, saving, wealth and consumption levels that could be expected for, say, Māori and Pacific Island women aged 45-55 as a group, rather than for a specific individual in that group.

A graphical illustration of the model we apply is given in Figure 2.[10] At the current time a household has a net worth (depicted as W_a) as measured in the HSS. This is projected to grow to an amount denoted W_p by the time they reach a predetermined retirement age (here we assume 65). In order to have a given level of income in retirement they would need to have accumulated retirement wealth depicted in Figure 2 as the stock, W_r. Part of their retirement income is provided by NZS. The stock of wealth at retirement equivalent to the flow of income from NZS is incorporated in W_r and W_p.

The difference between the required wealth (W_r) and the projected wealth W_p is labelled as the shortfall and is the amount which would need to be accumulated between now and retirement in order to add to the projected stock and hence support an income in retirement of level (denoted Y_r). This additional amount, in the absence of inheritances or unanticipated windfall gains or losses in asset values, would need to be accumulated through savings. These flows are depicted in Figure 2(b).

The approach assumes that some fixed share s of pre-retirement income will be saved ($s=S/Y_p$) and the replacement rate (R) is given by the ratio of gross income in retirement to gross income pre-retirement (ie, $R= Y_r/Y_p$). Under the New Zealand taxation system of TTE, post retirement taxes (denoted as T_r) are assumed to be zero, so real after tax consumption is equal to total pre-retirement income.[11]

Clearly some values of retirement income could imply a substantial shortfall in retirement wealth, which might in turn require unrealistic or unfeasible levels of saving pre-retirement. It is for this reason that the saving and replacement rates are jointly determined.

A number of additional factors arise which are not depicted in Figure 2. Instead of a constant pre-retirement income we assume that income grows from its actual level (as observed in the survey) by a fixed annual growth rate of 1% chosen to approximate the average annual rate of labour productivity and real wage growth in the economy. The gross income at retirement (Y_p) is then based on the observed actual earnings plus a

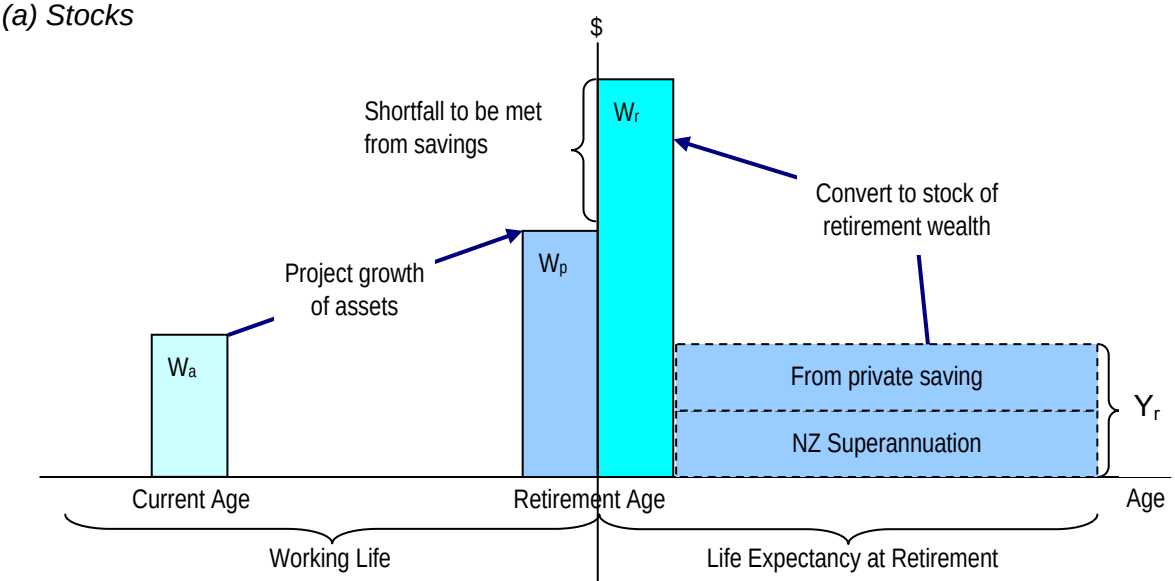
[10] A complete derivation of the model is given in Scobie and Gibson (2003).

[11] In the context of the New Zealand system of taxation, private retirement saving is made from after-tax pre-retirement income and the earnings on the investments are taxed. However, once those accumulated funds are withdrawn (in this case to purchase an annuity) then there is no further taxation payable by the recipient; taxes on earnings are paid by the seller. Furthermore, New Zealand Superannuation payments are received net of tax. Hence under this system (denoted TTE) we have assumed for the purpose of the modelling that there is no post-retirement taxation (ie $t_r = 0$).

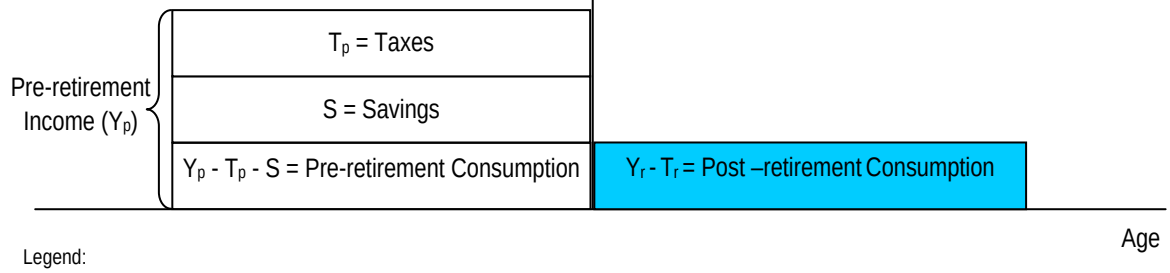
compound growth of 1% annually.[12] Pre-retirement tax rates are based on pre-retirement real income (Y_p). NZS payments are assumed to grow at 1% annually in real terms, matching the growth in average real wages. Bequests involve only the current equity in the principal residence and uncertainty is removed by assuming individuals predict their life expectancies.

Figure 2 – A stylised view of stocks and flows of income, savings and retirement wealth in a model of the joint determination of saving and replacement rates

(a) Stocks



(b) Flows



Legend:

Y_p = Pre-retirement income
T_p = Pre-retirement taxes
Y_r = Post-retirement income
T_r = Post-retirement taxes
W_a = Wealth at current age
W_p = Projected wealth at retirement
W_r = Wealth at retirement needed to supply a post-retirement income of Y_r
S = Savings

[12] An alternative approach would have been to estimate age earnings profiles for the survey. However, with a single cross section as in the HSS one cannot isolate cohort effects as these would have been compounded into earnings estimates. There are a number of individuals in the sample who report negative or very low incomes. These reported incomes could include a significant transitory component, such as a temporarily low income due to redundancy or losses in an unincorporated business. Some estimate of consumption is often used in such cases as a better proxy for permanent income. In this study we use the unemployment benefit rate as an estimate of a minimum consumption level for those reporting negative incomes or income below the benefit rate.

2.4 Some basic results from the survey

This section presents some summary results from the HSS. Total net wealth as measured by the HSS has been grouped into four elements.

a. *Net Housing Wealth*: based on the reported housing equity at the time of the survey.

b. Net Financial Wealth: includes all property other than the primary residence, shares, trusts, farms, businesses, motor vehicles, cash, bank deposits and collectibles net of all liabilities (credit cards, bank loans, student loans, etc).

c. Pension Wealth: the value of all pension schemes held at the time of the survey.

d. Superannuation Wealth: the present value of the future stream of payments from New Zealand Superannuation (NZS) assuming that current levels of payments and eligibility criteria apply.

No allowance is included for human capital. Gibson and Scobie (2003) have shown that when human capital estimates are included in net wealth the level and pattern change significantly, with a very marked reduction in the inequality of the wealth distribution.

Table 1 provides a summary of the results for couples.[13] Several points are noteworthy. First, NZS represents a very significant part of retirement accumulation for all age groups. Second, housing equity only represents about one quarter of wealth excluding NZS, and 15 percent of overall mean wealth when NZS is included. Third, while these results are based on means, the distribution of wealth is skewed to the higher end. For example the top 20% of couples aged 45-55 hold over 40% of the total wealth of that age group. Because of this inequality in the distribution, it is useful to consider the median as well as the mean values. The overall median levels for couples across all age groups are shown in the last row of Table 1.

Table 1 – Mean values and composition of current wealth for couples by age group: 2001

Age Group	Net Housing Wealth	Net Financial Wealth	Pension Wealth	Superannuation Wealth	Total Wealth
25-34	32,263	81,930	13,546	233,692	361,431
35-44	73,130	176,055	19,918	259,935	529,038
45-55	109,456	267,043	31,973	290,039	698,511
56-64	127,506	292,028	46,298	323,766	789,597
Total	85,502	205,187	26,982	275,075	592,747
Overall Median	36,000	51,350	0	270,414	446,786

Note: A couple is assigned to an age group based on the age of the older partner at the time of the survey.

Table 2 provides estimates by quintile of current income. The fact that the median total wealth for the lowest three quintiles (ie 60%) is similar despite wide differences in the non-NZS components of wealth is indicative of the equalising effect of NZS. A major

[13] A complete summary of current and projected retirement wealth for couples and unpartnered individuals is given in Appendix Tables 1 and 2.

difference arises from the financial wealth of the highest 20% of the income distribution, resulting in significantly greater total median wealth for this group.

Table 2 – Median values and composition of current wealth by income quintile for couples: all age groups combined: 2001

Income Quintile	Net Housing Wealth	Net Financial Wealth	Superannuation Pension Wealth	Superannuation Wealth	Total Wealth
1=poorest	0	11,500	0	287,507	377,317
2	27,000	24,700	0	267,120	384,346
3	55,000	38,955	0	267,519	428,215
4	45,000	77,860	0	269,682	531,131
5=richest	82,000	194,549	0	269,442	701,689
Total	36,000	51,350	0	270,414	446,786

2.5 Results from the model

Table 3 presents the projected wealth levels at retirement (age 65). These projections (corresponding to W_p in Figure 2) are based on the levels of reported wealth, including housing wealth, at the time of the survey.[14] Again, it is helpful to consider the median values. An important conclusion is that the projected wealth accumulated by age 65 is similar for all age groups. Although the younger age groups typically have a lower current level of wealth, the fact that they have a longer period until retirement for that wealth to grow means their projected wealth by the time they retire turns out to be remarkably similar to those close to retirement.

Table 3 – Mean and median values of projected wealth at retirement by age group: in 2001$

Age Group	Couples		Unpartnered Individuals	
	Mean	Median	Mean	Median
25-34	659,847	526,409	314,991	287,496
35-44	782,549	616,447	423,007	307,371
45-55	863,158	684,146	448,780	347,413
56-64	853,473	667,842	453,084	372,560
Total	794,607	607,687	394,777	310,100

While the projected levels of retirement wealth are similar across age groups, this is based solely on the growth in the real value of existing net assets. It does not reflect the fact that real incomes will grow - and the longer until retirement the more potential there is to have saved out of rising lifetime real incomes. As a result, we find that the projected median retirement incomes for couples by age group (all in $2001) are:

- 25-34: $45,565
- 35-44: $46,141
- 45-55: $38,872
- 56-64: $29,465

[14] Details of the methods are given in Scobie and Gibson (2003).

It is evident that when measured in constant 2001 terms, the real retirement income of the youngest age groups will be over 50% higher than that of the oldest cohort retiring over the next decade. At first glance this may seem inconsistent with the fact that the projected real levels of retirement wealth are comparable. However, there is nothing surprising in this result when it is recalled that the projections incorporate a real annual growth rate in incomes and NZS of 1%. Steady growth rates, even at modest annual levels, imply a significantly higher real income in future decades, parallel to the real incomes that people today enjoy compared to the real incomes of their grandparents.[15]

The next step is to estimate the average annual (constant) saving rate that would be required in order to achieve consumption smoothing. These saving rates are denoted "prescribed". At the same time the replacement rate can be derived. These results are summarised in Table 4.

Table 4 – Mean and median values of prescribed saving rates (percentages) and corresponding replacement rates (percentages) to achieve consumption smoothing: by age group: 2001

Age Group	Couples				Unpartnered Individuals			
	Prescribed Saving Rate		Replacement Rate		Prescribed Saving Rate		Replacement Rate	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
25-34	8.1	10.9	63.6	64.3	1.0	5.0	71.2	72.4
35-44	9.9	13.8	60.3	56.8	0.6	7.8	70.5	66.6
45-55	6.0	18.2	66.0	54.3	-5.4	4.0	78.1	69.1
56-64	1.6	14.9	72.9	60.4	-27.8	-13.9	103.8	90.9
Total	6.9	13.5	65.0	57.4	-4.6	4.9	77.1	71.4

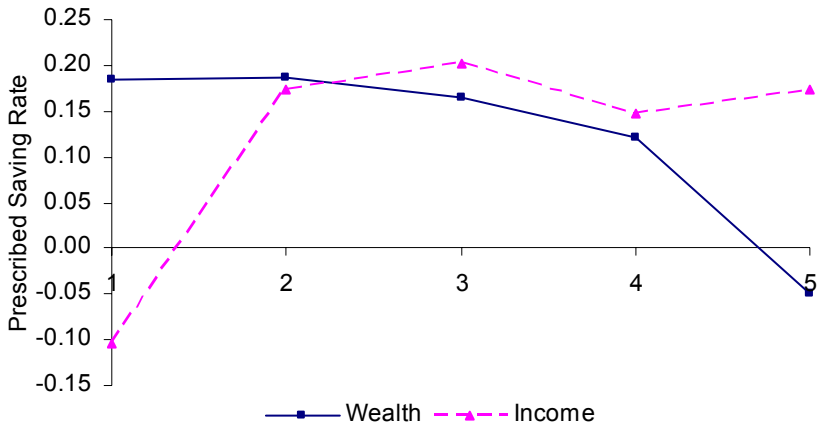
Note: The prescribed saving rate is that rate (as a percentage of before tax pre-retirement income) which would be required for a couple or individual to meet the definition of adequacy used in the model; ie to allow consumption smoothing, given their current wealth as measured in the survey. The replacement rate is the ratio of post to pre-retirement income (ie, $R= Y_r/Y_p$). Some individuals have such high levels of wealth accumulated already that, given their incomes, they would be able to smooth consumption with no further saving - in fact the model gives the result that they could "dissave" and run down current wealth (ie $s<0$). As a result it is possible in these circumstances that Yr can exceed Yp (ie $R>1$).

When the results are further disaggregated it is found that those with high wealth and those with low incomes tend to have negative rates of prescribed saving. This is illustrated in Figure 3 for couples aged 45-55 planning to retire at age 65. This can be interpreted that for those people, in order to smooth consumption no further saving is required. In the case of high wealth couples, this simply means that they already have accumulated sufficient wealth to sustain consumption given their reported incomes.

Of note is the fact that median prescribed rate of those in the lowest income quintile is also negative. This arises because NZS offers them an income in retirement that is comparable to or higher than that which they have pre-retirement. In such a case, they would be disinclined to save further now.

[15] For an analysis of real consumption trends for the New Zealand economy see Guest, Bryant and Scobie (2003).

Figure 3 – Median prescribed saving rates for couples aged 45-55 retiring at age 65 by wealth and income quintiles



Note: Quintiles of either income or wealth are shown on the horizontal axis

The saving rates in Table 4 are derived from a model, which has as its starting point the assumption that people save for retirement at a rate which would allow them to have the same standard of living (as measured by real consumption) in retirement that they had pre-retirement. Clearly there are many other rules for saving adequacy that could have been applied. How well do these prescribed rates match the rates at which people actually save? This comparison is presented in the next section.

2.6 A comparison with actual saving rates

In this paper we have estimated the rates of saving that we have defined as prescribed rates. These rates are those which, if people's saving behaviour was governed by a desire to smooth consumption over their lifetimes, would be consistent with that objective. Of course, modelling behaviour requires us to formulate a theory of how we think people behave with respect to savings and consumption now versus later. It is impossible to know for certain if the proposed theory is really how people behave. Often, evidence of a counter example will be used to imply that the theory cannot be valid. Some individuals might appear to behave in a way quite counter to that which the theory of savings would predict.

Theoretical models do not, however, try or pretend to predict the behaviour of every individual. They are by their very nature abstractions from the complexity of real world observations; were they not they would cease to be useful constructs. We do not claim that people actually behave in the way set out in the model and accumulate wealth converting the stock of all assets to an annuity at retirement. The question is whether the outcomes of such models are consistent with observed behaviour. In other words, are people acting *as if* they were endeavouring to smooth consumption over their lifetimes? The most powerful test of the underlying theory we have proposed about savings behaviour is whether or not it is capable of predicting how people actually behave.

In order to conduct the comparison we need data on actual savings behaviour. Unfortunately there are no surveys in New Zealand which have been designed to measure savings at individual household level. This represents an important limitation. We have used the Household Economic Survey (HES) as our source in the absence of any better measures.[16]

From that survey we were able to derive estimates of the ratio of household saving to disposable income by quintile of disposable income. We then adjusted these to ratios of savings to pre-tax (gross) income, using the relevant tax rates.[17] The results apply to couples rather than unpartnered individuals for whom it was not feasible to extract estimated saving rates from the HES.

Included in the data on consumption used to derive the measure of saving (defined as income less consumption expenditure) is expenditure on durables. The appropriate treatment of durables is to remove them from current consumption on the grounds that they provide a flow of services extending over years, in contrast to consumables which are fully used in the current year. One then calculates an annual charge (known as the user cost of capital) which allows for changes in valuation, interest on the capital and depreciation. This is then added back to expenditure to reflect annual costs of ownership. In the case of the HES it was not possible to construct a complete inventory and hence a true user cost of durables. In our base case we chose to exclude durable expenditures, which will understate the true costs of ownership by the amount of the user costs. It is argued that this is preferable to including all durables and overstating current consumption spending. Clearly the true value lies between these extremes, and we address this issue with sensitivity tests below.

The argument for excluding durables expenditure rests on the premise that these articles provide a flow of services over time. Anecdotal evidence suggests that people often replace these articles in the years leading up to retirement. If this were the case, then it would reinforce the argument that these items represent a form of saving. To test this proposition we examined the levels of spending on durables recorded in the HES. We compared the mean and median levels of expenditure for those in the pre-retirement age group (55-64) with those in the first decade of retirement (ages 65-74).[18] The results are summarised in the Table 5.

[16] See Gibson and Scobie (2001). It must be stressed that this survey was not designed to measure saving rates, although they can be derived from the income and expenditure data. Statistics New Zealand has noted this caveat (see Household Economic Survey, Background Notes 1996-97, p.17). There are two reasons for this. In the first place, savings, as a residual between two large numbers each with large sampling errors, is itself likely to be measured with large sampling errors. Second, some parts of annual expenditure are estimated by multiplying by 26 the expenditure information recorded by diary for a household for a 2 week period. The actual annual savings will not necessarily be equal to the difference between income and this estimated expenditure. In some cases it will over estimate savings and in others underestimate the actual amount of savings. However as we are only concerned with the pattern of saving for broad groups and do not attempt to report results for individuals, this latter problem should be minimised. It remains true however that the estimates will be subject to a margin of error. For examples of estimating saving as the difference between income and consumption see Attanasio (1998), Paxson (1996) and Deaton and Paxson (2000). It should be further noted that the rising trends in household saving which are found in the HES do not accord with the falling trends from the national accounts measures. For a comparison see Claus and Scobie (2002).

[17] From the HES we obtained S/Y_d where Y_d is disposable income. Now $S/Y_p = (S/Y_d)*(Y_d/Y_p)$. However, as $(Y_d/Y_p) = (Y_p - T_p)/Y_p = 1-t_p$ where T_p is total pre-retirement taxes and t_p the rate of personal income tax applicable to the particular income level, then $S/Y_p = (S/Y_d)*(1-tp)$.

[18] The ages refer to the head of the household.

Table 5 - Mean and median household expenditures on durables pre- and post-retirement by age of the head of household and selected years

	55-64		65-74	
Year	Mean	Median	Mean	Median
1996-97	5,500	1,300	3,400	650
1997-98	3,800	1,300	2,900	570
2000-01	3,800	1,000	2,900	550

Source: Computed from the Household Economic Survey.

Median spending on durables falls by about one half in the first decade of retirement. These findings are consistent with the proposition that durable spending is undertaken, like any form of saving, to provide a flow of services in years beyond the year of purchase.

The results for the medians for the prescribed and actual saving rates are summarised in Table 6, for both including and excluding durables as part of consumption spending. When durables are excluded, the median actual saving rate (estimated from the HES) exceeds the prescribed rate for the population as a whole. In fact the actual rates excluding durables are greater than the prescribed rates for every age cohort. This implies that individuals are actually saving at a rate which would allow them to meet the somewhat stringent test of sustaining pre-retirement consumption that we have applied.

Table 6 – Median values of saving rates (as percentages of gross income) from the HES compared with the prescribed rates for couples from the HSS: 2001

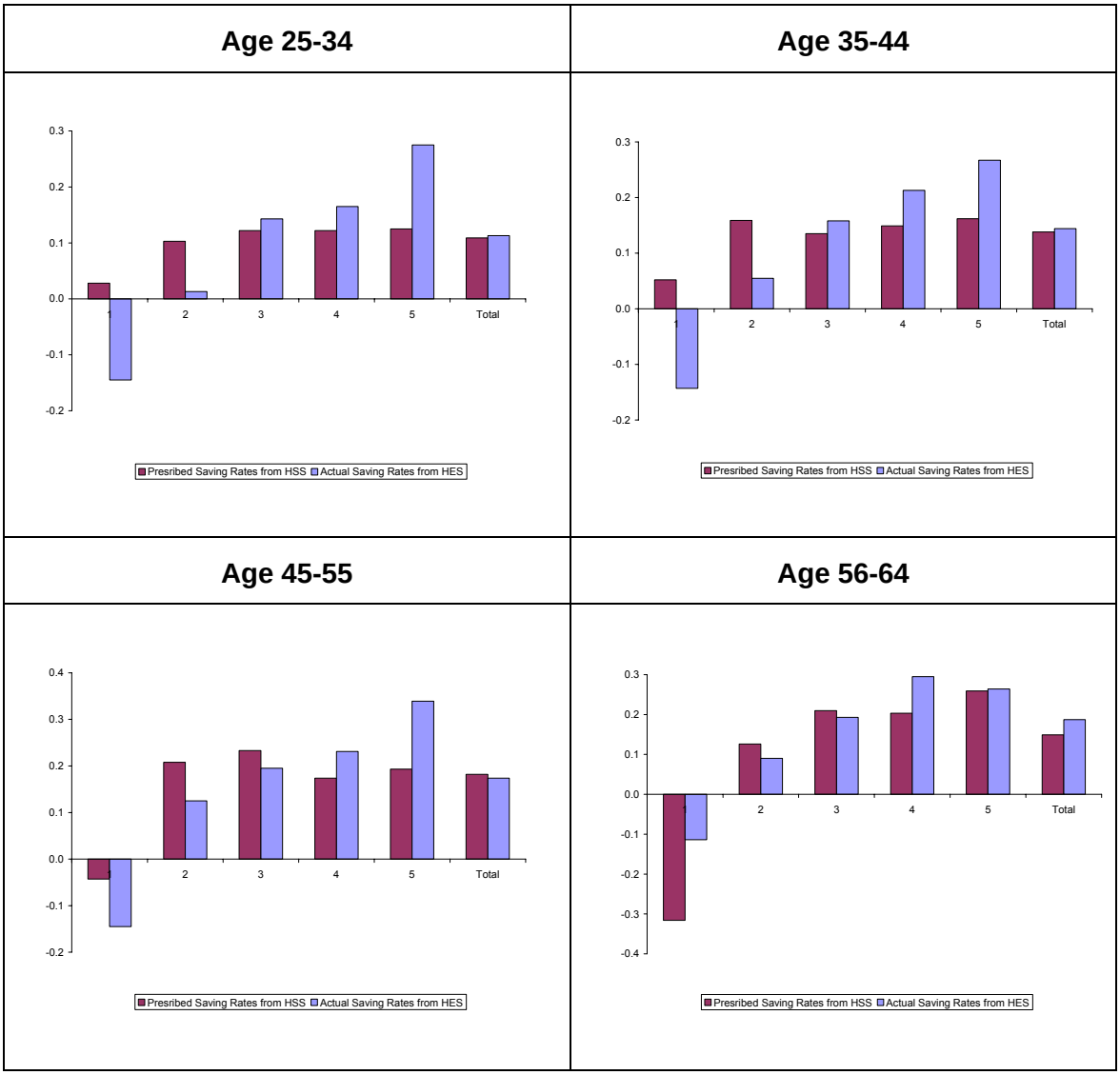
	Prescribed Median Saving Rate required to smooth consumption	Actual Median Saving Rates	
Age Group		With durables excluded from consumption	With durables included as consumption
25-34	10.9	11.3	4.4
35-44	13.8	14.4	9.0
45-55	18.2	17.4	10.4
56-64	14.9	18.7	13.2
Total	13.5	15.5	8.7

Note: The age category is based on the older of the couple in the HSS analysis, while the HES is defined as the age of the head of the household.

Figure 4 presents the results broken down by income quintile within each of the four age groups. For the poorest quintile of the two older age groups, the model prescribed saving rates that were negative and in fact that is exactly what is observed. For the top three quintiles the prescribed rates are quite comparable to the actual rates in almost all age cohorts.[19] It is the bottom 40% of those in the age range 25-44 who appear to have made insufficient provision for their retirement. But this is not particularly worrying, since these

[19] Throughout the study income tax rates are set at the schedule currently prevailing. In order to meet the increased costs of NZS as the population ages, a number of strategies could be followed. To the extent that these might involve an increase in tax rates to fund the pay-as-you-go portion of NZS, this has not been allowed for in this study.

Figure 4 – Median prescribed saving rates compared to actual saving rates from the Household Economic Survey (HES) for couples by age groups and 5 quintiles of income: 2001with durables excluded from consumption



people, many of whom have just started their career, still have a long working time to adjust their saving behaviour appropriately.

It is important to stress that the comparisons are not for exactly the same individuals. We have taken those in a particular age group from the HES and compared their actual saving rates with the mean and median rates for the similar age group from the HSS. Furthermore as we have only compared medians, it is possible that there is a tail of the distribution that is not saving "adequately" even though the median for their age group is below the actual rate. In other words, these results do not pretend to make the case that "every individual is saving adequately". There will be those who will find that their savings will not be sufficient to sustain their pre-retirement living standards ("grasshoppers") at one end, and at the other those who have saved enough or even more than was necessary (the "squirrels").

We have previously discussed the treatment of durable expenditures, arguing that their exclusion from current consumption is consistent with the concept they supply a flow of services over a number of years. We also showed evidence on durables expenditure

which was consistent with that which would be predicted if indeed there are intertemporal transfers made through durables; ie they have a savings element. We noted that in the absence of data to compute an annual user cost of capital, the theoretically appropriate strategy to address this issue, we had excluded durables from consumption expenditure when making estimates of the saving rate, acknowledging that this was an approximation.

A well known problem in the estimation of saving rates arise from the fact that savings is typically a small residual found as the difference between two much larger numbers, income and expenditure. For example suppose income were 100 and consumption 96, so that as a share of income the saving rate would be 4%. Now suppose durable spending of 2 were removed from the consumption spending so that the resultant estimate of the saving rate would now be 6%; ie, a small change in consumption spending, while not of major significance in absolute terms, can lead to a marked change in the derived saving rates. In short, while the absolute magnitudes might be quite small slight changes can lead to marked swings in the estimate of the savings rate.

A legitimate question arises as to the impact of our treatment of durables. What would the actual saving rates computed from the HES have been had we retained all expenditure on durables as part of consumption spending? We recomputed the actual saving rates under this extreme assumption; the results are shown in the last column of Table 6). As a result of counting all durables as current consumption, the estimated median actual saving rate for all individuals falls substantially from 15.5% to 8.7%, and is now below the prescribed rate.

It is informative however to consider the breakdown by age groups. The most dramatic reductions are in the younger age groups. This is not unexpected as savings are typically low during this stage of the lifecycle and hence any slight adjustments to the absolute numbers will have a dramatic effect of the rates as observed. If we focus on the oldest group, those approaching retirement, then we find that the effect on the estimated actual median saving rate is much less marked, and the actual and prescribed rates remain similar. It must be stressed that the median expenditure on durables for this age group was $1,000 in 2001 (Table 5) so that whether we include or exclude durables will have a limited effect on the *absolute* amount of saving required to achieve consumption smoothing despite the fact that it does alter the measured *rate* of saving.

To this point we have been comparing the prescribed rates with actual rate estimated from a single year of the HES. The prescribed rates are the annual average saving rates that would be required over the remainder of the working life to generate a stock of wealth by retirement that would provide an income sufficient to maintain pre-retirement consumption.

A more comprehensive way to make the comparison would be to estimate actual saving rates over the remainder of the working life. This was accomplished for two selected cohorts by forecasting the savings rates from regressions by age cohorts based on the pattern of saving by age reported in Gibson and Scobie (2001). A set of conditioning variables were included in the regressions to allow for the effect of house tenure, income, gender, ethnicity and employment type. The mean values of these for the respective cohort were assigned when making forecasts. For example the cohort born between 1930 and 1939 were on average 56 years old in the years covered by the HES. We used the corresponding regression equation for the actual saving rate to forecast saving rates for each year of age from 56 to the specified retirement age of 65. The results are summarised in Table 7.

Table 7 – A comparison of the prescribed saving rates with actual rates predicted from the Household Economic Survey by age cohorts over the years remaining to retirement

Age Cohort		Prescribed Saving Rates required to smooth consumption (%)	Actual Saving Rates	
			With durables excluded from consumption (%)	With durables included as consumption (%)
Cohort born 1930-1939[a]	Mean	3.8	24.6	18.1
	Median	16.6[c]	18.6	9.9
Cohort born 1940-1949[b]	Mean	8.0	26.6	21.4
	Median	16.0[d]	20.6	14.6

Notes:
a. Average age of this cohort over the years covered by the HES was 56.
b. Average age of this cohort over the years covered by the HES was 46.
c. Computed as the average of the prescribed rates for the age groups 45-55 and 56-64 from Table 6.
d. Computed as the average of the prescribed rates for the age groups 35-44 and 45-55 from Table 6.

For both cohorts examined, those born 1930-39 and 1940-49, the actual rates of saving exceed the prescribed rates for achieving consumption smoothing when durables are excluded from consumption. When we include durables as consumption spending, the actual median rates fall below the prescribed median rates. However the mean rates remain above the prescribed rates. In other words regardless of how durables are treated, the average rates of saving across these two cohorts exceeds the rate necessary to maintain consumption levels in retirement.

We have been conservative in requiring full consumption benefits to the surviving partner and maintaining consumption throughout retirement when typically consumption needs fall. If we were to relax these assumptions it is almost certain that even the median rates would then be sufficient to meet the lower prescribed rates.

The results to this point have suggested that the preferred strategy for some groups is to make no additional provision for retirement from their current income. This arises either because they have high levels of wealth relative to income, or have low levels of pre-retirement income relative to the income expected from NZS. In either case, they would be able to achieve a level of consumption in retirement that matched their pre-retirement consumption level (ie consumption smoothing) with no further saving. How many people are in these categories? To address this we estimated the proportion of all couples or unpartnered individuals for whom the prescribed saving rates are negative. The results, grouped by age and income quintile, are summarised in Table 8.

Table 8 reveals some striking results. Consider first the overall proportions. Some 17% of couples and 38% of individuals have a prescribed saving rate which was negative. It is important that the correct interpretation of this result be made. Technically it means that those people could actually consume some of their current wealth, and use this to even out their consumption over the lifetime. However, in the case of low income households, much of their retirement wealth is represented by the value of NZS, and clearly borrowing against that future income stream is not feasible. Rather a negative saving rate should be interpreted as a signal that if consumption smoothing is indeed the underlying behavioural

model of retirement savings, then no further saving would be indicated. Combining unpartnered individuals and couples, the overall share of all individuals for whom no further saving would be optimal is 24 percent. In short we would not expect up to one quarter of the population to be making additional saving for their own retirement over and above that which they have already accumulated.[20]

Table 8 – Proportion of couples and individuals retiring at age 65 for whom the prescribed saving rate is negative: 2001

Income Quintile	Couples					Unpartnered Individuals				
	25-34	35-44	45-55	56-64	Total	25-34	35-44	45-55	56-64	Total
1	35.4	43.0	60.8	64.5	52.2	100.0	100.0	100.0	100.0	100.0
2	3.9	9.7	12.0	22.2	10.6	54.0	49.2	56.3	85.3	58.1
3	3.9	5.1	7.3	8.2	6.0	1.4	4.0	9.8	19.8	5.8
4	4.1	8.2	10.0	17.2	9.4	4.5	8.4	7.0	31.3	9.6
5	4.3	4.2	10.0	16.4	8.0	3.6	17.9	18.3	40.1	15.6
Total	10.7	12.0	18.5	31.8	17.2	33.5	30.2	36.8	66.3	37.9

Note: A negative saving rate is interpreted as meaning that to a achieve an adequate retirement income (defined as the ability to maintain pre-retirement consumption levels) then given current and projected levels of wealth and income, no further saving would be required.

We can compare this finding with the survey results reported by Weiss and Drillien (2003) who find that almost 50% of those interviewed are not saving for retirement. Our results predict that at there are sound reasons to expect at least half this number have rational reasons not to be saving for retirement.

There are two reasons for this. As illustrated in Figures 3 and 4, the prescribed saving rates are typically negative in the lowest income group and the highest wealth group. A low present income relative to the expected retirement income which NZS offers under current policies means that the preferred savings strategy is not to reduce present consumption further from the low income. Equally those with high current wealth (typically having high incomes) have no need to save additional amounts. Their existing wealth would be sufficient to provide a retirement income which smoothed their lifetime consumption.

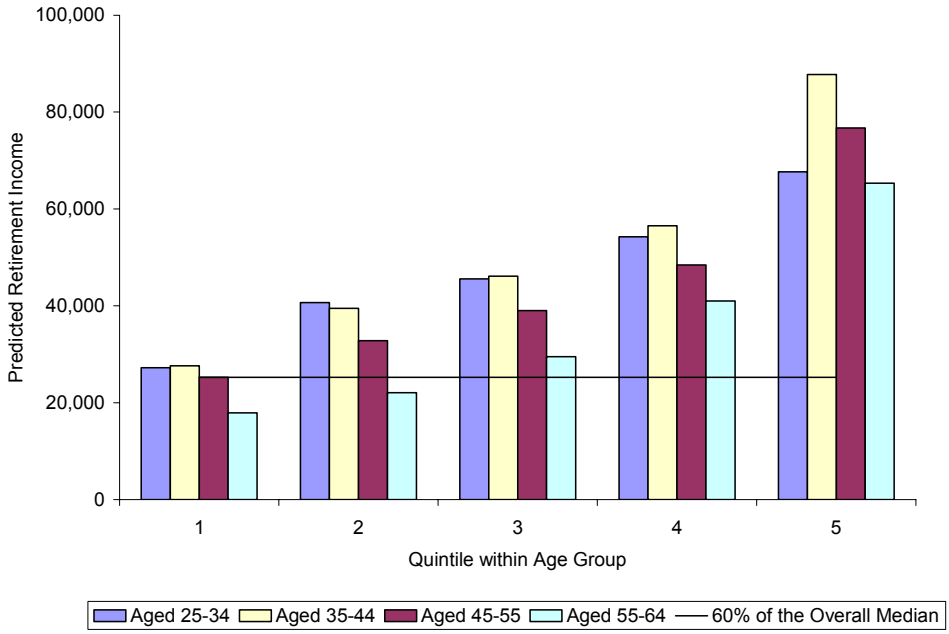
How many of those for whom additional saving is not the preferred strategy to achieve consumption smoothing come from the low income groups whose primary source of retirement income is NZS? Among couples 73% and among unpartnered individuals some 84% of those with negative prescribed saving rates are from the lowest 40% of the income distribution. In the case of unpartnered individuals in the lowest income quintile, 100% of every age group has a negative prescribed rate; based on a consumption smoothing model, we would not expect any of this group to be making additional retirement savings.

To explore this distributional aspect further we have computed the predicted retirement incomes of couples by age and income quintile and compared these to an income level represented by 60 percent of the median predicted retirement income. This level is sometimes used as poverty line. The results are presented in Figure 5. Those whose

[20] This average is computed as the weighted average of the results for couples and individuals based on the population numbers of 930,900 unpartnered individuals and 1,711,800 individuals in couples (Statistics New Zealand 2002, Table 1.01, p.24).

medians fall below the overall poverty line are aged 56-64 and in the lower two income quintiles.

Figure 5 – Median predicted retirement income for couples retiring at 65 by income quintile and age group



Finally we can ask: what proportion in each group has a projected retirement income level which falls below the poverty line? These results are summarised by age and ethnicity in Table 9.

Table 9 – Percentage of couples in each age group falling below 60 percent of the overall median predicted level of retirement income

Age Group	Pakeha	Maori & Pacific Is.	Total	Total share falling below the poverty line for their age group
25-34	3.1	16.6	7.9	10.8
35-44	3.5	12.9	6.3	10.1
45-55	6.6	30.4	10.1	8.0
56-64	34.2	66.4	39.6	9.5
Total	10.3	26.0	13.7	9.5

Note: Ethnicity of a couple refers to that of the respondent.

The results show that a greater proportion of the Maori and Pacific Island population have predicted incomes below 60 percent of the overall median; this is especially marked for the oldest age group.

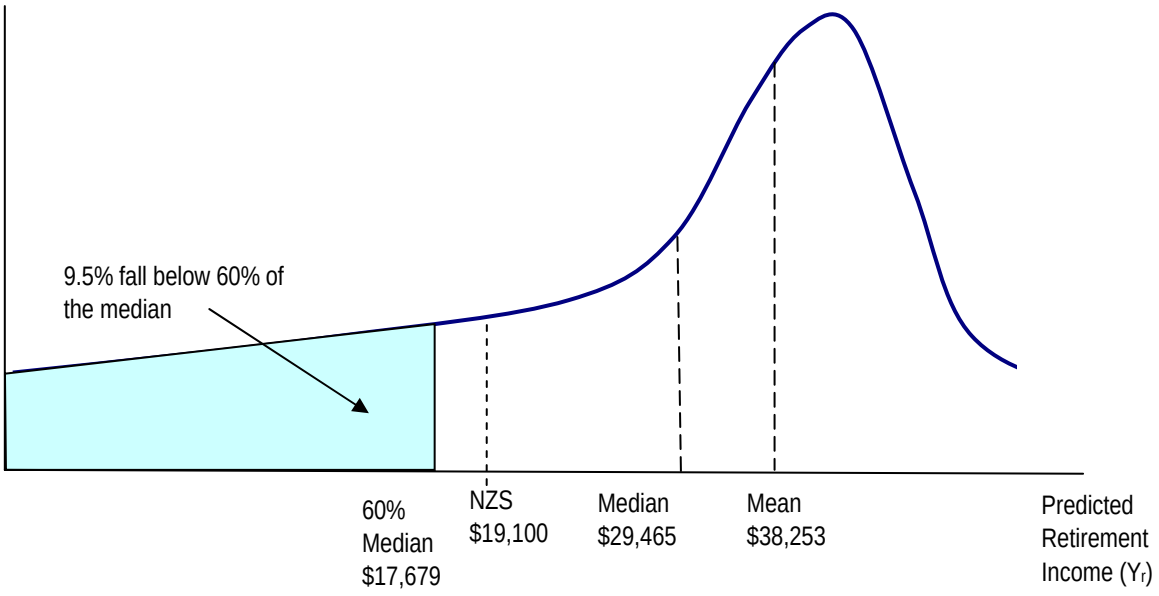
It must be recalled however that NZS provides a floor under the retirement income, so while there a significant share of the population falling below the poverty line, the actual gap in dollar terms is quite small. This is illustrated in Figure 6.

For the purposes of illustration we have taken the total population of couples aged 56-64. The mean and median predicted retirement income of this group is $38,253 and $29,465

respectively, again emphasising the skewness of these distributions. Of this group, 9.5% were predicted to have incomes below the value corresponding to 60% of the median for their group; ie, below $17,679.[21] However NZS places a floor on the retirement income of a couple of $19,100 so that in effect no retirees fall below 60% of the median retirement income for this group.

Two points emerge from this analysis. The first is that some 32% of this older age group is projected to have no other savings for retirement, and would therefore rely solely on NZS. Note however, that where their pre-retirement incomes are low, then their behaviour is still consistent with wishing to smooth their consumption. It is true that additional pre-retirement saving would provide them with a higher income in retirement– but that would come at the expense of reducing their already low level of pre-retirement consumption.

Figure 6 – Distribution of predicted retirement incomes for couples aged 56-64, retiring at age 65 with no consumption of housing wealth



This finding mirrors recent results for the USA. Engen, Gale and Uccello (2004) use a model for estimating optimal wealth accumulation which, like the present study, is based on a measure of consumption smoothing. Unlike the present study however, it allows for uncertainty in life-time earnings. They compare the optimal level of lifetime wealth accumulation derived from the model with the actual levels of reported wealth accumulation. They report that while some people have very low levels of wealth accumulation this is completely consistent with rational behaviour.

> "The low level of wealth accumulation exhibited by a significant minority of households in the simulation model is consistent with optimizing behaviour and in no way implies a retirement saving shortfall owing to myopia, irrationality, or poor information". (p.10)

The second point is that almost 10% of retired couples would have projected retirement incomes below 60% of the median retirement income[22] for this age cohort in the absence

[21] Given that the poverty line defined as 60% of the median income is $17,679 and NZS payment $19,100, the question arises as to why 9.5% should appear to fall below the poverty line. This arises because some people have negative net worth, which makes their total current wealth lower than that from NZS alone. So when that stock of wealth is converted into a flow of income, the incomes they would receive in retirement will be lower than NZS payment. In effect, income from NZS is needed to pay off debts existing at the time of retirement.

[22] Note that this figure rises from 10% to almost 40% if we make the comparison with 60% of the overall median income.

of NZS. However, once NZS is allowed for, these couples receive an income from NZS that is above the so-called poverty line by some 8% ($19,100 compared to $17,679). In other words, it would appear that payments under NZS are in fact set to provide an income slightly above the basic minimum standard of living for retirees.

It is worth noting however that the Survey of Living Standards of Older New Zealanders (2001) reports that:

> Overall, the results show that most older people were doing relatively well, with any restrictions relating to more "luxury" oriented items ….A preliminary comparison across the total population showed that older people tended to report fewer material restrictions and difficulties than younger people with this trend holding for both Maori and non-Maori respondents.
>
> Living Standards of Older New Zealanders: A Technical Account, p.13

This finding suggests that the level of NZS does appreciably limit deprivation among older people and that the findings that people are saving adequately for retirement is consistent with the fact that little deprivation amongst retirees is found.[23]

2.7 International comparisons

The findings of this study are consistent with recent studies for the USA and the UK. In Table 10 we compare the results of the present study with two studies for the USA. The results of all three studies are remarkably similar. In all cases the prescribed saving level for the lowest income group is either close to zero or negative. The rate rises with income and reaches similar levels across all studies for the highest income group.

The uniformly low level of saving prescribed for the low income group is a reflection of the public provision of retirement income. Bernheim et al. (2000) observe:

> "The fact that the recommended saving rate is close to zero for the low income group and that the rate rises with income is not surprising. Most of the low-income households will receive the majority of their post-retirement incomes from Social Security. And the higher the level of income, the smaller the fraction of pre-retirement income being replaced by Social Security".

which is consistent with the findings of this study for New Zealand. The argument that compulsory pension schemes result in a substitution for other forms of saving receives additional support from the work of Attanasio and Rohwedder (2003). They examine household saving in the UK and conclude that the state earnings related pension scheme (SERPS) results in a significant substitution for financial wealth.[24] In other words those who had built up pension wealth in the obligatory SERPS scheme accumulated less in other forms of wealth, a result they note "is in accordance with the basic prediction of the life cycle model" (p.1515).

[23] A caveat is that the comparison here is strictly between those who were retired and those who are nearing retirement. In other words these refer to different cohorts and to address the question of whether a particular cohort reached retirement and felt their living standards were satisfactory would require longitudinal panel data which does not exist.

[24] They find that a 10% increase in pension wealth through SERPS is accompanied by a reduction of between 6.5 and 7.5% in the financial wealth of 55-64 year olds.

Table 10 – Median prescribed saving rates (%): a comparison with USA results

Income Category	USA			New Zealand (2001)	
	Bernheim et al (2000)		Moore and Mitchell (1997)		
	50-55	56-61	51-61	45-55	56-64
Low	1	0	Negative	Negative	Negative
Lower Middle	13	17	3	20.8	12.6
Upper Middle	14	20	9	17.4	20.3
High	17	23	17	19.3	25.9

Note: The income categories are based on deciles: Low = 1; Lower Middle = 3 and 4; Upper Middle = 6 and 7, and High = 10. For the New Zealand results from this study the data are drawn from quintiles where: Low = 1; Lower Middle = 2; Upper Middle = 4, and High = 5.

Sources: Bernheim, Forni, Gokhale and Kotlikoff (2000) Table 1, p.290); Moore and Mitchell (1997), Table 3, p.33.

In a related study Attanasio and Brugiavini (2003) present similar evidence for Italy. Their paper provides new evidence on the substitutability between private and pension wealth by exploiting the Italian pension reform of 1992. They find convincing evidence that saving rates increase as a result of a reduction in pension wealth. By allowing for the possibility that substitutability changes with age, they find that substitutability is particularly high (and precisely estimated) for workers between 35 and 45.

A recent study by Scholz et al (2004) for the USA, asks whether Americans are saving "optimally" for retirement. They use a life cycle model but incorporate uncertain life expectancies, taxation and transfers, pension benefits and uninsurable earnings and medical expenses. Their model is able to explain over 80% of the cross sectional variation in retirement wealth accumulation and they argue that the results provide strong support for the life cycle model. The life cycle model does a much better job of explaining retirement accumulations than simply assuming that households save a given fraction of their income (depending on age and income). They find that there is "strikingly little evidence that HRS households have undersaved". They conclude:

> "The results, based on data from the Health and Retirement Study, are striking… We find that the model is capable of accounting for more than 80 percent of the 1992 cross-sectional variation in wealth. Fewer than 20 percent of households have less wealth than their optimal targets, and the wealth deficit of those who are under saving is generally small".

Engen, Gale and Uccello (2004) use a simulation model of optimal wealth accumulation for retirement that is based on consumption smoothing.[25] An important feature of their work is that it allows for precautionary savings in the face of uncertain future earnings. A second innovation in their work is the use of lifetime earnings rather than current earnings. In the present study we have been restricted to using current earnings, as no data were available for lifetime earnings to date of individuals in the sample of the HSS. Current earnings may well reflect a transitory component so for example an observed low level of earnings in the survey year may understate the life time earnings level of the individual. This could result in the level of savings and retirement wealth being underestimated, and creating an impression of adequacy of saving based on a transitory rather than a permanent measure of earnings.

[25] Their model holds the marginal utility of consumption constant rather than the level of consumption as in the present study. A comparison of the two approaches is given in Scobie and Gibson (2003).

The authors find that households at the median level of wealth to lifetime earnings are saving as much or more than the optimal needed for consumption smoothing. At the high wealth end of the distribution, actual saving rates are significantly greater than the optimal level, but among the lowest 25 percent of the population there was undersaving.

These results are very similar to the case of New Zealand reported in this study. However because of the role played by NZS, undersaving appears to occur more in the second to lowest quintile of the income distribution than in the lowest group. Engen, Gale and Uccello also stress that any reduction in Social Security benefits "could have significant deleterious effects on the adequacy of saving especially among low-income households". The implication is that like the case of NZS, Social Security represents the principal if not only source of retirement income for many low income households, and their retirement savings have been heavily influenced by the expectation of receiving these payments. Any changes would seriously disadvantage this group of households.

3 Conclusions

This paper has focussed on the accumulation by New Zealand households for retirement. The question addressed in the paper is as follows: based on the results of the Household Savings Survey, what can be said about how adequately New Zealanders are saving for retirement? To answer this question one must establish some criterion of adequacy.

There are many candidates, but this paper uses a life cycle approach and posits that retirement savings are undertaken in order to smooth lifetime consumption. Using a model derived from this premise, and based on the observed wealth accumulations at the time of the survey, we are able to estimate for individuals and couples the rate of saving they would need to achieve an "adequate" retirement income. By comparing this rate with independent estimates of saving rates from the Household Economic Survey, we are able to offer a tentative conclusion on the question of adequacy. Our results are based on the assumption that current NZS policies will be maintained in the future. Other critical assumptions are that real incomes grow at 1% annually, individuals plan to retire at 65, life expectancies are known with certainty, and that no bequests are made other than the current equity in the principal residence.

The evidence suggests that actual saving rates are quite consistent with people behaving as if they were attempting to smooth consumption over their life cycle. If among the many possible definitions of adequacy, one were to agree that saving at a rate which would allow consumption smoothing represents a plausible definition, then based on the limited information we have available, we find no significant evidence of gross under-saving for retirement by New Zealanders.

There are important limitations in the data for measuring what the actual rate of household saving really is. It has been shown that the definition of saving has a critical effect. In particular when durable expenditure is all regarded as current consumption in the year of purchase the actual saving rates fall, as they are quite sensitive to small changes in absolute levels of income and consumption. With durables included in consumption the median actual saving rates typically fall below the prescribed rates; however this is not the case for the average savings rates for a particular group; they appear to be more than sufficient to sustain their consumption levels in retirement.

There is of course a distribution of saving rates across any population group, and regardless of the median level of savings for the group, some individuals might be saving

at a rate which later, they may come to view as "too low". Even if all households were saving adequately this should not be interpreted as indicating that the nation as a whole is saving adequately. That may or may not be the case – but in any event is not a question that can be resolved by looking at the savings of one sector in isolation.[26]

It should be stressed that we have deliberately adopted a conservative position in estimating future retirement incomes; the net effect of these conservative assumptions is to make the required saving rates we estimate higher than they would otherwise be. We allow for no further capital appreciation on housing, farms, commercial or rental properties, time shares and all other property. We exclude the primary residence from the calculation of the retirement annuity; ie no equity in the house is used to support retirement incomes. We assume a modest rate of return on other assets.

We assume full survivor benefits; ie, the same real consumption as enjoyed prior to the death of a partner is available to the surviving partner. In other words, the level of pre-retirement consumption is assumed to be sustained until the death of the surviving partner. In fact consumption requirements typically fall with age. Based on an analysis of the Household Economic Survey, Gibson and Scobie (2001) show that the median level of consumption expenditure falls by some 30% as the age of the household head increases from 65 to 75. Arguably this could arise due to income being constrained, forcing a decline in real consumption. In fact savings rates (both mean and median) rise, not fall over this period. One would not expect to observe rising saving rates if consumption were to be constrained by inadequate income. We conclude that our assumption of requiring a constant level of retirement consumption is conservative, given the evidence that people in fact appear to have reduced consumption needs as they grow older. The effect is to make the prescribed savings rates higher than they would otherwise be.

We assume that people face no uncertainty about their life expectancy.[27] Clearly this is not the case in reality. However for those on modest pre-retirement incomes and for whom NZS will constitute the majority of their post-retirement income, this is not an issue due to the lifetime annuity aspect of NZS. This applies to a very significant share of the population.

However, in higher income deciles not all of their retirement income is so protected. That part which is represented by NZS carries the lifetime annuity, but the remainder is by our assumptions, only protected until they reach the age of their life expectancy, given their gender and ethnicity. It would, therefore be expected that in order to compensate for this uncertainty people in the upper income deciles would save at a rate somewhat greater than that which would be needed if they could accurately forecast their age at death. In fact, this is precisely that which we observed – those in the upper 40% of the pre-retirement income distribution appear to save at a rate greater than that prescribed by our approach to adequacy. This phenomenon might well be reinforced by their desire to leave bequest beyond the equity in the primary residence which we allowed for. In short, the fact that actual overall saving rates for these age groups exceed those necessary to achieve consumption smoothing may well reflect the fact that people do allow for uncertainty and their saving incorporates a precautionary component.

[26] For an analysis of the impact of population ageing on the optimal national saving rate see Guest, Bryant and Scobie (2003). For an overview of savings issues see The Treasury (2003).

[27] Dynamic micro-simulation modelling offers the prospect for incorporating uncertainty about such factors as health status, income and employment, marriage formation and dissolution and life expectancy in models of retirement wealth accumulation. For a selection of models and their applications see NATSEM (2003).

A significant proportion of individuals has little or no accumulation and will rely exclusively on NZS. This provides a floor under retirement incomes. For those aged 56-64 planning to retire at 65, NZS would represent an income close to 60% of the median predicted retirement income for that group. Those relying on NZS are from the lower income quintiles, and for them the preferred strategy is not necessarily to try and save more; that would reduce their current consumption levels which are already low. If their retirement incomes are felt to be too low, higher pre-retirement earnings must eventually be the route to greater savings and higher retirement incomes. Across the entire population 24% would make no further savings for retirement if their preferred strategy is to achieve consumption smoothing. Of these over half come from the lowest income quintile.

A dominant theme that emerges from this study, albeit not a surprising one, is that NZS plays a critical role in the planning, saving and income for retirement. There are three reasons for this. In the first place NZS places a floor under the incomes of retirees, such that even where some fall below what is arguably a poverty line, the gap is negligible. Second, the presence of NZS significantly reduces the inequality of retirement wealth accumulation. Finally, the finding that NZS represents a major portion of the retirement wealth accumulation for some groups is consistent both with the basic predictions of the life cycle model, and is reinforced by findings for the USA and the UK. For almost half of those in the lowest 40% of the income distribution, their preferred strategy for achieving consumption smoothing is to make no additional saving for retirement. The case for arguing that this group is saving "inadequately" for retirement may better be viewed as a statement about the absolute level of their pre-retirement incomes, rather than their saving behaviour. Given their level of income together with the expectation of NZS, we find that their behaviour is rational when assessed against a model based on smoothing lifetime consumption.

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Appendix Table 1 – Mean and median values of current and projected retirement wealth for couples: all age groups: 2001

Current Wealth Quintile	Current Wealth		Projected at Age 65	
	Mean	Median	Mean	Median
1 (= lowest)	245,229	247,404	449,446	453,705
2	338,548	339,017	504,373	506,533
3	451,124	446,786	606,172	598,986
4	637,488	633,408	808,565	787,856
5 (= highest)	1,292,713	1,034,909	1,605,824	1,289,922
Total Sample				
Housing wealth	85,502	36,000	85,502	36,000
Financial wealth	205,187	51,350	258,875	64,492
Pension wealth	26,982	0	37,836	0
Superannuation wealth	275,075	270,414	412,394	408,306
Total wealth	592,747	446,786	794,607	607,687
Ethnic Sub-groups				
Pakeha				
Housing wealth	94,804	52,000	94,804	52,000
Financial wealth	242,035	66,479	305,291	85,374
Pension wealth	31,306	0	43,508	0
Superannuation wealth	279,222	273,918	414,202	410,753
Total wealth	647,367	496,751	857,805	656,124
Māori-Pacific				
Housing wealth	36,256	0	36,256	0
Financial wealth	69,887	8,600	87,927	9,498
Pension wealth	13,966	0	20,839	0
Superannuation wealth	252,955	243,224	396,080	389,914
Total wealth	373,064	301,466	541,101	457,841

Note: All values are weighted to population averages and are in 2001 dollars. Ethnicity of a couple refers to that of the respondent.

Appendix Table 2 – Mean and median values of current and projected wealth for unpartnered individuals: all age groups: 2001

Current Wealth Quintile	Current Wealth		Projected at Age 65	
	Mean	Median	Mean	Median
1 (= lowest)	117,759	129,172	249,975	259,581
2	154,304	154,986	277,932	276,024
3	186,395	184,284	291,313	290,721
4	278,012	276,251	370,241	372,322
5 (= highest)	643,737	503,353	786,071	612,104
Total Sample				
Housing wealth	40,043	0	40,043	0
Financial wealth	64,429	6,480	81,611	8,000
Pension wealth	10,237	0	15,110	0
Superannuation wealth	160,993	157,385	258,012	256,254
Total wealth	275,702	184,230	394,777	310,100
Ethnic Sub-groups				
Pakeha				
Housing wealth	45,996	0	45,996	0
Financial wealth	76,215	9,190	95,270	12,384
Pension wealth	11,811	0	17,709	0
Superannuation wealth	166,937	163,711	264,665	263,552
Total wealth	300,960	204,405	423,640	332,780
Māori-Pacific				
Housing wealth	15,630	0	15,630	0
Financial wealth	34,885	811	46,503	829
Pension wealth	4,769	0	6,743	0
Superannuation wealth	142,641	139,062	235,230	237,271
Total wealth	197,925	146,084	304,106	254,280
Male				
Housing wealth	29,261	0	29,261	0
Financial wealth	89,496	8,700	114,565	11,487
Pension wealth	12,125	0	18,860	0
Superannuation wealth	145,781	142,618	240,243	241,531
Total wealth	276,663	165,879	402,929	283,071
Female				
Housing wealth	48,425	0	48,425	0
Financial wealth	44,942	4,781	55,993	5,511
Pension wealth	8,769	0	12,196	0
Superannuation wealth	172,819	172,570	271,826	270,036
Total wealth	274,955	194,056	388,440	328,483

Note: All values are weighted to population averages and are in 2001 dollars.