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Net Wealth of New Zealand Households: An Analysis based on the Household Savings Survey

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Paper presented to a Symposium on Wealth and Retirement

sponsored by the Retirement Commission

Wellington

13 June, 2003

Abstract

Statistics New Zealand has recently released the results of a new survey of the assets and liabilities of New Zealand households. This paper presents some initial analyses of this rich data set. Results are presented for both non-partnered individuals and for couples. The paper presents some of the basic information contained in the survey, and then explores the key factors that explain differences in net wealth across households. It is found that once allowance is made for a range of household characteristics (both demographic and economic), there are limited differences due to ethnicity. The effect of the student loan scheme on various measures is explored. Finally, the paper presents an initial attempt to allow for human capital as an asset. This is found to be a significant element in total net wealth.

JEL CLASSIFICATION D31: Personal Income and Wealth Distribution
J26: Retirement

KEYWORDS Household net wealth; retirement; New Zealand

The results presented in this study are the work of the author, not Statistics New Zealand.

Access to the data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975.

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1 Introduction

There are a range of public policy issues that might be better formulated and evaluated if information were available on the assets and liabilities of households. Issues relating to regional disparities in income and wealth, cost of living, poverty, retirement policy, the adequacy of saving for retirement, the effect of the student loan scheme and possible ethnic differences in net wealth could potentially all be better understood with information about the net worth of individual households. Furthermore, to the extent that there were to be a continuing survey of household net worth, then issues such as an improved measure of actual household saving and changes in the distribution of wealth over time could be analysed.

Up until now, no such information has been available in New Zealand. Estimates of household wealth at the aggregate level have been made (Thorp and Ung 2001) but no data at the unit record level had ever been assembled in a national survey. In 2001 Statistics New Zealand undertook such a survey for the Office of the Retirement Commissioner, and the results were recently released (Statistics New Zealand 2002a, b). The survey is entitled the *Household Savings Survey* and referred to as the HSS. This paper reports analyses of the survey results that have been generated through a joint project between the Office of the Retirement Commissioner and The Treasury.

The paper proceeds as follows. After some brief notes on the survey itself (section 2), we present a glimpse of some of the basic findings of the survey (section 3). We then report on some preliminary models that are aimed at identifying key variables that explain the observed differences in net worth (section 4). The following two sections address specific issues that have been raised: possible ethnic differences (section 5) and the impact of student loans (section 6). The survey covers the physical and financial assets of households, but has not attempted to collect information about human capital. In section 7 we make a first attempt at augmenting the survey results for household net wealth by adding estimates of human capital. The conclusions and directions for future work are presented in Section 8.

[1] We are most grateful to Tanya Randall, Mike Camden, Irene Zeng, Jean Watt, John McGuigan and Sandra McDonald of Statistics NZ for their support in organising access to the data and for guidance and comments. David Feslier of the Office of the Retirement Commission (ORC) has been instrumental in supporting this project which has been a joint undertaking between the .ORC and the Treasury.

2 The survey

The survey[2] covered those over 18 years old living in private dwellings and usually resident in New Zealand. 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). The survey results, when appropriately weighted, represent about 98% of the resident adult population. The socio demographic characteristics of the respondents are summarised in Appendix Table 1 and Appendix Table 2.

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 where they had a partner, information was collected for the couple, ie, where the respondent and his/her partner were living in the same household the couple was interviewed as a single unit. 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 non-partnered individuals and couples rather than for households or families.

3 Some basic indicators

In this section we present a very brief summary of some indicators of net worth[3]. Across all individuals the median reported level of net worth was $10,300, while the mean was $97,900. The large discrepancy between the mean and the median is indicative of a highly skewed distribution of net worth with a long "right hand tail" to the distribution; ie a few very high net worth individuals. A similar pattern emerges for couples where the median net worth was $172,900 and the mean $322,300. A summary of the distributions is given in Table 1.

Table 1 – Distribution of net worth for individuals

Level of Net Worth	Percentage of all:	
	Individuals	Couples
Negative	23	8
$0 - $20,000	34	10
$20,001 - $100,000	16	18
$100,001 - $500,000	23	45
$500,001 and more	4	19
Total	100	100

Source: (Statistics New Zealand 2002b), Table 2.01

Some 23% of all individuals and 8% of couples report negative net worth. Among the individuals, over one half are between 18 and 24 years old. Of that age group, 43% of all respondents reported negative net worth, in contrast to 7.5% of those individuals and about

[2] For further details see (Statistics New Zealand 2002b).

[3] Statistics NZ uses the term "net worth" to refer to the results from the HSS. We preserve that terminology but additionally introduce the term "net wealth" which expands the concept of net worth by adding human capital.

1% of couples between 45 and 64 years of age[4]. The proportion of males and females reporting negative net worth is virtually the same, as is the mean net worth of males and females. However female respondents not living with a partner report a median net worth some 65% greater than for individual male respondents.

The overall distribution of net worth is highly skewed with a small number of individuals having substantial levels of net worth. Typically, the distribution of net worth is much more unequal than the distribution of income. For any given level of income, different life events such as inheritances, bequests, health, employment status, marital status and the number of dependents vary widely. Furthermore preferences for consumption versus saving differ widely across individuals. As a consequence, net worth is much more unequally distributed than disposable income. Further evidence is found in the Gini coefficient, an index of inequality which ranges between zero (a perfectly uniform distribution of income or wealth) and unity (all wealth held by one individual). The population of all economic units (individuals and couples) has a Gini coefficient for net worth of 0.689 in contrast to the Gini for all household disposable income of 0.322.[5]

While there is considerable inequality across all economic units, there is also marked concentration in the holdings of wealth within each age group. For example, among 45-54 year olds (typically the age group with the highest average net worth) about two-thirds of the wealth is held by the top 20% of individuals (see Table 2).

Table 2 – Net worth held by the top 20 percent: by age group

Age Group	Non-partnered Individuals		Couples	
	Total Net Worth ($billion)	Share held by top 20 percent (%)	Total Net Worth ($billion)	Share held by top 20 percent (%)
18-24	1.4	183[a]	0.5	124
25-34	3.7	107	25.8	78
35-44	17.1	79	62.4	60
45-54	20.0	66	78.2	57
55-64	17.8	60	63.5	57
65-74	13.1	59	30.1	59
75 and over	18.0	61	15.4	59

Source: (Statistics New Zealand 2002a),Figure 4.11.

Note: a. Share can exceed 100% due to the significant proportion with negative net worth.

Amongst the age group typically thought of as retired (65 and over), the mean level of net worth was $197,100 and the median $120,900. Individuals in this age group report a median value of property assets of $135,000 and a median level of mortgage liability of $28,000. Clearly a significant part of the net worth of the over 65 age group is represented by property. Approximately 30% of all those individuals over 65 report net worth greater than $200,000.

A similar picture emerges for couples. Among those 65 and over (the age of the respondent in the case of couples), the mean and median net worth are $359,500 and $211,500 respectively. Based on equal shares this implies a *per capita* mean of about $180,000, and

[4] Unless otherwise noted reference to the age of a couple refers to the age of the respondent.

[5] See Statistics New Zealand, 2002 , p.28.

a median of $106,000, figures of the same order of magnitude as those for non-partnered individuals. However, these comparisons do not hold constant other factors such as income, employment etc, and it may well be that there are underlying differences between individuals and couples.[6] Couples aged 65 and over reported a median value of property assets of $171,000, and a corresponding level of mortgage liabilities of $42,000. Their net property investment represents about 35% of their total median net worth.

Across all economic units, property represents the single largest asset type (Table 3). Thirty six percent of all net worth is held in this form. Farms and business represent 18%, while most other assets are a minor share of total wealth. In contrast, 80% of total liabilities comprise mortgages (see also Table 3) while student loans represent 5% of all liabilities.

Table 3 – Composition of assets and liabilities of economic units

Assets		Liabilities	
Type	Share of Total Assets (%)	Type	Share of Total Liabilities (%)
House	36	Mortgage	80
Farms & Business	18	Bank Debt	10
Super. & Life Ins.	8	Student Loan	5
Trusts	6	Credit Card/HP	4
Shares & Funds	6		
Bank Deposits	6		
Rental Property	4		
Motor Vehicles	4		
Total $bn	$444bn		$68bn

Source: (Statistics New Zealand 2002a) Figure 9.1

Tables 4 and 5 give the median levels of each type of asset and liability held by individuals. For example, 37% of all individuals report holding property with a median value of $139,000, while 70% of couples hold property assets worth a median value of $184,000. Superannuation assets are held by 12% of individuals and 32% of couples, with median values of $12,000 and $30,000.

Although the value of collectively held Maori assets is reported in Table 4, this type of asset is not included in the calculation of net worth. The HSS did not ask questions to determine whether such assets would be readily available to the respondent, and instead assumed that they would not. In total, 2.8% of non-partnered individuals and couples hold Maori assets, although 52% of the respondents holding such assets were unable to place a value on them. Hence, the median value of Maori assets reported in Table 4 is calculated only from those respondents who could place a value on their share of the asset.

A key aim of the current analysis is to examine wealth differences across ethnic groups so the exclusion of an asset held particularly by one ethnic group may appear to undermine such analysis. However, only a minority of Maori report holding Maori assets, and those who do have higher net worth than other Maori, even with the value of their Maori assets excluded. In other words, the exclusion of Maori assets from the net worth total mainly reduces the estimated net worth of wealthier Maori. Hence, this exclusion is unlikely to

[6] See Section 4 for an econometric analysis of whether unpartnered individuals and couples can be pooled in the same model.

affect analyses based on either the median level of Maori wealth or questions about the adequacy of wealth levels that focus on the poorer parts of the population.

Table 4 – Asset holdings by type and coverage: Non-partnered individuals and couples

Type of Asset	Median Value	Percentage of all non-partnered individuals reporting holding this asset (%)	Median Value	Percentage of all couples reporting holding this asset (%)
Property	$139,000	36.7	183,500	70.0
Superannuation	$12,000	11.6	30,000	31.9
Business	$30,000	4.4	50,000	19.7
Bank deposits	$1,200	89.0	4,000	92.7
Trusts	$101,700	10.9	300,000	5.9
Maori assets	$15,000	2.8	15,000	2.8

Source: (Statistics New Zealand 2002b), Tables 4.01 and 4.02

The most common forms of liabilities are credit cards, although the median value of debt is less than $1,000 in *per capita* terms (Table 5). Mortgages are the next most common form of liability, and have a median value which greatly surpasses the other types of liabilities. Of all individuals, 21% report having a student loan with a median value of $9,000, while 10% of couples report having a student loan (held by either one or both of them).

Table 5 – Liabilities by level and coverage: Non-partnered individuals and couples

Type of Asset	Median Value	Percentage of all non-partnered individuals reporting holding this asset (%)	Median Value	Percentage of all couples reporting holding this asset (%)
Mortgage	$68,000	17.0	$91,400	42.2
Student loan	$9,000	20.6	$8,000	10.4
Credit card	$800	33.7	$1,500	58.8
Bank liabilities	$2000	21.5	$4,000	27.1
Hire purchase	$1000	14.9	$1,300	21.3

Source: (Statistics New Zealand 2002b), Tables 5.01 and 5.02

4 What explains differences in net worth?

Clearly there are wide differences in the level of net worth. We have noted that the dispersion of net worth typically exceeds that of income; in fact income is only one factor which might explain the pattern of wealth accumulation. Attitudes toward risk, differences in time preferences, health and marital status, number of children, the presence or expectations of inheritances, the strength of a bequest motive to leave wealth to future generations, expectations of future earning power, labour force status, life expectancy and health, the extent of family support networks, the level of income replacement supplied by public pensions, the provision of publicly funded education, health services, and welfare

benefits and asset tests in social benefit schemes that discourage wealth accumulation could all affect the observed level of wealth accumulation and contribute to explaining the dispersion in net wealth across individuals. A snapshot of the net worth of economic units such as that provided by the HSS is an encapsulation of many forces that have shaped peoples lives, and the policies that have influenced their decisions up to the time of the survey.

It is likely that there are significant age cohort effects, and it should be emphasised that a single cross-sectional survey cannot untangle these. The implication is that we should be cautious in inferring, for example, that the net worth pattern of today's 60-64 year olds is a good predictor of the net worth that today's 40-44 year olds will have in 20 years time[7]. It may well be that some of the relations we observe with age do not necessarily represent the dynamic patterns of wealth accumulation that would apply to individuals of the same cohort over their life cycle.

Not all the factors that might explain the differences in net worth across individuals are observable. As a consequence it is to be expected that any model of net worth holdings will only explain a part of the variation across individuals. Typically we find we are able to explain between 30 and 40% of this variation.[8] Clearly this leaves unexplained a significant part of difference in net worth levels across individuals.

The HSS contains no information about health status. Differences in health status would likely be associated with labour market earnings and both the capacity and the perceived need for wealth accumulation. It may be that individuals with a more precarious health status would attach more weight to precautionary savings. Above all, wealth accumulation depends critically on an individual's preference for present consumption over future consumption; some will save much more from a given income with a view to higher consumption (or making bequests) than others – in short there are squirrels and cicadas and it is not possible to capture these differences in individual preferences from the data from the HSS.

Ideally we would have measures for all these factors. While that is not possible, the HSS does contain a rich set of information on which we have drawn. Our approach has been to estimate multivariate regression equations which can be thought of as descriptive models. We have used as covariates many factors which might reasonably be considered as influencing the level of net wealth. We start with a set of variables that we consider as a "core" model, related to demographic characteristics, education, location, inheritances, and income. While some of these variables may be chosen with lifetime wealth objectives in mind, we ignore any modelling of their endogeneity and treat them as predetermined, at least by the time the HSS observed respondents. Alternative sets of explanatory variables are added to the core model, to represent different asset holding behaviour (risky versus safe), labour supply and occupational choice, and fertility and family structure decisions.

The first set of variables in the core model are for age. We would expect the level of wealth to generally rise with age, but as it may first decline as young people borrow, and also decline in later years as retirees draw down some accumulated saving, then we include age, age squared and age cubed to allow for two turning points.

To illustrate, the following model of net worth as function of a cubic in age was fitted:

[7] For estimates of how past saving behaviour differs by age cohort in New Zealand see (Gibson and Scobie 2001).

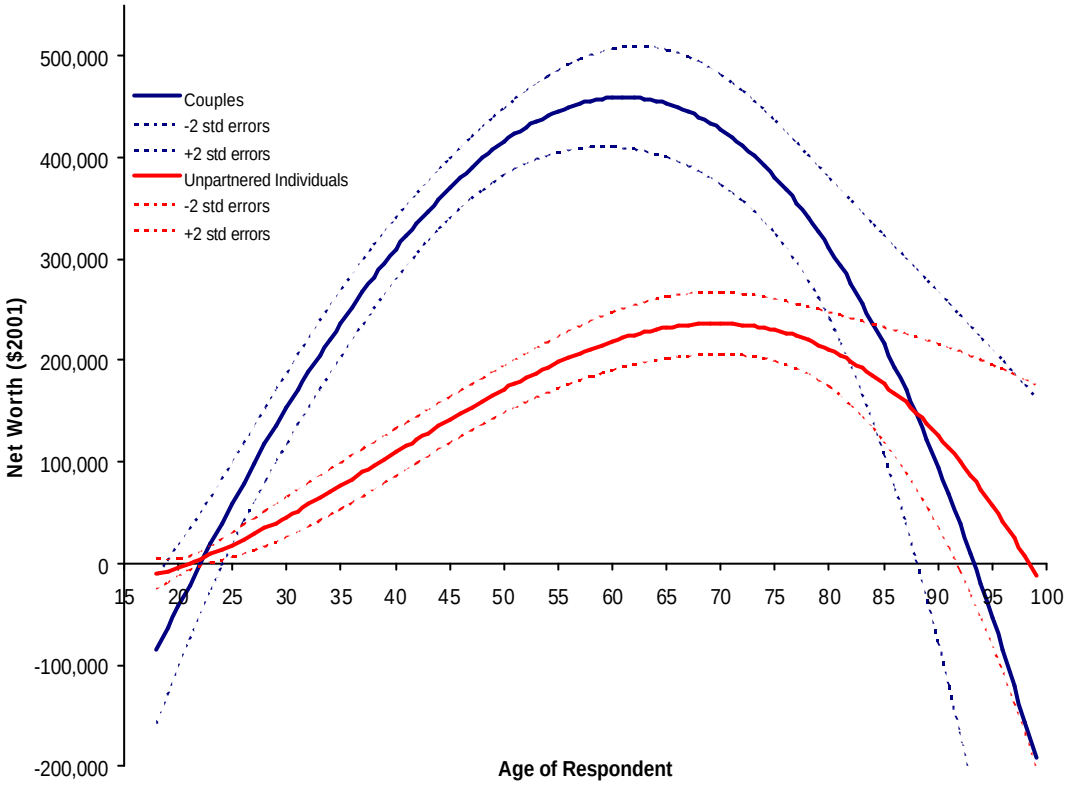
[8] (Smith 1995) is able to explain 30% of variability for similar models estimated on USA data.

Individuals: $NetWorth = -4817.54 + 4646.52A + 282.99A^2 - 2.39A^3$

Couples: $NetWorth = -501752 + 24136A - 17.91A^2 - 1.96A^3$

where A = age of the respondent in years.[9] The pattern from these cubic specifications are shown in Figure 1 where average net worth of individuals is seen to peak at age 70, and somewhat earlier for couples. The upper and lower bounds are based on two standard errors (ie, the 95% confidence interval) either side of the predicted mean.

Figure 1 – Predicted net worth of individuals and couples by age



The fitting of separate models to non-partnered individuals and couples is a recurring feature of the analyses in this report. One reason is that the two groups have different characteristics, so couples are not just the same as two individuals living together and separate models help to reflect this fact. Apparently, characteristics that are valuable when forming and maintaining a couple are also favourable for the accumulation of net worth, so in *per capita* terms, couples are wealthier than non-partnered individuals. For example, the unconditional average net worth of couples is over three times that of non-partnered individuals, rather than simply double which would be expected if couples were just like two individuals.

These differences between couples and non-partnered individuals persist even when differences in their observable characteristics are controlled for. Age is one such difference, with the respondents from couples being an average of five years older than the non-partnered respondents. But even after controlling for age, the net worth gap persists,

[9] In the case of couples, a quadratic function in age would have been a statistically adequate representation because the cubic term was surrounded by a large standard error. However, the cubic was used to maintain comparability across the two samples. Moreover, when other covariates are added to the model, all terms in the cubic specification become statistically significant for couples.

as is evident in Figure 1. At age 30, a non-partnered individual has a predicted net worth of approximately $40,000, in contrast to a couple (where the age of the respondent was also 30) whose predicted net worth is approximately $150,000; at age 50, individuals have a net worth of $150,000, compared to $400,000 for couples. In fact, even when the full set of characteristics in our "core" model are controlled for, the net worth of couples is $45,000 higher in *per capita* terms.[10] To allow for these unexplained differences in the net worth of couples and non-partnered individuals, we use separate but parallel models for the two groups, utilising the same sets of variables (where appropriate) but allowing different responses to those variables.

The core variables in these models are demographics, education, location, inheritances, and income. The effect of age has already been described. Other demographic variables include dichotomous (zero-one) variables for male/female and never married.[11] Five ethnic groups are included: European/Pakeha. Maori, Pacific peoples, Asian and other. The first group is dropped, so the results are relative to European/Pakeha. Whether the individual was a migrant[12], lives in urban or rural areas and lives in a metropolitan area (Auckland, Wellington or Christchurch) are included as dichotomous variables. Regional variables were also included in a preliminary analysis, but were typically not significant.[13]

The number of years the respondent attended secondary school and the number of years of study post-school are included to reflect the educational differences. Intergenerational effects can also affect differences in wealth and we include the following three variables: has the respondent ever received an inheritance of $10,000 or more; what was the amount inherited; and does the respondent think they will inherit $10,000 or more at some time in the future. We note in advance that the results for the amount inherited may be clouded somewhat by measurement error because the survey used broad categories, which we converted to a continuous variable by taking the mid-point.[14] Moreover, the survey did not indicate when the inheritance was received, so there was no way to convert the reported values into a set of common prices.

A final set of variables relates to income. We include a set of dichotomous variables for the major source of income, together with the level of total income and a quadratic term in income. A complete listing of all the variables used (both in the core model and subsequent extensions) together with their definitions and mean values is given in Appendix Table 1 for non-partnered individuals and in Appendix Table 2 for couples.

[10] This difference of $44,480 is statistically significant at the 99.9% confidence level, with t=3.40. A more general model allows each variable in the core model to have a different coefficient for couples than for non-partnered individuals. A test of these interaction effects (*aka* slope dummy variables) rejects the hypothesis that they are all jointly zero ($F_{(27,553)}$=5.27), which corroborates the previous result based just on an intercept dummy variable model. These tests suggest that it is not econometrically appropriate to pool couples and non-partnered individuals in the same model.

[11] Other categories included in a trial estimation but found to be not significant, included divorced, widowed, separated, legally married and not specified.

[12] An alternative variable would be the number of years since arrival in New Zealand. However there are too few observations on migrants within the total sample to use this variable.

[13] The exception was a positive effect for non-partnered individuals in the Tasman/Nelson/Marlborough region, which disappears once standard errors are corrected for the clustered and stratified nature of the sample.

[14] Specifically, there were intervals of $10,000 from $10,000 to $50,000, then intervals that widened at every step. The final interval was $500,000-$1,000,000.

4.1 Results for non-partnered individuals

The basic results for the core model applied to this population are given in Appendix Table 3. Age has a significant effect on wealth. Initially, net worth declines as age rises, but from age 28 years onwards, net worth rises with age. The second turning point occurs in the mid-70s, after which wealth again declines with age. Neither gender nor marital status have any significant effect on the net worth of non-partnered individuals.

The ethnicity effects are measured relative to European/Pakeha. None of the categories are significantly different from the reference group with the exception of Asian respondents, whose average level of wealth is $44,000 above that of the European/Pakeha group. Notably, Maori respondents show no significant difference from the level of European/Pakeha net worth, in any of the models considered in Appendix Table 3. We return to the issue of ethnicity in greater detail in Section 5.

Both rural and metropolitan respondents have a higher net wealth than urban (+$68,000) and non-metropolitan (+$13,800) respondents. However, the metropolitan effect, which is based on residence in either Auckland, Wellington or Canterbury, is not statistically significant. It is perhaps not surprising that the rural respondents, who include farm owners, report significantly greater net worth, especially following the recent agricultural boom and the associated rise in asset values. Migrants have a somewhat average lower level of net wealth but it is not significantly below that of those born in New Zealand.

The number of years of secondary schooling is significantly related to net worth, with each additional year increasing average wealth by $7,100. Interestingly, post-secondary schooling years are not significantly related to wealth. Those completing higher tertiary study typically remain at school longer, such that the secondary schooling variable has already accounted for part of the educational effect on wealth. In fact some with post schooling years are those who have left secondary school early and subsequently studied in a diploma or certificate course, which has not necessarily lead to higher wealth accumulation than those who completed secondary schooling even if they had fewer years of post school education.

All variables relating to inheritance have a significant positive effect on net worth. Those who have ever received an inheritance of over $10,000 have an observed stock of wealth some $44,000 greater than those who had had no inheritance. Holding this 'intercept effect' constant, every additional dollar of inheritance received resulted in an average of 57 cents of greater net worth. Another way to study the 'pass through' from inherited wealth to current net worth is to estimate the equation with out the indicator variable for the receipt of an inheritance. According to this estimate (which is not reported in an Appendix Table), every dollar inherited increases net worth by 68 cents (with a standard error of 24 cents). While this result could indicate that almost one-third of inheritances are consumed, the measurement error described above will also tend to attenuate the coefficient estimate. Notably, this coefficient estimate does not allow the hypothesis of 100% pass-through to be rejected ($F_{(1,525)}$=1.87, p<0.18). The final inheritance variable indicates that those expecting to receive an inheritance of $10,000 or more already have $24,400 more net worth on average than those with no such expectation. This could reflect an ongoing cycle of intergenerational wealth transfer, if those expecting an inheritance also expect to make bequests.

The main source of income appears to matter. Those respondents who obtain most of their income from self-employment, investment or other forms of non-wage income

(excluding superannuation and pensions) have significantly higher net worth than do those on wages and salaries. Those whose main source of income is NZ superannuation average $53,800 less in net worth than those on wages and salaries. This comparison holds age constant and may well apply to those superannuitants who have left the workforce early because of disability or ill health. However the effect is only marginally significant.

Table 6 gives the simple correlation coefficients between indicators for the main source of income and net worth. None of these correlations are particularly high. Only those who are self-employed or who have investment income show any significant degree of correlation with net worth. This pattern is also repeated in the correlations for couples. The other feature of Table 6 is that the correlation between current income and net worth is only 0.33 (0.36 for couples), which suggests that factors other than income may be important contributors to wealth accumulation.

Table 6 – Simple correlation coefficients between net wealth and indicator variables for the main income source

Income Source	Non-partnered individuals	Couples
Main income source is wages and salaries	0.0142	0.0303
Main income source is self-employment	0.3423	0.2504
Main income source is NZ Super	0.1568	0.0198
Main income source is other pension	0.0709	0.1246
Main income source is other support	-0.1327	-0.1318
Main income source is investment	0.3546	0.2827
Main income source is other	0.1675	0.0896
Total income	0.3267	0.3604

One set of factors that may explain why people with similar incomes have different net worth, concerns attitudes to asset holding. The HSS did not ask attitudinal questions, so we proxy for these concepts by using the age that the respondent first bought property, and the share of net worth held in various forms. Those who bought property at a younger age have higher net wealth, some $2,000 extra for each year younger when first acquiring property. In addition those holding a higher share of property in their portfolio had higher net wealth. In an attempt to assess whether risk aversion might influence wealth accumulation we included a variable for the proportion of the portfolio held in shares. If those holding more shares were less risk averse they may be inclined to invest in higher payoff instruments and may have accumulated more wealth. However there is no significant effect.

The proportion of equities held as assets will depend not only on the attitude to risk, but the also on the risk associated with other assets. For most individuals with labour income, their principal asset is their non-tradable human capital, which represents a claim on a future income stream. If this stream were regarded as riskless, then we would expect the allocation of other assets to be biased toward more risky assets. Hence those with high levels of relatively secure labour income whose health status seems favourable, would be expected to hold a higher proportion of riskier assets than those with a greater risk of redundancy, periods of unemployment or poor health. Hence the proportion of equities held

may, in addition to capturing the effect of attitudes to risk, may be also a reflection of the perceived riskiness of other assets, regardless of risk preferences.[15]

The remaining three sets of estimates in Appendix Table 3 relate to models that add labour force status, occupation, and fertility-related variables. Only a few of the additional coefficients are statistically significant and their inclusion has no effect on the previously reported characteristics. Most of the remaining analysis is therefore concentrated on the "core" and "core + portfolio" models.

The results presented to this point have been based on ordinary least squares regressions (OLS). However as the conditional distribution of net worth is highly skewed with respect to a number of variables, we have also estimated median regressions. Results are given in Appendix Tables 4 and 5. The effect of the median regressions is to provide different estimates of the effect of a variable on net worth where the mean and the median differ substantially.[16] As an illustration consider the effect on the coefficients for Asian respondents in Appendix Tables 3 (OLS) and 4 (median regression). In the first case they are found to have net worth $44,000 above that for European/Pakeha. However the presence of a limited number of very high net worth individuals will raise the mean well above the median. As a result, when fitting the regression through the median, the coefficient for Asian respondents falls to $8,900. Similarly, those with NZ Superannuation as their main source of income have on average net worth some $54,000 less than wage and salary earners. However, the effect at the median is only $1,500.[17]

4.2 Results for couples

In this section we present the results of regression models estimated for couples. Dealing with couples adds an additional dimension to the analysis. In particular, we have two possibilities to represent the characteristics of couples. The first is to maintain a separate set of variables for both of the respondent and the partner. An alternative approach is to construct variables that represent the couple in some sense. For example in the first case we might include the amount inherited by the respondent and the partner as separate variables, while in the second we could construct a combined variable for the total amount inherited by the couple. In the basic OLS regressions we present both sets of results.

A second way in which couples add a dimension to the analysis is that they allow us to go beyond traditional 'unitary' models of household asset accumulation. The traditional model treats the household as a single individual. But in reality, partners (or spouses) may have separate preferences and there can be possible conflicts of interest. Consequently,

[15] For further discussion see Campbell et al. (1999).

[16] In the case of median regressions the standard errors of the coefficients have to be derived by a boot-strapping procedure. In the first case we do this by successive random drawings with replacement from the entire sample set of observations (2,392 in the case of individuals). We have limited the number of random draws to 20, largely governed by the fact that one run takes over an hour of computing time. One consequence of this procedure is that a repeated run would not necessarily give the same set of values for the standard errors, as it would be based on different randomly choose values. Randomly drawing from the entire sample set ignores the fact the underlying sampling procedure was based on a cluster sample approach. We have therefore repeated the median regressions and re-estimated the standard errors to given a set of t-statistics that allow for this. This adjustment has no effect on the point estimates of the regression coefficients, but does alter the associated t values. The results for the median regression for individuals with t-statistics adjusted for clustering are given in Appendix Table 5.

[17] As another example, for each dollar inherited, net worth at the median level is 90 cents higher compared to 57 cents at the mean. The mean apparently includes higher net worth individuals who have received an inheritance and were more profligate than the typical (median) beneficiary.

policies that affect bargaining power may affect household outcomes such as saving. We explore these effects, using one particular variant of an 'intra-household' model.

Appendix Table 6 presents the OLS regression models for couples, controlling for separate individual characteristics. The age of the respondent is a significant determinant of net worth, and follows closely the pattern observed for individuals. Specifically, net worth declines as age rises until about age 30, and then increases with age until about age 80 before declining again. There is no significant effect on net worth due to the age of the partner. Again there are no significant gender effects for the respondent or the partner. However couples who are married have, on average, a higher net worth (+$58,000) than those not married. There are no significant differences due to ethnicity of either the partner or the respondent.[18] The respondent's schooling contributed to greater net worth but the partner's schooling had no significant impact. In general once the characteristics of the respondent have been accounted for, there appears to be very little added explanatory power coming from the variables describing the characteristics of the partner.

Appendix Table 7 reports the results of the OLS regression for net worth of couples using variables to represent the couple, as distinct from specifying separately the characteristics of each partner. The gender mix appears to matter, with male-male and mixed couples having higher net worth than female-female couples. We now find that there is an ethnic effect, but only when both respondent and partner identify as Maori. In this case, net worth is $68,000 below couples where both identify as Pakeha. Where either one or both are migrants, net worth is significantly reduced. None of the variables for children (ie, age of youngest child, total number of children or whether children are at home) have any significant effect on net worth either in the case of unpartnered individuals, or for couples.

In Appendix Table 8 we report the median regression for couples.[19] Again, the point estimates of the coefficients can be expected to differ from the OLS regression results where the conditional distributions are highly skewed. For example, the effect of ethnicity where both identify as Maori is now reduced to net worth being $37,000 below that for a Pakeha-Pakeha couple. In this case, there are effects of children. An extra child reduces net worth at the median by about $8,000, while the presence of children at home increases net worth by $15,000. Where one partner is unemployed, net worth is reduced by $22,000, while if both are unemployed net worth is reduced by $172,000.

An Intra-household model

In Appendix Table 10 we report the results of the intra-household model. The idea behind this model is that since female partners are typically younger than males (by 2.7 years in the HSS) and have longer life expectancy, women may prefer to save more for retirement than do men. Thus, for couples in which women have greater relative bargaining power may accumulate higher levels of net worth. Evidence for this effect has been found in the United States, where net worth is higher when women have more years of education and are older than their male spouses (Lundberg and Ward-Batts, 2000).

However, in New Zealand the evidence points in exactly the opposite direction. There is a consistent negative effect on net worth when women have greater age, greater years of secondary schooling and larger inheritances than their male partner. This evidence is

[18] The only exception was for partners who identified their ethnicity as "other".

[19] These results are with no adjustment for clustering in the estimates of the t-statistics. Adjustments for clustering are shown in Appendix Table 9.

tempered by the fact that only the effect for secondary school years is statistically significant. Nevertheless, even just for that single variable the result are large; a one year increase in years of secondary schooling for the female partner reduces net worth by an average of $12,000 ($5,700 at the median). This negative pattern is consistent with the evidence of lower (and even negative) required saving rates for women to meet target income replacement rates in retirement (Gibson and Scobie, 2003). Thus, it may not be surprising if improved women's bargaining power shifts income towards current consumption and away from wealth accumulation.

5 Ethnicity and wealth: are there differences?

What do the results tell us about the differences if any in the net worth of different ethnic groups? In the main, the regression results have indicated that once the effect of other variables is accounted for there are few differences in net worth due to ethnicity per se. The purpose of this section is to further analyse these differences, and to decompose them into direct effects of ethnicity and indirect effects that might arise as a result of correlations between ethnicity and other variables such as age, employment or education.

The preliminary classification of the results of the HSS (Statistics New Zealand 2002a, b) suggest that there are strong ethnic differences in the level of observed net wealth. A summary of these results is given in Table 7.

Table 7 – Net worth by ethnic group

Ethnic Group	Non-partnered individuals		Couples	
	Mean	Median	Mean	Median
European/Pakeha	119,900	21,700	369,900	209,900
Maori	38,900	800	138,800	34,700
Pacific Island Peoples	46,400	0	58,500	11,100
Asian	59,900	3,000	224,600	120,100
Other	67,400	0	238,600	98,400
Total	97,900	10,300	322,300	172,900

Source: (Statistics New Zealand 2002a),Figure 5.1.

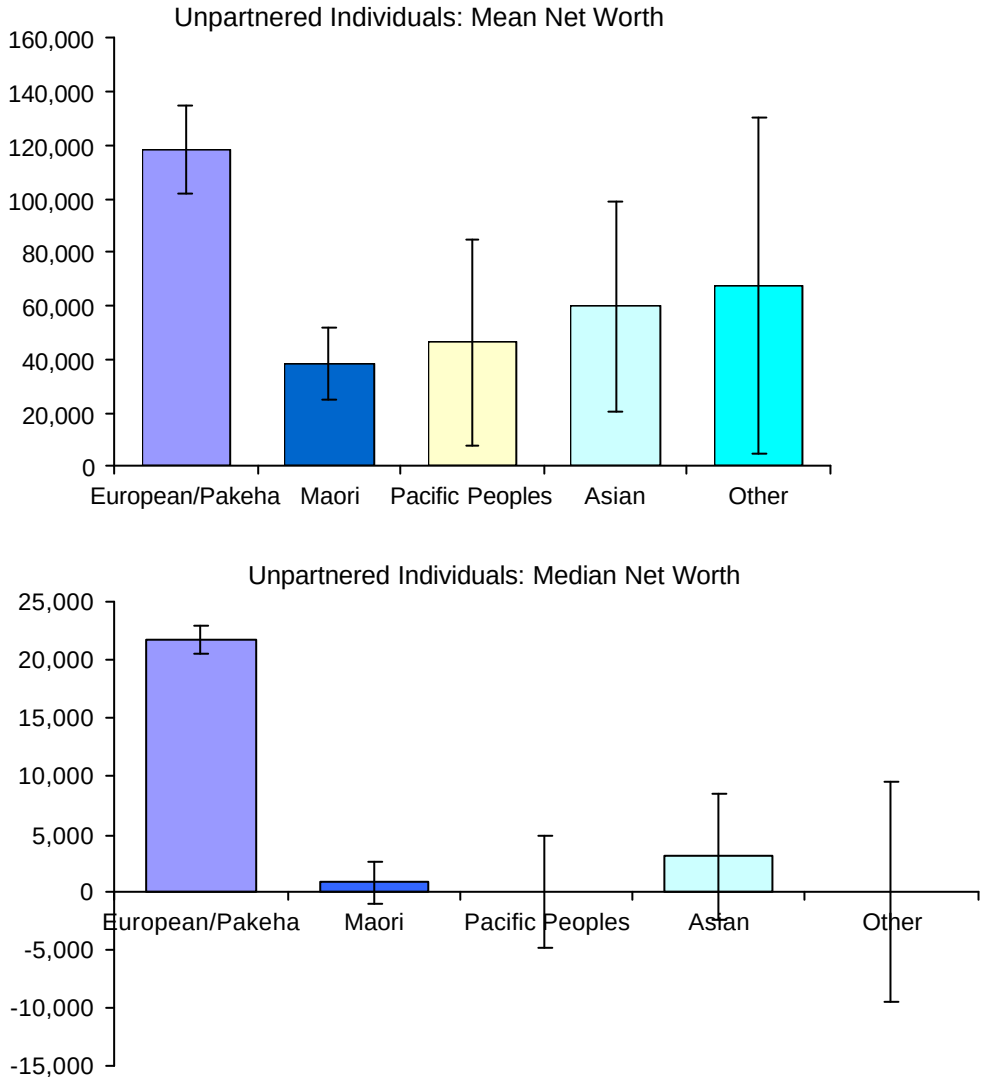
A limitation of this form of analysis is that many other factors (some of which may of course be related to ethnicity) are not explicitly controlled for. For example if it were seen that Pacific Island peoples had lower net wealth than Asians, there exists the possibility that factors such as age or education levels might be different.[20] Unless we control for these (and many other factors) we cannot be certain of comparing like with like. In an effort to isolate the effect of ethnicity on wealth accumulation we have undertaken a series of tests that are reported in this section. The results are reported separately for non-partnered individuals and couples.

[20] Statistics New Zealand emphasise this aspect when they note that "other contributing factors to differences in net worth are differences in education, labour-force status, income and socio-economic status". (Statistics New Zealand 2002a), p.31.

5.1 Results for non-partnered individuals

We start by plotting the means and medians of net worth for different ethnic groups of non-partnered individuals. These figures also include measures of the sampling error, to help assess which of the differences are statistically significant (Figure 2). According to the Figure, the difference across the ethnic groups is even more marked at the median. One reason is that the distribution of net worth is more skewed within some ethnic minorities than it is for European/Pakeha. For example, the mean level of net worth occurs at the 72nd percentile for European/Pakeha but at the 82nd percentile for Maori.

Figure 2 – Means and medians of net worth for unpartnered individuals by ethnic group



Note:
Error bars show 95% confidence intervals. Standard errors for the median are calculated from 100 bootstrap replications, drawn from the stratum/PSU cluster.

The first step in analysing the ethnic differences was to estimate a set of unconditional regressions in which the dependent variable (net worth) was regressed on a set of dichotomous variables for ethnicity. The omitted category was European/Pakeha, whose estimates are given by the constant term. The results for both means and medians are summarised in Table 8.

The absolute values of each group are obtained by summing the constant term (the European/Pakeha coefficient) with the corresponding group coefficient. For example, the mean level of net worth for Maori individuals is given by: $(118,492 – 80,242) = $38,250.[21]

Table 8 – Unconditional regression of net worth on ethnicity for individuals

Dependent Variable:	Type of	Using Means		Using Medians	
Total Net Wealth	Variable	Coefficient	t value	Coefficient	t value
Maori	D	-80,242	**-7.35**	-20,969	**-18.92**
Pacific Island	D	-71,987	**-3.37**	-21,709	**-8.37**
Asian	D	-58,691	**-2.70**	-18,727	**-6.49**
Other	D	-51,109	-1.55	-21,729	**-4.44**
Constant		118,492	**14.06**	21,729	**34.46**

Note: Statistically significant variables shown in **bold**.

However this pattern changes when we allow for a full range of other factors. For example, consider the case of the Core model including variables for portfolio preference (see Appendix Table 3). The estimate for the net worth of individuals identifying as Maori is given by the sum of the constant term and the corresponding coefficient for Maori or $(127,283 – 1,386) = $125,897. In this model, the Maori coefficient is not significantly different from zero, implying that once other variables are held constant (such as age, education, labour-force status and income), there is no remaining difference which can be ascribed to ethnicity.

We now adopt another approach based on (Oaxaca 1975). In this procedure we ask the following question: how much of the observed difference in net worth between Pakeha and Maori non-partnered individuals can be explained by the conditioning variables (age, education, income, etc) and how much remains due to ethnic differences? As a second step we will estimate what proportion of the difference arising from the conditioning variables can be attributed to each – ie how much is due to education, age, labour force status etc.

The gross difference between the net worth of Pakeha and Maori is $(118,492 – 38,250) = $80,242 (see Table 8). The next step is to estimate a regression model of net worth on the full set of covariates but restricted only to the observations for Pakeha individuals. The results of this are given in Appendix Table 11. We can now address the question: what would the net worth of Maori individuals be if they were to have the same set of coefficients as estimated from the Pakeha only model, together with the actual mean values of the variables as observed for Maori?

In other words the following model is estimated:

$$NW^{P} = b_0 + \sum_i b_i^{P} X_i^{P} + u$$

[21] Minor differences between these estimates and those reported by Statistics New Zealand arise as some further editing of the data files was undertaken after the publication of the initial report (Statistics New Zealand 2002a). In addition Statistics New Zealand has rounded many of their published estimates to the nearest hundred.

where NW^p is the net worth for Pakeha, which depends on a set of explanatory variables (X_i^p) and their associated coefficients (b_i^p) together with the error term, (u). The net worth of Maori can then be predicted using the estimated Pakeha coefficients ($\hat{b}_i^p$) and the set of Maori values for the variables (X_i^m):

$$\hat{NW}^m = \hat{b}_0 + \sum_i \hat{b}_i^p X_i^m$$

If the predicted value of Maori net worth using Pakeha coefficients were significantly greater than the estimated value of Maori net worth based on Maori coefficients (with Maori values for the variables used in both cases), then one would conclude that there are differences due to ethnicity, quite apart for the levels of the covariates. In contrast if the predicted level of Maori net worth using Pakeha coefficients is close to that using Maori coefficients, little if any difference could be attributed to ethnicity.

Using the Pakeha coefficients with the Maori values of the variables (see Appendix Table 11) we find that the predicted value of Maori net worth ($\hat{NW}^m$) is $40,130, compared with the earlier estimate based on Maori coefficients of $38,250. In short, there is virtually no difference between the predicted and actual values, suggesting that there is no effect of ethnicity per se that can explain the difference between Maori and Pakeha wealth levels. In fact the difference we observe between Maori and Pakeha levels of mean net worth must therefore be due to differences in the levels of the conditioning variables.[22]

The final step is to decompose this difference: which variables are crucial in explaining the difference? To do this we estimate the following changes in net worth due to the difference between the Pakeha and Maori values of each of the conditioning variables.

$$\Delta NWi = \hat{b}_i^p (X_i^p - X_i^m)$$

The results of this decomposition are set out in Table 9. For the i-th factor, the absolute difference in net wealth between Maori and Pakeha is given, together with the share of the total difference explained by that factor. Negative values for the differences indicate that, due to that factor, Maori net worth is below the Pakeha level, by the amount shown.

Table 9 – Decomposition of the factors explaining the difference between Maori and Pakeha net worth for non-partnered individuals

Factor	Difference (ΔNW)	Share of Difference
Age	-54,124	69.1%
Male	-98	0.1%
Never Married	4,239	-5.4%
Migrant	4,959	-6.3%
Location	894	-1.1%
Education	-538	0.7%

[22] In fact, if the mean value of the characteristics for European/Pakeha are inserted into a model of net worth estimated on the Maori sub-sample, the mean predicted value of net worth is $101,300. The difference of $63,000 between this estimate and the predicted mean using the Maori average value of the conditioning variables reflects one estimate of the value (in terms of net worth) of the difference in demographic, educational, inheritance, income and portfolio characteristics between Maori and European/Pakeha. The other estimate comes from applying the coefficients from the European/Pakeha model to the difference in characteristics, as reported in Table 9.

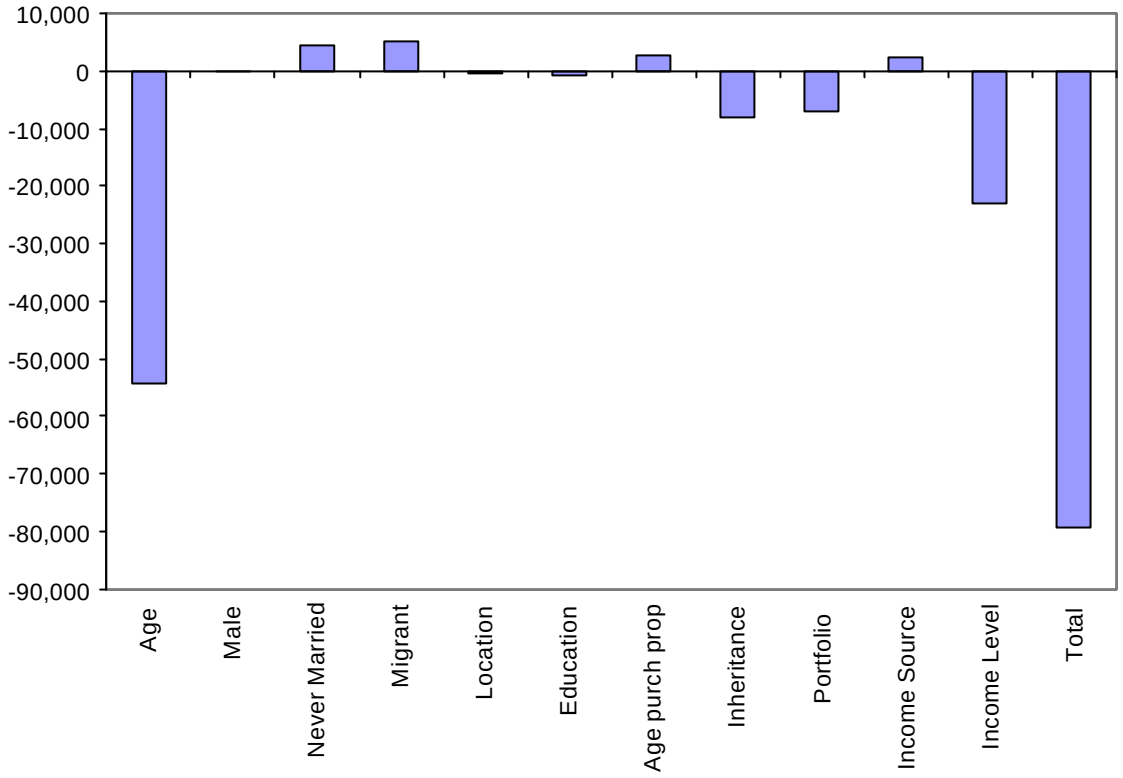
Age purch prop	2,662	-3.4%
Inheritance	-8,079	10.3%
Portfolio	-6,991	8.9%
Income Source	-1632	-2.1%
Income Level	-22,875	29.2%
Total	-78,319	100.0%

As shown in Figure 3, of the total difference of almost $80,000, nearly 70% is explained by the sole fact that non-partnered Maori respondents were on average some 10 years younger than Pakeha. In fact, by simply taking the predicted values of the unconditional age-net worth relation plotted in Figure 1, we find that across all respondents at the predicted mean net worth at age 34 is $70,00 rising to a mean level of $135,000 at age 44. Hence, even if Maori had the same values for all other variables as Pakeha, the ten year age difference alone would predict that their net worth would be some $65,000 below that of Pakeha.

In fact, Maori have different values for many of the variables, some leading to a positive effect and others contributing directly to the overall lower level of net worth compared with Pakeha. However, together age and lower incomes explain almost all of the difference. There are some other minor factors, such as a smaller proportion of Maori are migrants (2% compared to 14% for Pakeha). As migrants typically have somewhat lower net worth, this results in a positive effect for Maori. Virtually none of the difference is explained by gender, education or location.

The implication is that as the population eventually evolves to the point where there is little difference in the age structure between Maori and non-Maori, we would expect to see a very large part of the difference in net worth evaporate. Rising Maori incomes will also contribute, but with a much less significant effect than does age.

Figure 3 – Factors explaining Pakeha-Pakeha differences in net worth

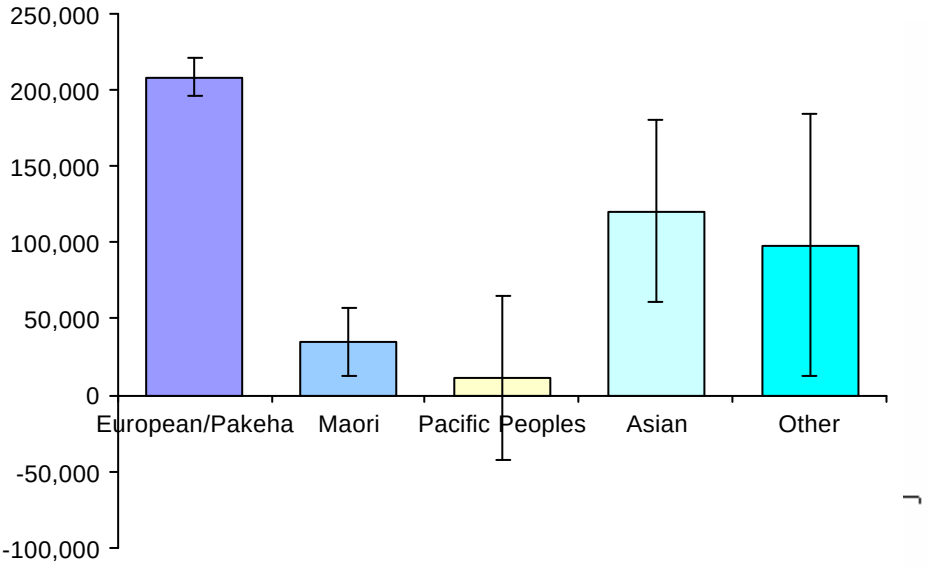


5.2 Results for couples

In measuring the relation between ethnicity and net worth for couples, we must be precise in what we mean by the ethnicity of a couple. There are five ethnic categories given in the data and each partner can be assigned to any one of these; a total of potentially 20 possible combinations. In order to keep the analysis within manageable bounds, and recognising that there are relatively few observations for some of the combinations, we have restricted the subsequent analysis to Maori and Pakeha.

Figure 4 plots the means and medians of net worth by the ethnicity of the respondent. These results are from the survey data and are not conditional on any other personal characteristics; ie, we are not holding constant such factors as age, education or income etc, all of which contribute to the observed differences in net worth of couples. In all cases the distributions are

Couples: Median Net Worth



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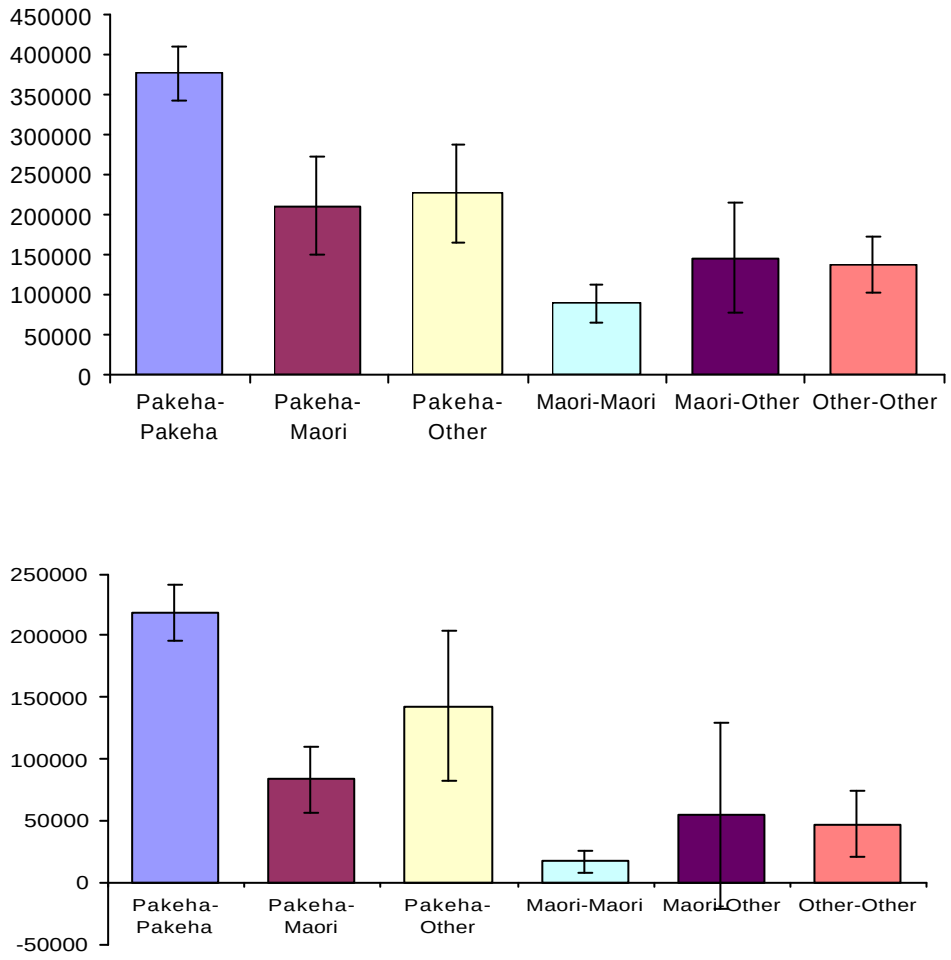
Note: Vertical bars show the 95% confidence limits. Standard errors for the medians are calculated from bootstrap replications drawn from the stratum/PSU cluster.

In Figure 5 we plot the means and medians of net worth for each combination of Maori and Pakeha respondents and their partners. All other ethnic groups are aggregated into the Other-Other category. This shows the net worth of Maori households depending on the ethnic combinations. Again these results are not adjusted for other factors that effect net worth. They do, however, illustrate that in households where either the respondent or the partner identified as Maori, unadjusted net worth is significantly below that of an all Pakeha household. In particular the combination Maori-Maori has significantly lower net

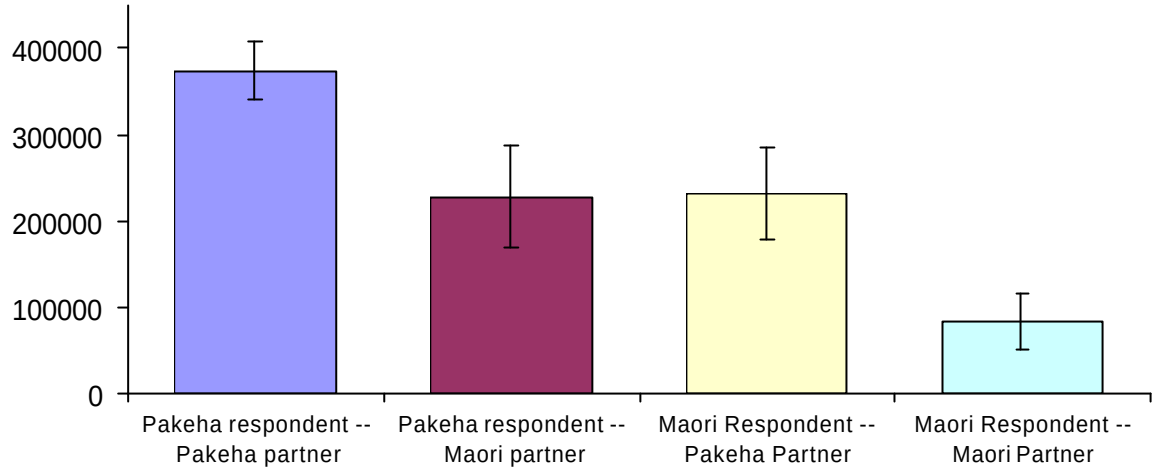
Figure 5 - Variation in Net Worth by Ethnic Groups, Using Couple-level Definition of Ethnicity



Note: The vertical bars show the 95% confidence limits. Standard errors for the medians are calculated from bootstrap replications drawn from the stratum/PSU cluster.

One question that arises is: does the ordering between the respondent and the partner matter in the case where they report mixed ethnicities? In Figure 6 we show the mean net worth of Pakeha and Maori couples. It is evident that in the case of mixed couples, the ordering has no significant effect.

Figure 6 – Mean net worth of Pakeha and Maori couples



The largest difference in net worth for couples is between Pakeha-Pakeha and Maori- Maori couples. We therefore repeated the Oaxaca decomposition on these two groups to see how much of this difference could be explained by the conditioning variables. The gross difference in mean net worth between these two groups is $(376,400 – 89,230) = $287,170. Using the Pakeha coefficients with the Pakeha and Maori mean values of the variables we find that the 'explained' difference, $\Delta NWi = \hat{b}_i^p (X_i^p - X_i^m)$ is $238,320. Thus, 83% of the very significant gap in net worth between Pakeha-Pakeha and Maori- Maori couples can be accounted for by different mean values of the characteristics of each group. This explained fraction is slightly lower than in the case of non-partnered individuals. There is also somewhat greater diversity in the sources of the explained difference; age and income level are still the two largest contributors but inheritance, income sources and education are more important than they were for individuals.

Table 10 – Decomposition of the factors explaining the difference in mean net worth between Maori- Maori and Pakeha-Pakeha couples

Factor	Difference (ΔNW)	Share of Difference
Age	-98,374	41.3%
Male	357	-0.1%
Married couple	-17,314	7.3%
Migrant	6,055	-2.5%
Location	-3,047	1.3%
Education	-21,140	8.9%
Age purch prop	-11,462	4.8%
Inheritance	-25,864	10.9%
Portfolio	24,205	-10.2%
Income Source	-24,587	10.3%

Income Level	-67,152	28.2%
Total	-238,320	100.0%

Behaviour in response to inheritances may be one factor contributing to the 'unexplained' different in net worth (ie, the part due to difference in coefficients rather than difference in characteristics). The 'pass through' coefficient implies that one dollar of inherited wealth adds to 67 cents (with a standard error of 25 cents) to current net worth for the Pakeha-Pakeha couples. In contrast, for Maori- Maori couples, a dollar of inheritance appears to *reduce* net worth by 34 cents (standard error of 22 cents). Whereas the coefficient for Pakeha couples doesn't allow the hypothesis of 100% pass through to be rejected, this hypothesis is easily rejected for Maori-Maori couples.[23] This results indicate some barriers to the inter-generational building up of net worth by Maori families.

5.3 Partitioning direct and indirect effects of ethnicity

An alternative approach to decomposing the effects of ethnicity and related variables on net worth is to examine the total correlation between ethnicity and wealth and break it down into direct and indirect components.[24]

We have shown that there is some evidence of ethnic differences in net worth. We argue that ethnic differences potentially operate through two channels: one which denotes as "direct", and a second and potentially important set of "indirect" channels. For example the raw data may show that ethnic group A has a higher net worth than group B. This could be due to a direct (or pure) effect of ethnicity. Alternatively it is possible that group B displays marked differences in other characteristics such as age, education or employment status. In that case the observed differences in net worth may be due to differences in this "indirect" effects rather than the direct effect of ethnicity per se. It is the object of this section to partition the effect of ethnicity into the direct effects and a series of additive components which reflect the indirect effects of explanatory factors. This will permit us to measure the fraction of the correlation between ethnicity and net worth that is accounted for by ethnicity, in contrast to that due to other factors.

We start by illustrating the procedure for the case of a single indirect factor, unemployment (U). The objective is to decompose the observed correlation between ethnicity (E) and net worth (W) into two additive elements; the direct ethnic effect and the part due to the indirect relation between ethnicity and net worth operating through the level of unemployment.

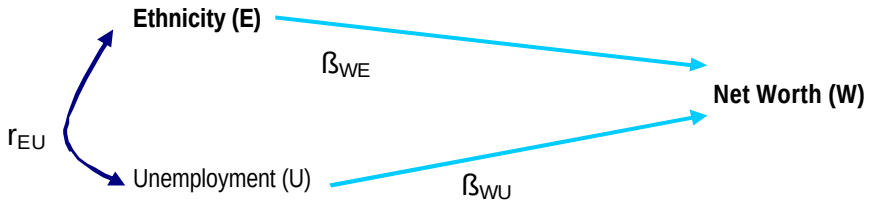
> "It is a remarkable fact about correlation coefficients that this can be done. Moreover the technique we use does not require that we introduce the variables in any particular order".
>
> Bowles and Gintis(2002): 8

Figure 7 provides an illustration for the sample case of one indirect component, unemployment.

[23] Specifically, $F_{(1,354)}$=36.5 for Maori- Maori couples and $F_{(1, 508)}$=1.69 for Pakeha couples.

[24] The methodology follow Bowles and Gintis (2002). Details are given in Appendix A.

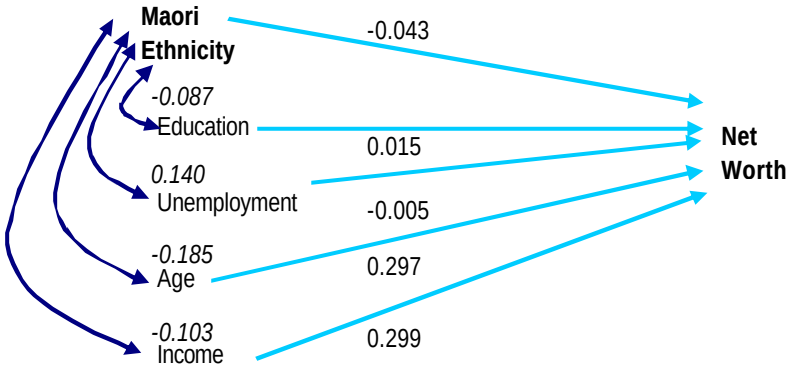
Figure 7 – Representing a correlation as the sum of direct and indirect effects



There is a direct relation between ethnicity and net worth, but in addition there are potentially other paths, such as the relation between ethnicity and unemployment and unemployment and ethnicity. In this simple case one could imagine that there was a very high relation between ethnicity and unemployment. The correlation coefficient (r_{EU}) would be close to 1. If unemployment were the only indirect influence, then we could decompose the total into that directly due to ethnicity and that due to unemployment. In this case, unemployment would explain most to the difference in net worth.

To apply this framework, we first run the regression model given in Appendix A to obtain the estimate of the betas. We have chosen education, unemployment, age and income as the explanatory variables.[25] The sample was restricted to those non-partnered respondents identifying as Maori or Pakeha (a total of 2,239). From these results, we can establish the following representation (see Figure 8).

Figure 8 – Direct and indirect effects of ethnicity on net worth of unpartnered individuals



The straight lines represent the regression coefficients (betas) and show the effect of a one standard deviation increase in the value of an explanatory variable on the standard deviation increase in wealth. The curved lines represent the correlation between ethnicity and each of the underlying (or indirect) effects in turn. From these results, we can derive the following:

[25] Provided the regression co-effeicients are unbiased, the decomposition is valid whether or not the regressors are correlated.

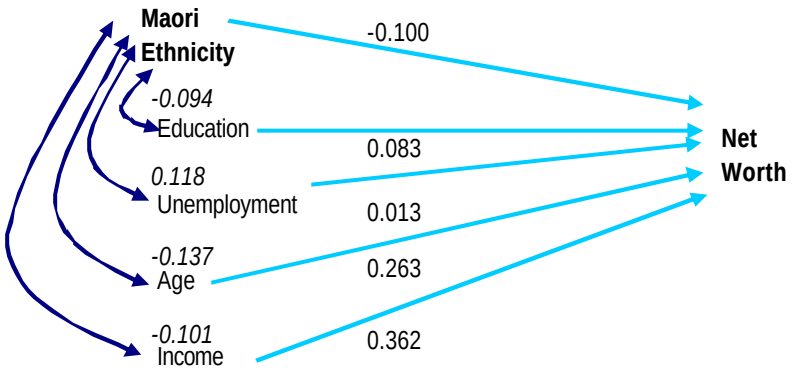
Total effect = [direct effect] + [education + unemployment + age + income]
= -0.0430 + [(-0.087*0.015) + (0.140*-0.0050) + (-0.185*0.297) + (-0.103*0.299)]
-0.1292 =-0.0430 – 0.0013 - 0.0007 - 0.0550 - 0.0308
100% = 33% + 1% + 1% + 42% +24%

This result confirms that two thirds of the total apparent effect of ethnicity on wealth is due to differences in age (42%) and income (24%). Education and unemployment account for a trivial fraction, and the remaining third is potentially due to the direct influence of ethnicity. Of course, there could well be other indirect influences not accounted for in this model.

5.4 Results for couples

In the case of couples, we again decompose the effect of ethnicity into its direct and indirect components. We have restricted the comparison to couples in which both respondents identified as pakeha with couples in which both identified as Maori. The results are in Figure 9.

Figure 9 – Direct and indirect effects of ethnicity on net worth of couples: Pakeha/Pakeha and Maori/Maori



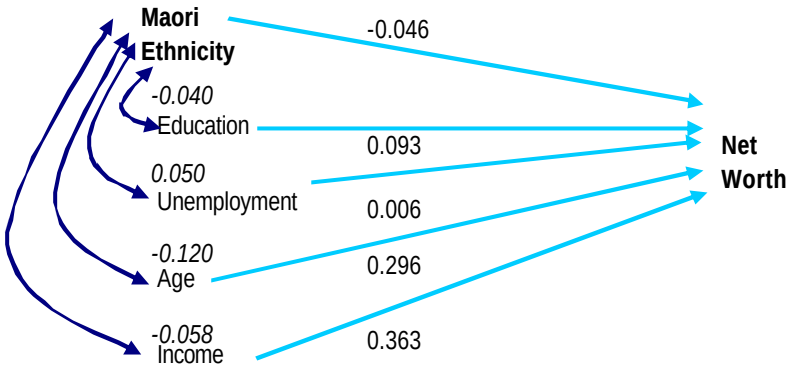
From these results, we can derive the following:

Total effect = [direct effect] + [education + unemployment + age + income]
= -0.100 + [(-0.094*0.083) + (0.118*0.013) + (-0.137*0.263) + (-0.101*0.362)]
-0.1806 =-0.100- 0.0078 + 0.0015 - 0.0388 - 0.0366
100% = 53% + 4% + 1% + 21% +20%

The results are broadly similar to the case of unpartnered individuals, however now the direct effect of ethnicity accounts for approximately one half of the total effect, while somewhat less than half the effect is explained by age and income. The direct effects of age and unemployment, once income is held constant, are negligible.

To complete the analysis we compare Pakeha/Pakeha couples with mixed Maori-Pakeha couples. It will be recalled that the ordering of who is the respondent and who is the partner in mixed couples had no effect. These results are summarised in Figure 10.

Figure 10 – Direct and indirect effects of ethnicity on net worth of couples: Pakeha/Pakeha and Pakeha/Pakeha or Pakeha/Maori



From these results, we can derive the following:

Total effect = [direct effect] + [education + unemployment + age + income]
= -0.046 + [(-0.040*0.093) + (0.050*0.006) + (-0.120*0.296) + (-0.056*0.363)]
-0.1059 =-0.04600- 0.0037 + 0.0003 - 0.0355 - 0.0211
100% = 43% + 3% + 0% + 33% +20%

The basic pattern is similar to the earlier cases. Age and income continue to account for slightly over half the total effect and education and unemployment remain insignificant. In this case, 43% of the total is attributed to the direct ethnic effect.

6 Do student loans matter?

Considerable interest centres on the possible impact of the student loan scheme. The presence of a debt might be expected to alter subsequent behaviour (such as parenthood or home purchase) and have an effect on the level of mortgage debt available.[26] This section presents the results of testing a range of hypotheses about the impact of the student loan scheme.

The total liability under the student loan scheme represented only 5% of the total debt held by all economic units in the survey. This is in comparison to mortgage debt which was 80% of total liabilities. Amongst the non-partnered individuals, about 10% of their total liabilities is made up of the student loan. The median student loan is $10,000 for males and $8,000 for females ($9,000 overall). For couples, the median value of student loans is $8,000.

To analyse the effect of the student loan scheme a number of hypotheses were tested.[27] Two variants of each test were carried out, the first based on an indicator variable for whether the individual or couple (meaning that either or both partners had a loan) had a student loan and the second based on the value of the loan. For each test, a regression model was used where the control variables are the same as those used in the "core"

[26] Norton (2003) reports on a similar debate in Australia regarding the demographic effects of the Higher Education Contribution Scheme (HECS).

[27] Details of the statistical results for each of the following tests are available from the authors on request.

model of net worth (for couples, the couple-level characteristics were used). The results of the tests are summarised in Table 11.

H1: Student loans have no effect on total net worth

The survey results show no clear effect of student loans on the net worth of couples. The mean net worth is higher and the median lower when a student loan is present, while each dollar in loan value appears to reduce the value of net worth by 16 cents at the mean and $1.41 at the median. However, all of these coefficients are surrounded by wide standard errors and we cannot rule out the hypothesis that student loans have no effect on the net worth of couples.

The situation for non-partnered individuals is somewhat different, where there is close agreement between the effects measured at the mean and those measured at the median. The net worth of unpartnered individuals is approximately $15,000 lower if they have a student loan, holding other characteristics constant. This effect appears statistically significant at the median (although the standard errors are based on only 20 bootstrap simulations). Each dollar of student loan reduced net worth by about $1.35.

H2: The likelihood of having a mortgage is unaffected by student loans

There appears to be no effect of either the presence or value of student loans on the probability that a couple has a mortgage. In fact, the odds ratio (the odds for those with a loan versus those with out) of having a mortgage is slightly higher for student loan holders, although the effect is statistically insignificant. In contrast, both the presence and value of student loans affect the mortgage-holding behaviour of individuals. Specifically, he odds that non-partnered individuals with a student loan hold a mortgage are only 40% as high as the odds that individuals without student loans have a mortgage. We therefore reject the null hypothesis and conclude that there is evidence that the presence of a student loan lowers the probability of having a mortgage. However, because the overall odds of non-partnered individuals holding a mortgage are fairly low, the size of student loan effect is only modest. At the mean value of characteristics, non-partnered individuals with a student loan are only about 6% less likely to have a mortgage than are individuals without a student loan.[28]

H3: The size of the mortgage is unaffected by student loans

The aim of this hypothesis is to test whether the presence of a student loan might reduce the amount of mortgage debt, as lenders consider total liabilities and borrowers feel constrained in the total amount of debt they can service. In a multivariate regression with the total amount of mortgage debt as the dependent variable we find that the presence of a student loan has no effect on the value of mortgages held by couples. There is a weak effect from the value of the student loan, with each dollar of student loan debt reducing the value of the mortgage by 46 cents (with a standard error of 26 cents).

For non-partnered individuals, the dichotomous variable for the presence of a student loan is significant and indicates a reduction in the total observed mortgage debt by some $11,000. Alternatively, an additional one dollar of student loan debt reduces the amount of mortgage debt by 74 cents, leading us to reject the null hypothesis, and suggesting that the financial markets operate effectively to incorporate the presence of student loan debt.

[28] This estimate comes from an unreported probit model, where the coefficients were transformed into probability derivatives.

H4: The total value of property assets is unaffected by student loans

Does having a student loan mean that the total value of property assets is lower? On average, couples with student loans have property values that are $19,600 lower than other couples – although the effect is not statistically significant. The alternative test suggests that each dollar of student loan lowers property value by $1.10 for couples (but with a relatively large standard error of 53 cents). The effects for non-partnered individuals are estimated more precisely, with property values $12,500 lower for those with student loans, (in the alternative test, total property value is reduced by 89 cents for every additional one dollar of student loan).

H5: The total number of children is unaffected by student loans

Standard regression analysis suggests that the number of children a couple has is independent of either student loan presence or size of a student loan. Similarly, higher levels of student loans do not appear to reduce the number of children among non-partnered individuals. In fact, the results suggest that individuals have an average of 0.11 more children if they have a student loan, and this effect is (weakly) significant.[29]

Although regression analysis is easy to interpret, it may not be the most appropriate estimator when the data are integer counts, as they are for the number of children the respondent has ever had. Therefore, the final row of Table 11 includes the results of a Poisson regression, which is designed to deal with the special characteristics of count data. According to the Poisson results, there is no effect of student loans on the number of children that couples have, and only a weak negative effect of loan values on the number of children from non-partnered individuals.

Table 11 -- Effect of Student Loans on Various Measures of Wealth and Fertility

	Couples		Non-partnered Individuals	
Dependent variable:	Presence of Student Loan	Value of Student Loan	Presence of Student Loan	Value of Student Loan
Mean Net Worth	32245.88	-0.16	-15227.69	-1.33
	(0.54)	(0.10)	(1.40)	(2.42)*
Median Net Worth	-26059.60	-1.41	-14,501.97	-1.36
	(0.26)	(1.23)	(5.26)**	(11.14)**
Odds of having a mortgage(s)[a]	1.11	1.00	0.42	1.00
	(0.62)	(0.73)	(2.67)**	(2.51)*
Value of all property mortgages	-4637.46	-0.46	-11075.66	-0.73
	(0.69)	(1.79)+	(2.37)*	(3.23)**
Total value of all property	-19601.10	-1.10	-12579.92	-0.89
	(1.57)	(2.06)*	(1.90)+	(2.75)**
Number of children (regression)[b]	-0.03	-0.05	0.11	0.02
	(0.28)	(0.81)	(1.90)+	(0.98)
Number of children (Poisson)[b]	-0.04	-0.07	0.04	-0.21
	(0.60)	(1.44)	(0.41)	(1.94)+

[29] Approximately two-thirds of the population of children covered by the sample come from couples, versus one-third from non-partnered individuals, so greater weight should be placed on the results for couples.

Absolute value of t-statistics in parentheses corrected for complex sample design effects (weighting, clustering and stratification); * significant at 5%; ** significant at 1%; + significant at 10%.

Median net worth estimated by quantile regression, with standard errors from 20 bootstrap replications that capture the clustering in the data. [a] From a logistic model, with the coefficients transformed into odds ratios.

[b] Coefficients multiplied by 1000 in the models where value of the student loan is used.

It must be emphasised that in the case of student debt, there is no offsetting asset included in the net wealth estimated from the survey. Unlike housing for example where the value of the property (housing capital) is recorded as an asset and any debts incurred in acquiring the property are listed as liabilities, the student loan scheme is treated differently. There is no allowance for the asset (human capital) acquired through borrowing under the student loan scheme. We address further this issue in the following section of the paper.

7 Expanding the concept of wealth to include human capital

What does wealth consist of? In an economic sense wealth, or a stock of capital, can be viewed as the present value of a future stream of benefits that could be expected to accrue as a result of ownership of that asset. The ownership of a vehicle provides a flow of motoring services, a house a flow of housing services, etc. What then of the flow of income that a person might expect in the future?

This is a critical issue in assessing the "true" net wealth position of individuals. Consider the case of two individuals who are "identical" (ie same sex, region, gender, ethnicity, age, marital status etc). One has a plumbing business with assets of $120,000 and business loans of $60,000. The second is a final year medical student with no recorded assets and a student loan of $60,000. The net worth recorded from the HSS will be dramatically different for these two individuals; the plumber will have + $60,000 and the student - $60,000. We could argue that these are not true reflections of the real wealth of these individuals. In particular, the balance sheet for the student includes no value for an asset matching the liability of the student loan. It is equivalent to including the mortgage as a liability, but not the value of the property as an asset. In this section we make an initial attempt to "correct" for this by estimating the value of the underlying asset commonly referred to as human capital.

Conceptually human capital encompasses a wide range of attributes including such elements as inherent abilities, social skills, health status, extent of networks and family support, as well as the more commonly used level of acquired education, skills and training. Ideally we would want measures, or at least include proxies, for all these elements. That is clearly not possible. In this paper we therefore adopt a different approach and use market earnings as an indicator of the overall level of human capital. It is argued that such factors as more education and acquired skills together with health and inherent abilities will be reflected in greater earning power. In short the assumption is made that those with higher observed earnings have by definition a greater stock of human capital. To adequately measure the "true' net wealth of individuals we must include this estimate of human capital as an asset.

Jorgenson and Fraumeni undertook to develop a new system of national accounts for the USA whose distinctive feature was the incorporation of fully comparable measures of investment in both human and non-human capital.

> "The concept of human capital is based on an analogy between investment in physical capital and investment in human beings. The common element is that present expenditures yield returns over the future. In order to construct comparable measures of investment in human and non-human capital, we define human capital in terms of lifetime labour incomes…(which)…correspond to the asset values for investment goods used in accounting for physical and non-human capital"
>
> (Jorgenson and Fraumeni 1989):227.

Jorgensen and Fraumeni show that it is relatively easy to get an estimate of the present value of lifetime labour income from a cross-section. For a person aged t years with a certain level of education, their expected earnings n years in the future are based on the current earnings of people of the same education, ethnicity and gender who are t+n years old. The calculations are made easier by the fact that the present value of lifetime labour income for a person of given age is just their current annual labour income plus the present value of their expected lifetime income in the next period (where this expectation depends on employment and survival probabilities). Thus, by backwards recursion it is possible to calculate the present value of lifetime income at each age. For example, assuming that all individuals retire when they are 65 years old, then for a 64-year-old person, the present value of lifetime labour income is just their current labour income. The lifetime labour income of a 63-year-old individual is equal to their current labour income plus the present value of lifetime labour income of the 64-year-old. This recursive process can be summarised as:

where:

$$H_{kt} = (1-u_k)\,y_t + (1-d_k)(1-u_k)[(1+g)/(1+i)]P_{t+1,R-k}$$

H_{kt} = the human capital at time t of an individual aged k years; ie the present value of life time labour income at age k;

g = the annual average rate of growth of real income y_t;

i = the rate of interest;

u_k = the unemployment rate of individuals aged k;

d_k = the probability of death of an individual aged k;

$P_{t+1,R-k}$ = the present value of income of an individual aged k+1 from time t to R-k where R is retirement age.

By applying this relationship to different categories of individuals (eg male/female, ethnic group, educational attainment) we are able to estimate the present value of labour income at any age. In making these estimates we have not allowed for the value of non-market income, and we assume that human capital has no market value beyond age 65. We illustrate these findings in Figures 11 and 12 for Pakeha males and females.

While these are strictly preliminary results which should be taken as indicative, there are a number of striking features. In the first instance, it will be immediately apparent that the levels of human capital are significantly greater than the net worth measured by physical and financial assets alone. In the case of Pakeha males with a school qualification, net worth in the 25-44 year age group would be of the order of $120,000, yet it is evident from Figure 11 that the human capital wealth of this group could be close to $500,000.[30]

A second implication is that while we found no significant effect of gender when comparing the net worth from the HSS, it is apparent that the human capital stock of Pakeha females is below that of Pakeha males at all ages and educational qualifications.

Third, while the net worth estimates from the HSS showed only modest differences by educational level, there a very marked differences in the stock of human capital by level of attainment. A 30 year old Pakeha male university graduate would have about four times the human capital of a similar male worth no educational qualifications.

Finally, the peak of human capital for both males and females occurs at a younger age the higher the level of educational qualifications. This is to be expected as a young person with more qualifications faces a longer period with higher labour incomes and hence their implied stock of human capital is greater.

The human capital estimates presented here do not attempt to deduct a charge for consumption from the gross income figures. Some authors argue that physical capital estimates are net figures, so to be consistent human capital should also be net of maintenance costs (Eisner, 1988). Weisbrod (1961) attempted to account for maintenance, but he encountered many difficulties. What types of expenditures should be classified as maintenance, and how to account for economies of scale and "public" goods when estimating per capita consumption for members in the same household are problems that are not easily resolved. On the other hand, others maintain that consumption is an end, rather than a means, of investment and production, hence gross earnings are a more relevant variable to use when estimating human capital using a lifetime labour income approach (Graham and Webb, 1979).

The following figures plot the lifetime labour earnings for Pakeha males (Figure 11) and females (Figure 12). In each case the results are shown for four levels of educational attainment.

What is the effect on the distribution of net wealth from including human capital? We construct the augmented wealth of each individual by combining the net worth estimated from the HSS together with the estimates of human capital derived in this section. For couples, the human capital of both the respondent and their partner are included. This augmented measure averages $420,000 for non-partnered individuals, with net worth contributing just under $100,000. The augmented measure for couples averages $1,160,000 with about $320,000 of this in the form of net worth. We then explore what factors are critical in exploring the differences across individuals and couples. The results are summarised in Appendix Table 12.

We now find a broad range of variables are significant in explaining the variation in augmented net worth. Age continues to be important. However, now gender is important

[30] This is consistent with the findings of (Trinh, Gibson and Oxley 2002) who estimate that the human capital of New Zealand is over twice the value of the physical capital.

and males have about $180,000 more than females. Married couples have higher wealth than non-married couples (about $57,000), and male-male couples have higher net wealth than mixed or female-female couples. For both individuals and couples, all ethnic groups (except the category of other) have lower wealth than do Pakeha individuals or Pakeha-Pakeha couples. Where both partners are migrants net wealth is significantly lower, and inheritances boost net wealth significantly.

Figure 11 – Lifetime labour income by age and education: Pakeha males

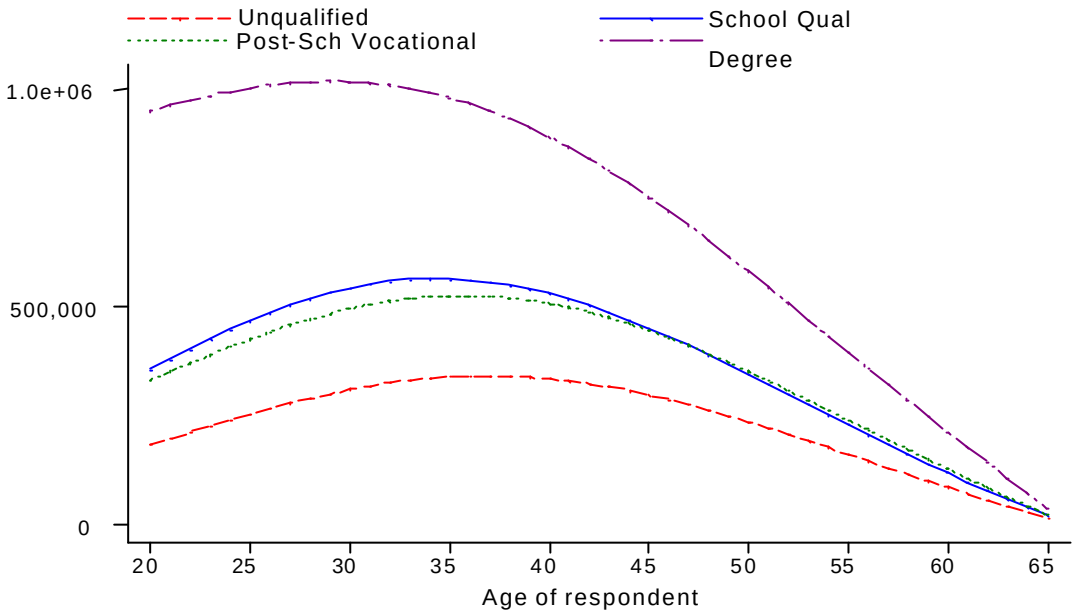
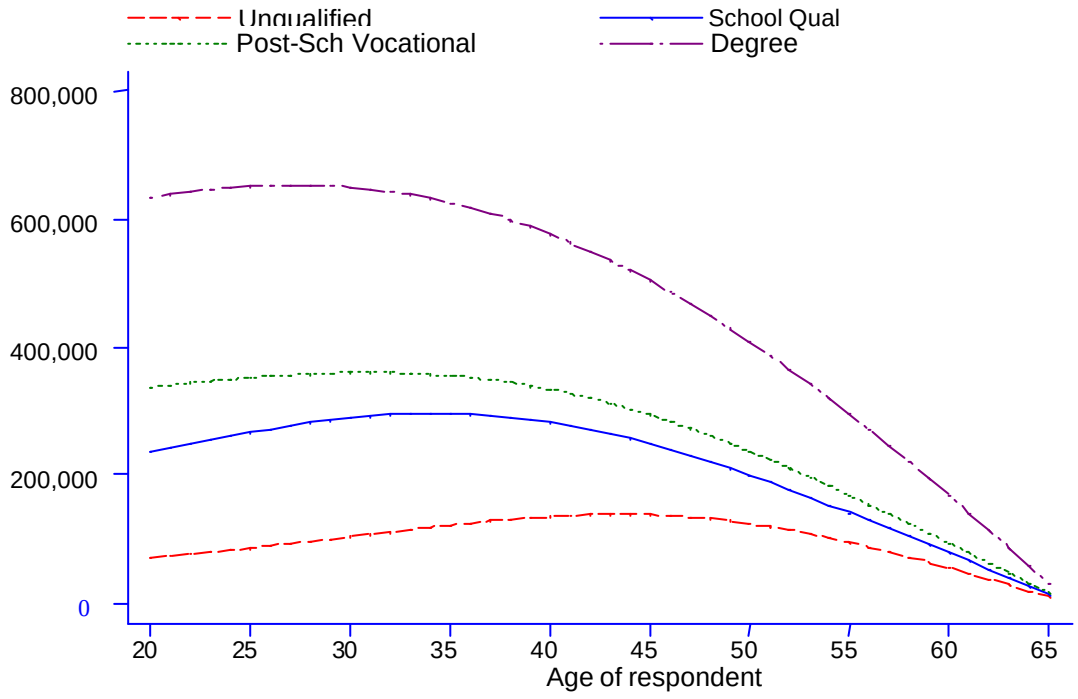


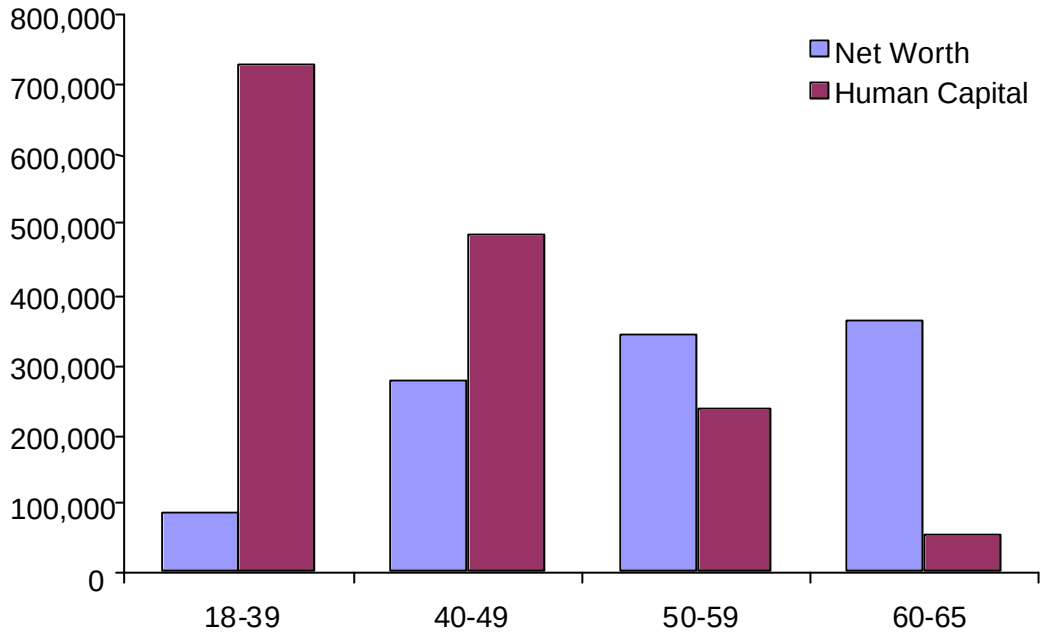
Figure 12 – Lifetime labour incomes by age and education: Pakeha females



Overall, the results confirm that human capital plays a significant role in determining net wealth, and those groups, (migrants, Maori and Pacific Islanders and female-female couples) with lower investments in human capital have substantially less total net wealth.

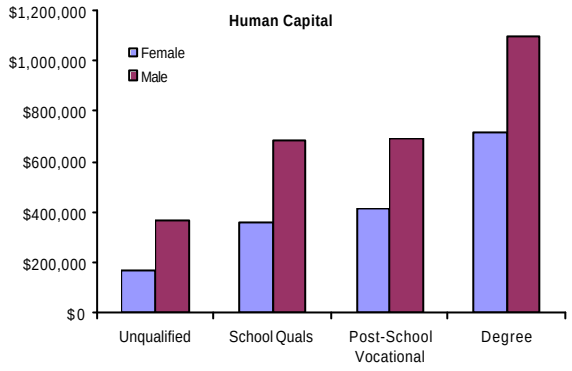
Another comparison of the age patterns of human capital and net worth is presented in Figure 13. It is apparent that in the younger age groups, the present value of expected lifetime labour income is substantially higher than accumulated net worth. It is only for the age groups above 50 years that net worth exceeds the average value of human capital.

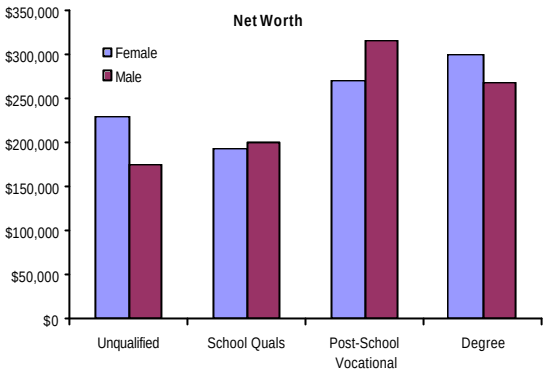
Figure 13 – The distribution of net worth and human capital by age



A second implication is that while we found no significant effect of gender when comparing the net worth from the HSS, it is apparent that the human capital stock of Pakeha females is below that of Pakeha males at all ages and educational qualifications (Figure 14). Third, while the net worth estimates from the HSS showed only modest differences by educational level, there a very marked differences in the stock of human capital by level of attainment. A 30 year old Pakeha male university graduate would have about four times the human capital of a similar male worth no educational qualifications. Across all age ranges, the human capital of the graduate would be valued at three times that of the unqualified person, whereas net worth for the graduate would only be 50% higher.

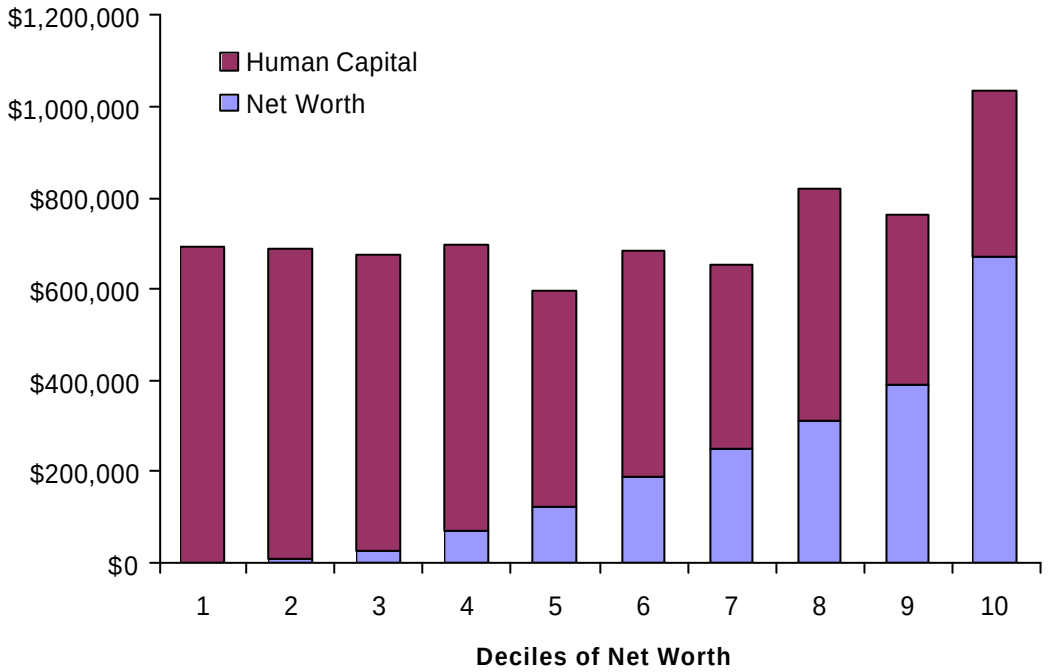
Figure 14 - Comparison of Human Capital and Net Worth by Educational Level and Gender: European/Pakeha





What is the effect on the distribution of net wealth from including human capital? According to Figure 15, the addition of human capital considerably equalises the distribution of wealth. For example, the net worth of the highest net worth decile is over 100 times higher (ie, 10,000%) than the second lowest decile (the lowest decile has negative net worth which precludes this comparison). But once human capital is added, the advantage for the highest net worth decile is only 50%. In fact, amongst the seven deciles with lowest net worth, there is very little inequality in their combined total of net worth plus human capital, which ranges from $600,000 to $700,000 in per capita terms.

Figure 15 Composition of total net wealth by decile of net worth



8 Conclusions and unfinished business

This paper has presented some preliminary findings from a major project that has been undertaken between the Treasury and the Office of the Retirement Commissioner. The projects aims to analyse the data from the 2001 Household Savings Survey, which provides the first set of data on the assets and liabilities of households in New Zealand.

The paper reports on some of the findings for individuals and couples. The paper provides a brief sketch of some of the basic results from the survey. Across all individuals the mean level of net worth was $97,900. However as indicated by the fact that the median level is only $10,300 there is a highly unequal distribution. In total 23% of all individuals are estimated to have negative wealth. As these are concentrated in the younger age groups, it reflects in part the presence of student loans. Some 21% of individuals reported student loans as a liability and the median loan was $9,000.

We have addressed a number of issues in the paper. The first was to determine the factors that might be important in explaining differences in net worth across individuals and couples. We used descriptive regression models for this purpose. About 40% of the variation was explained by a range of variables for which data was available from the survey. However it should noted that the accumulation of wealth is greatly influenced by personal traits and preferences for which we have few, or at best imperfect proxy measures. Individuals identical in all observed respects may have very different levels of net worth simply because their preferences for consumption now versus consumption in the future are quite different: Some will constrain current consumption in order to save more and accumulate wealth which can be used in future, while others with a similar income may choose to enjoy higher current consumption and store less for the future we refer to this phenomenon as the squirrels and the grasshoppers.

It is not only these (non-observable) preferences which matter. Some individuals will experience good fortune (eg the favourable timing for purchase and sale of assets) while others will suffer from poor health. Where possible we have tried to account for individual differences. For example we use the share of property and of shares in the total portfolio as a way to reflect different preferences for types of investments. Two otherwise identical individuals may have different net worth simply because one chose to invest in a different mix of assets.

One serious limitation arises from the fact that we have only a cross-section of the population in the HSS at a point in time (the year 2001). The implication of this is we are not able to separate out cohort effects which are likely to be quite important.

> This survey only provides a snapshot of net worth characteristics. It is important that the data is not read as a commentary on net worth accumulation over time. For example, while the current net worth of today's 50-54 year olds reflects the economic and cultural circumstances of that particular group, it cannot be assumed that future groups will replicate these characteristics when they reach this age.
>
> (Statistics New Zealand 2002a):5

It will only be through a longitudinal panel survey or through repeated cross-sectional surveys, that a more complete picture which separates out age and cohort effects could be derived.[31]

We find (perhaps unsurprisingly) that there is a clear and significant relation between net worth and age. For the very young (18-20) net worth is typically negative. Beyond that age it climbs to reach a peak at age 70 of $236,000. By age 85 which approximates life expectancy it has however only declined by some $60,000 to $176,000. A considerable fraction of net worth at that age is represented by the value of property. Across most age

[31] For a detailed analysis of the effects of cohorts on saving patterns in New Zealand see (Gibson and Scobie 2001).

groups, couples have more than twice the net worth of individuals, in part no doubt due to assortative mating.

The level of current income was significantly related to net worth, and those who derived income from self-employment typically had higher net worth. There were no significant differences in net worth by gender of whether the respondent was ever married. Migrants tended to have a lower level of net worth but this was not particularly significant. More years of secondary schooling contributed to higher net worth, as did location (with both rural and metropolitan residents having higher net worth). Those who had received or expected an inheritance also had higher net worth.

Those who bought property at a younger age had higher net worth (although this could in part be a cohort effect). Those with a higher share of property in their asset portfolio had higher net worth, but he same effect was not observed for a higher share of share holding. As an occupational class, farmers had higher net worth. Those with more total years employed had higher net worth, but there was no significant effect from either the age of first employment or labour force status. Variables related to the number and age of dependent children had no significant effect.

A second major theme of the paper is to test whether there is any evidence that different ethnic groups behave differently with respect to wealth accumulation. This is not to argue that there are not gross differences in the level of net worth by ethnic group – clearly there are. However, the evidence we present strongly supports the contention that among individuals these differences can be virtually fully accounted for by differences in the level of other variables, rather than to ethnicity per se. We examine in some detail the difference between Maori and European/Pakeha individuals. The fact that Maori are on average ten years younger, alone explains nearly 70% of the difference in the net worth levels.

The case of couples is more complex, because of the wide range of mixed ethnicity. However, comparing couples where both identify as Pakeha with those in which both identify as Maori, we observe significant differences. Across all cases examined the direct effect of ethnicity appeared to explain about one half of the observed correlation between ethnicity and net worth; age and income together explained 40-60%.

Third we test a series of hypotheses about the possible effects of the student loan scheme. While we cannot reject the hypothesis that there is no effect of the scheme on the overall level of net wealth (those having a student loan do not have significantly lower net worth) we do find some effects. For example, those with a student loan are 6% less likely to have a mortgage, and each dollar of student loan reduces the amount of mortgage debt by 74 cents. The financial sector apparently does consider a borrowers overall debt position but the student loans are not fully discounted when considering the amount of property lending.

A final theme of this paper is the role that human capital might play in a more comprehensive profile of net worth. It is our judgement that human capital represents a missing element in the balance sheet. In particular we would argue that those with a student loan but few if any other recorded physical or financial assets would appear to have significant negative net worth. Yet at the same time the individual may well have acquired a corresponding asset, in the form of the human capital built through higher education and training. In the same way as the capital acquired through other forms of borrowing (eg farm and business loans, property mortgages) would appear as an asset on the balance sheet, we argue that human capital should also appear. The HSS did not attempt to explicitly measure human capital. We find that the distribution of wealth is significantly altered by the inclusion of human capital as an asset.

By estimating the present value of lifetime labour earnings at every age we are able to form an estimate of human capital. For a young adult this could easily an amount up to four times the level of their reported assets of financial and physical capital. A more complete picture of distribution of net worth will emerge when account is taken of human capital as an important asset of individuals.

This study represents an initial analysis of the results presented in the HSS. It covers only a limited selection of aspects that could be pursued. We still understand little about how health status, expectations of employment security or the provision of NZS affects private decisions on wealth accumulation. We have little knowledge about what determines the mix of assets that are held. The relation between the level and type of wealth accumulation and the decision to retire has to be a fruitful and important issue to pursue. It is our hope that this rich data set will encourage others to test hypotheses about the accumulation and decumulation of wealth over the life cycle.

References

Bowles, Samuel and Herbert Gintis (2002) “Inter-generational inequality” *Journal of Economic Perspectives* 16(3): 1-28.

Campbell, John Y. et al (1999) Investing retirement wealth. MIT Discussion Paper No 1896.

Eisner, R. (1988) “Extended accounts for national income and product.” *Journal of Economic Literature* 26(4): 1611-1684.

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

Gibson, John and Grant Scobie (2003) Retirement wealth of New Zealand households: An initial analysis based on the Household Savings Survey. Paper presented to a Symposium on Retirement and Wealth, Office of the Retirment Commissioner, Wellington, 13 June.

Graham, J. W. and Webb, R. H. (1979) “Stocks and depreciation of human capital: New evidence from a present-value perspective.” *Review of Income and Wealth* 25(2): 209-224.

Jorgenson, Dale W. and Barbara M. Fraumeni (1989) "The accumulation of human and nonhuman capital, 1948-84." in Robert E. Lipsey and Helen Stone Tice eds *The measurement of saving, investment, and wealth .National bureau of economic research studies in income and wealth, vol. 52 .* (Chicago: University of Chicago Press.): 227-282.

Lundberg, Shelly and Jennifer Ward-Batts (2000) “Saving for retirement: Household bargaining and household net worth.” Paper presented to the Econometric Society World Congress.

Norton, Andrew (2003) “Student debt: A HECS on fertility?” *Issue Analysis* No. 32, Center for Independent Studies.

Oaxaca, Ronald L. (1973) "Male-female wage differentials in urban labor markets." *International Economic Review* 14(4): 693-709.

Smith, James P (1995) "Racial and ethnic differences in wealth in the health and retirement study." *Journal of Human Resources* XXX(Supplement): S158-S183.

Statistics New Zealand (2002a) "The net worth of New Zealanders: A report on their assets and debts." Wellington, Statistics New Zealand. <http://sorted.org.nz/survey_index.php>

Statistics New Zealand (2002b) "The net worth of New Zealanders: Data from the 2001 household savings survey: Standard tables and technical notes." Wellington, Statistics New Zealand, August. <http://sorted.org.nz/survey_index.php>

Thorp, C and B Ung (2000) "Trends in household assets and liabilities since 1978." *Reserve Bank of New Zealand Bulletin* 63(2): 17-37.

Thorp, C and B Ung (2001) "Recent trends in household financial assets and liabilities." *Reserve Bank of New Zealand Bulletin* 64(2): 14-24.

Trinh, Le Thi Van, John Gibson and Les Oxley (2002) "A forward-looking measure of the stock of human capital in New Zealand." Wellington, Paper presented to the annual conference of the New Zealand Association of Economists, June.

Weisbrod, B (1961) “The valuation of human capital.” *Journal of Political Economy* 69(5): 425-436.

Appendix A – The decomposition of the ethnicity-wealth correlation[32]

Suppose ethnicity directly affects net wealth but that net worth is also determined by a set of other variables ($u_1, u_2 ..... u_n$), where each of these variables (eg age, education, unemployment) are in turn correlated with net worth.

Consider the following regression model for net worth:

$$W = b_{WE}E + b_{Wv_1}v_1 + ... + b_{Wv_n}v_n + e_W$$

All variables in this model are normalised to have zero mean and unit variance: ie,

$$u_i = \left[\frac{u_{i'} - u_{i'}}{sui'}\right]$$

where a prime (') indicates the underlying observations on the i-th variable. Now substitute equations () into the expectation **E**[EW]. This expectation of the product of the variables E and W, each with zero mean and unit variance is the correlation between them. This results in:

$$r_{WE} = \mathbf{E}[EW] = \mathbf{E}[EE]\,b_{WE} + \mathbf{E}[u_1 w]\,b_{Wu_n} + ... + \mathbf{E}[u_n W]\,b_{wun}$$

for the case of n indirect factors where

Direct Effect of Ethnicity on net worth = b_{WE}

Indirect Effect of Other Factors $= \sum_i^n r_{viw}\, b_{wv_i}$

and the shares are given by

Direct ethnic share $= \dfrac{b_{WE}}{r_{WE}}$

Indirect share of *i*-th factor $= \dfrac{r_{uiwb\,wui}}{r_{WE}}$

[32] This appendix follows Bowles and Gintis (2002): 23-24

Appendix Table 1 – Listing of variables for the analysis of non-partnered individuals

Variable Name	Definition	Units	Mean
A. Core Model			
Age	Age of the respondent at the time of interview in 2001	years	41.03
Age^2	Age squared	years	2091.48
Age^3	Age-cubed	years	125,314.40
Male	Male =1, Female=0		0.44
Never Married	(=1 if yes, 0 if no)		0.60
European/Pakeha	Coded Variable for ethnicity		0.70
Maori	Coded Variable for ethnicity		0.17
Pac Is	Coded Variable for ethnicity		0.06
Asian	Coded Variable for ethnicity		0.06
Other	Coded Variable for ethnicity		0.01
Migrant	Yes =1; No =O		0.19
Rural	Rural =1 Urban=0		0.10
Metro	Akld/Well/Chch =1; otherwise = 0		0.55
Yrs Sec School	No. years attended second. school	years	3.54
Yrs Post Sec	No years of post-secondary training	years	1.83
Ever inherited (>$10,000)	Yes =1; No =0		0.14
Amt inherited	Total amount inherited	$	$11,594
Expect inheritance	Yes =1; No =0		0.33
Age bought property	Age when purchased first property	years	31.10
Property as share of NW	Property value as a share of Net Worth		0.28
Shares as share of NW	Shares held as a share of Net Worth		0.01
Main income is wage/salary	(=1 if Yes, 0 if No)		0.51
Main income is self-emp	(=1 if Yes, 0 if No)		0.05
Main income is NZ Super	(=1 if Yes, 0 if No)		0.14
Main income is other pension	(=1 if Yes, 0 if No)		0.01
Main income is other income support	(=1 if Yes, 0 if No)		0.21
Main income is investment	(=1 if Yes, 0 if No)		0.02
Main income is other	(=1 if Yes, 0 if No)		0.02
Main income is not spec.	(=1 if Yes, 0 if No)		0.04
Total income	Total current income	$	$24,586
Total Income^2	Total current income squared	$	$1.27e+09

Appendix Table 2 – Listing of the variables for the analysis of couples

Variable Name	Definition	Units	Mean
A. Core Model			
Respondent: Age	Age of the respondent at the time of interview in 2001	years	46.91
Respondent: Age sq	Age squared	years	2427.77
Respondent: Age cubed	Age-cubed	years	136614.70
Partner: Age	Male =1Female=0		46.95
Partner: Age sq	Age squared		2430.48
Partner: Age cubed	Age-cubed		136796.60
Respondent: Male	Male =1Female=0		0.51
Partner: Male	Male =1Female=0		0.50
Couple is married	(=1 if Yes, 0 if No)		0.81
Respondent is Maori	(=1 if Yes, 0 if No)		0.10
Respondent is Pacific Peoples	(=1 if Yes, 0 if No)		0.05
Respondent is Asian	(=1 if Yes, 0 if No)		0.05
Respondent is Other	(=1 if Yes, 0 if No)		0.02
Partner is Maori	(=1 if Yes, 0 if No)		0.09
Partner is Pacific	(=1 if Yes, 0 if No)		0.05
Partner is Asian	(=1 if Yes, 0 if No)		0.05
Partner is Other	(=1 if Yes, 0 if No)		0.01
Respondent: Migrant	Yes =1; No =O		0.23
Partner: Migrant	Yes =1; No =0		0.23
Rural	Rural =1 Urban=0		0.15
Metro	Akld/Well/Chch =1; otherwise = 0		0.54
Respondent: Sec Sch Yrs	Number years attended secondary school	years	3.52
Partner: Sec Sch Yrs	Number years attended secondary school	years	3.47
Respondent: Post Sec Yrs	Number years of post-secondary training	years	1.93
Partner: Post Sec Yrs	Number years of post-secondary training	years	1.90
Either ever inherit? (>$10,000)	(=1 if Yes, 0 if No)		0.28
Inheritance amount			23632.38
Expect to inherit in future?	(=1 if Yes, 0 if No)		0.41
Main income is wage/salary	(=1 if Yes, 0 if No)		0.60
Main income self-employment	(=1 if Yes, 0 if No)		0.16
Main income NZ Super	(=1 if Yes, 0 if No)		0.12
Main income Other Pension	(=1 if Yes, 0 if No)		0.01
Other income support	(=1 if Yes, 0 if No)		0.06
Main income Investment	(=1 if Yes, 0 if No)		0.02
Main income other	(=1 if Yes, 0 if No)		0.01
Main income not specified	(=1 if Yes, 0 if No)		0.02
Total income	Total current income	$	64593.41
Total income]^2	Total current income squared	$	7.32E+09
B. Portfolio Variables			
Respondent: Age buy property	Age when purchased first property		30.92

Variable Name	Definition	Units	Mean
Partner: Age bought property	Age when purchased first property		32.06
Property share of NetWorth	Property value as a share of Net Worth		0.48
Shares share of Net Worth	Shares held as a share of Net Worth		0.02
C. Labour Force Variables			
Respondent: Age at first job	Age first started working in paid employment		17.78
Partner: Age at first job	Age first started working in paid employment		17.96
Respondent: Yrs of work	Number of years in paid employment		24.02
Partner: Yrs of work	Number of years in paid employment		23.90
Respondent: Employed	(=1 if Yes, 0 if not)		0.71
Partner: employed	(=1 if Yes, 0 if not)		0.70
Respondent: not in lab force	(=1 if Yes, 0 if not)		0.28
Partner: not in labour force	(=1 if Yes, 0 if not)		0.28
D. Occupation Variables			
Partner: Manager	(=1 if occupation is this, 0 otherwise)		0.10
Partner: Professional	(=1 if occupation is this, 0 otherwise)		0.12
Partner: Technical	(=1 if occupation is this, 0 otherwise)		0.09
Partner: Clerical	(=1 if occupation is this, 0 otherwise)		0.09
Partner: Service and Sales	(=1 if occupation is this, 0 otherwise)		0.09
Partner: Agriculture & fishery	(=1 if occupation is this, 0 otherwise)		0.07
Partner: Trades	(=1 if occupation is this, 0 otherwise)		0.06
Partner: Plant Operator	(=1 if occupation is this, 0 otherwise)		0.06
Partner: Elementary	(=1 if occupation is this, 0 otherwise)		0.04
Partner: Not specified	(=1 if occupation is this, 0 otherwise)		0.00
Partner: Unemployed	(=1 if labour force status is this, 0 otherwise)		0.02
Respondent: Manager	(=1 if occupation is this, 0 otherwise)		0.10
Respondent: Professional	(=1 if occupation is this, 0 otherwise)		0.11
Respondent: Technical	(=1 if occupation is this, 0 otherwise)		0.09
Respondent: Clerical	(=1 if occupation is this, 0 otherwise)		0.08
Respondent: Service & Sales	(=1 if occupation is this, 0 otherwise)		0.09
Respondent: Agriculture etc	(=1 if occupation is this, 0 otherwise)		0.08
Respondent: Trades	(=1 if occupation is this, 0 otherwise)		0.06
Respondent: Plant Operator	(=1 if occupation is this, 0 otherwise)		0.06
Respondent: Elementary	(=1 if occupation is this, 0 otherwise)		0.04
Respondent: Not specified	(=1 if occupation is this, 0 otherwise)		0.01
Respondent: Unemployed	(=1 if labour force status is this, 0 otherwise)		0.01
Age of youngest child	Age of youngest child ever had		14.59
Total children	Total number of children ever had		2.39
Children at home	Number of children <18yrs living at home and not working full-time		0.88

Appendix Table 3 – Regression results for the net worth of non-partnered individuals

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Age	-25,087.82	-20,864.09	-25,092.04	-24,978.35	-24,900.64
	(3.73)**	(3.04)**	(3.76)**	(3.81)**	(3.43)**
[Age]^2	622.40	558.55	593.20	621.30	619.08
	(4.41)**	(3.96)**	(4.31)**	(4.50)**	(4.07)**
[Age]^3	-3.95	-3.59	-3.69	-3.94	-3.90
	(4.58)**	(4.20)**	(4.41)**	(4.68)**	(4.31)**
Male	5,990.65	7,691.66	1,788.86	2,035.20	2,984.21
	(0.72)	(0.94)	(0.21)	(0.22)	(0.34)
Never Married	10,037.00	23,390.39	8,906.56	13,327.17	-2,437.89
	(0.58)	(1.28)	(0.52)	(0.77)	(0.16)
Ethnic Group					
Maori	-7,859.99	-1,386.07	-7,954.53	-7,446.67	-5,700.75
	(0.91)	(0.16)	(0.91)	(0.87)	(0.65)
Pacific Island	5,889.00	15,707.37	6,918.10	4,726.23	7,020.22
	(0.36)	(0.98)	(0.42)	(0.26)	(0.43)
Asian	44,080.59	51,669.55	47,865.34	38,873.87	42,912.38
	(2.45)*	(3.33)**	(2.63)**	(2.05)*	(2.36)*
Other	-69,095.47	-46,891.96	-64,594.60	-59,038.18	-69,799.19
	(1.30)	(0.92)	(1.23)	(1.17)	(1.31)
Migrant	-14,205.12	-15,813.09	-13,977.63	-13,974.19	-14,346.70
	(1.21)	(1.45)	(1.22)	(1.16)	(1.23)
Rural	67,905.14	68,625.05	70,756.72	59,150.06	69,344.58
	(3.24)**	(3.21)**	(3.35)**	(3.08)**	(3.34)**
Metro	13,761.94	13,675.47	14,461.59	12,724.03	13,416.39
	(1.45)	(1.49)	(1.52)	(1.41)	(1.43)
Years Secondary School	7,147.46	6,623.22	6,943.53	7,265.66	6,553.69
	(1.86)+	(1.82)+	(1.79)+	(1.92)+	(1.67)+
Years Post Sec School	-2,956.57	-3,381.06	-3,003.25	393.57	-3,174.82
	(0.92)	(1.07)	(0.94)	(0.12)	(0.99)
Ever inherited	44,037.89	37,304.80	43,934.01	43,366.05	43,578.96
	(2.06)*	(1.77)+	(2.05)*	(2.06)*	(2.00)*
Amt inherited	0.57	0.58	0.57	0.58	0.57
	(2.39)*	(2.43)*	(2.39)*	(2.53)*	(2.42)*
Expect inheritance	24,363.15	21,832.62	24,290.73	24,282.81	24,176.53
	(2.33)*	(2.14)*	(2.27)*	(2.38)*	(2.30)*
Main Income Source					
Self-employment	249,257.27	247,623.31	246,065.32	249,156.23	248,814.68
	(4.91)**	(4.92)**	(4.86)**	(5.09)**	(4.91)**
NZ Superannuation	-53,828.42	-54,149.70	-44,276.06	-47,450.43	-51,831.97
	(1.84)+	(2.00)*	(1.49)	(1.55)	(1.71)+

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Other pension	-17,449.06	-14,529.79	-6,149.38	-16,461.41	-19,584.57
	(0.47)	(0.41)	(0.16)	(0.44)	(0.50)
Other income support	24,233.12	26,347.58	29,173.35	30,131.77	26,370.19
	(2.00)*	(2.22)*	(2.45)*	(2.21)*	(2.23)*
Investment	270,374.01	262,211.96	278,017.00	271,037.23	269,214.88
	(3.14)**	(3.31)**	(3.35)**	(3.15)**	(3.14)**
Other regular	108,645.15	106,030.87	116,531.21	113,642.35	110,187.40
	(3.69)**	(3.76)**	(3.95)**	(3.85)**	(3.70)**
Source not specified	57,868.15	61,617.19	66,843.16	66,476.93	59,169.26
	(2.51)*	(2.83)**	(2.92)**	(2.82)**	(2.57)*
Total income	3.53	3.25	3.55	3.66	3.55
	(4.65)**	(4.34)**	(4.24)**	(4.76)**	(4.71)**
[Total income]^2	-0.00	-0.00	-0.00	-0.00	-0.00
	(2.91)**	(2.76)**	(2.72)**	(2.92)**	(2.96)**
Age bought property		-2,125.98			
		(3.21)**			
Property as share of NW		35,472.88			
		(2.00)*			
Shares as share of NW		176,225.52			
		(1.33)			
Age at first employment			293.95		
			(0.46)		
Number years employed			1,259.26		
			(2.13)*		
Full time			-9,974.12		
			(0.60)		
Part time			8,599.13		
			(0.62)		
Not in labour force			-11,737.02		
			(0.98)		
Occupation					
Manager				38,639.82	
				(1.22)	
Professional				-34,144.98	
				(1.71)+	
Technical				-37,952.72	
				(1.77)+	
Clerical				39,507.47	
				(2.19)*	
Service and Sales				11,933.82	
				(0.95)	
Agriculture and fisheries				87,629.72	
				(1.81)+	

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Trades				-4,962.84	
				(0.13)	
Plant & Mach Operator				-9,954.12	
				(0.48)	
Elementary				22,176.23	
				(1.50)	
Not specified				-77,912.47	
				(1.65)+	
Unemployed				21,736.98	
				(1.66)+	
Age of youngest child					-809.73
					(1.22)
Total Children					-1,799.30
					(0.35)
Children at home					-3,341.25
					(0.58)
Constant	159,420.39	127,282.54	169,665.05	140,166.41	173,227.98
	(1.83)+	(1.47)	(1.91)+	(1.68)+	(1.88)+
R-squared	0.37	0.39	0.37	0.38	0.37

Note:
Absolute value of t-statistics in parentheses corrected for complex sample design effects (weighting, clustering and stratification);
+ significant at 10%. * significant at 5%; ** significant at 1%; Number of sample observations 2392 corresponding to a population of 930,900.

Appendix Table 4 – Median regression results for the net worth of non-partnered individuals

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Age	-14,338.75	-2,937.21	-12,904.76	-14,283.80	-14,382.67
	(26.98)**	(5.57)**	(23.05)**	(33.95)**	(22.01)**
[Age]^2	369.88	106.26	321.33	370.60	379.19
	(33.97)**	(9.99)**	(28.02)**	(43.07)**	(28.24)**
[Age]^3	-2.46	-0.71	-2.08	-2.47	-2.53
	(36.27)**	(10.84)**	(29.14)**	(46.27)**	(30.43)**
Male	-15.98	-553.20	1.91	-290.64	-676.42
	(0.02)	(0.54)	(0.00)	(0.34)	(0.53)
Never Married	3,444.59	5,434.96	5,676.73	5,558.93	-3,378.60
	(2.68)**	(4.28)**	(4.25)**	(5.53)**	(2.09)*
Ethnic Group					
Maori	-3,905.30	-1,140.65	-4,259.91	-3,911.94	-2,134.97
	(3.47)**	(1.03)	(3.57)**	(4.40)**	(1.59)
Pacific Island	-5,941.35	1,380.92	-3,618.99	-7,675.07	-2,044.16
	(2.17)*	(0.52)	(1.30)	(3.73)**	(0.65)
Asian	8,929.49	6,344.28	10,424.65	9,790.78	10,195.19
	(3.07)**	(2.17)*	(3.46)**	(4.21)**	(2.99)**
Other	-15,541.03	-9,661.36	-15,635.53	-15,044.87	-12,965.69
	(3.65)**	(2.21)*	(3.66)**	(4.55)**	(2.59)**
Migrant	1,020.65	1,295.93	2,709.93	1,819.08	59.05
	(0.65)	(0.85)	(1.67)+	(1.47)	(0.03)
Rural	6,417.81	6,456.71	4,675.85	3,853.59	6,648.41
	(3.70)**	(3.84)**	(2.62)**	(2.82)**	(3.39)**
Metro	2,241.35	2,235.52	554.47	2,208.53	2,597.73
	(2.27)*	(2.31)*	(0.54)	(2.85)**	(2.24)*
Years Sec School	1,980.52	1,544.03	1,930.51	2,142.98	1,281.42
	(5.07)**	(4.00)**	(4.68)**	(7.00)**	(2.81)**
Years Post Sec School	-539.96	-1,504.12	-711.60	-35.82	-1,194.34
	(2.04)*	(5.77)**	(2.56)*	(0.17)	(3.96)**
Ever inherited	14,763.42	10,404.21	24,084.65	15,431.96	18,301.44
	(10.40)*	(7.37)**	(16.20)*	(13.79)*	(10.98)*
Amt inherited	0.90	0.95	0.87	0.89	0.91
	(110.57)**	(111.02)**	(102.23)**	(139.66)**	(95.79)**
Expect inheritance	2,398.65	3,045.76	2,561.65	2,220.52	2,802.78
	(1.99)*	(2.58)**	(2.03)*	(2.35)*	(1.98)*
Main Income Source					
Self-employment	146,404.56	125,854.09	144,921.62	141,123.88	140,023.42
	(63.86)**	(56.15)**	(59.82)**	(78.32)**	(52.17)**
NZ Superannuation	-1,462.60	-5,130.00	-4,824.19	-1,621.87	-6,154.69
	(0.64)	(2.27)*	(1.74)+	(0.81)	(2.27)*

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Other pension	41,938.34	53,046.07	64,392.90	43,403.09	39,012.18
	(12.10)**	(16.16)**	(17.38)**	(15.24)**	(9.53)**
Other income support	4,270.21	869.15	3,019.28	3,435.17	4,961.27
	(3.17)**	(0.66)	(1.54)	(2.53)*	(3.04)**
Investment	286,599.98	300,832.14	282,533.14	280,882.09	289,328.54
	(79.36)**	(84.13)**	(69.20)**	(94.70)**	(68.11)**
Other regular	15,722.25	14,437.24	14,987.00	13,644.95	15,222.07
	(5.41)**	(3.84)**	(4.02)**	(5.68)**	(3.52)**
Source not specified	16,027.50	8,372.47	13,496.91	12,626.18	17,058.15
	(4.38)**	(2.27)*	(3.42)**	(4.21)**	(3.96)**
Total income	1.04	0.57	1.11	1.13	1.04
	(28.55)**	(15.88)**	(28.60)**	(39.21)**	(24.06)**
[Total income]^2	-0.00	0.00	-0.00	-0.00	-0.00
	(3.07)**	(10.56)**	(3.94)**	(5.79)**	(2.75)**
Age bought property		-1,333.78			
		(32.77)**			
Property as share of NW		77,538.68			
		(56.78)**			
Shares as share of NW		34,726.53			
		(5.28)**			
Age at first employment			-233.80		
			(3.74)**		
No. years employed			559.12		
			(9.51)**		
Full time			-4,819.84		
			(2.60)**		
Part time			4,148.79		
			(1.31)		
Not in labour force			-463.30		
			(0.25)		
Occupation					
Manager				901.63	
				(0.42)	
Professional				-8,739.28	
				(4.28)**	
Technical				-9,012.84	
				(4.72)**	
Clerical				730.09	
				(0.36)	
Service and Sales				-308.91	
				(0.19)	
Agriculture and fisheries				5,735.91	
				(2.59)**	

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Trades				2,833.67	
				(1.17)	
Plant & Mach. Operator				-3,347.42	
				(1.64)	
Elementary				769.41	
				(0.37)	
Not specified				-19,601.91	
				(4.30)**	
Unemployed				4,630.30	
				(2.13)*	
Age of youngest child					-261.31
					(4.72)**
Total Children					-5,227.49
					(12.58)**
Children at home					1,862.54
					(2.42)*
Constant	128,933.81	25,659.40	119,459.24	124,156.42	136,637.01
	(15.87)**	(3.22)**	(14.06)**	(19.50)**	(13.87)**
Pseudo R-squared	0.246	0.292	0.248	0.249	0.249

Note:
Absolute value of t-statistics in parentheses calculated from 20 bootstrap replications; * significant at 5%; ** significant at 1%; + significant at 10%. Number of observations 2392

Appendix Table 5 – Median Regression results for-the net worth of non-partnered individuals with adjustments to the t-statistics for sample clustering

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Age	-14,338.75	-2,937.21	-12,904.76	-14,283.80	-14,382.67
	(6.02)**	(1.60)	(4.82)**	(6.17)**	(6.04)**
$[Age]^2$	369.88	106.26	321.33	370.60	379.19
	(6.16)**	(2.36)*	(4.58)**	(6.38)**	(6.21)**
$[Age]^3$	-2.46	-0.71	-2.08	-2.47	-2.53
	(5.62)**	(2.32)*	(4.01)**	(6.07)**	(5.78)**
Male	-15.98	-553.20	1.91	-290.64	-676.42
	(0.01)	(0.37)	(0.00)	(0.10)	(0.23)
Never Married	3,444.59	5,434.96	5,676.73	5,558.93	-3,378.60
	(0.65)	(0.48)	(1.05)	(1.15)	(0.76)
Ethnic Group					
Maori	-3,905.30	-1,140.65	-4,259.91	-3,911.94	-2,134.97
	(2.16)*	(0.19)	(2.66)**	(1.43)	(1.22)
Pacific Island	-5,941.35	1,380.92	-3,618.99	-7,675.07	-2,044.16
	(1.46)	(0.40)	(1.14)	(1.42)	(0.54)
Asian	8,929.49	6,344.28	10,424.65	9,790.78	10,195.19
	(2.03)*	(1.22)	(1.47)	(1.47)	(1.68)+
Other	-15,541.03	-9,661.36	-15,635.53	-15,044.87	-12,965.69
	(0.86)	(0.88)	(0.73)	(0.83)	(0.46)
Migrant	1,020.65	1,295.93	2,709.93	1,819.08	59.05
	(0.29)	(0.32)	(1.02)	(0.37)	(0.02)
Rural	6,417.81	6,456.71	4,675.85	3,853.59	6,648.41
	(1.95)*	(2.21)*	(1.21)	(0.74)	(1.39)
Metro	2,241.35	2,235.52	554.47	2,208.53	2,597.73
	(1.01)	(1.18)	(0.28)	(0.90)	(1.76)+
Years Sec School	1,980.52	1,544.03	1,930.51	2,142.98	1,281.42
	(1.98)*	(1.27)	(1.39)	(1.40)	(1.50)
Years Post Sec School	-539.96	-1,504.12	-711.60	-35.82	-1,194.34
	(0.71)	(2.22)*	(0.76)	(0.03)	(2.19)*
Ever inherited	14,763.42	10,404.21	24,084.65	15,431.96	18,301.44
	(0.87)	(0.82)	(1.52)	(0.92)	(1.01)
Amt inherited	0.90	0.95	0.87	0.89	0.91
	(3.09)**	(3.24)**	(4.23)**	(3.75)**	(3.42)**
Expect inheritance	2,398.65	3,045.76	2,561.65	2,220.52	2,802.78
	(1.13)	(1.59)	(1.02)	(0.69)	(1.35)
Main Income Source					
Self-employment	146,404.56	125,854.09	144,921.62	141,123.88	140,023.42
	(3.97)**	(4.59)**	(5.34)**	(4.63)**	(3.60)**
NZ Superannuation	-1,462.60	-5,130.00	-4,824.19	-1,621.87	-6,154.69

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
	(0.06)	(0.32)	(0.20)	(0.07)	(0.27)
Other pension	41,938.34	53,046.07	64,392.90	43,403.09	39,012.18
	(1.90)*	(2.46)**	(2.36)*	(1.72)+	(1.63)
Other income support	4,270.21	869.15	3,019.28	3,435.17	4,961.27
	(1.42)	(0.60)	(0.73)	(0.82)	(1.80)+
Investment	286,599.98	300,832.14	282,533.14	280,882.09	289,328.54
	(3.31)**	(2.47)**	(2.53)**	(2.46)**	(2.13)*
Other regular	15,722.25	14,437.24	14,987.00	13,644.95	15,222.07
	(1.31)	(1.11)	(0.95)**	(2.36)*	(0.93)
Source not specified	16,027.50	8,372.47	13,496.91	12,626.18	17,058.15
	(1.88)+	(1.00)	(2.43)**	(1.73)+	(2.67)**
Total income	1.04	0.57	1.11	1.13	1.04
	(2.96)**	(2.32)*	(3.81)**	(3.35)**	(3.08)**
[Total income]^2	-0.00	0.00	-0.00	-0.00	-0.00
	(0.05)	(0.35)	(0.13)	(0.12)	(0.06)
Age bought property		-1,333.78			
		(3.86)**			
Property as share of NW		77,538.68			
		(6.94)**			
Shares as share of NW		34,726.53			
		(1.31)			
Age at first employment			-233.80		
			(0.65)		
No. years employed			559.12		
			(1.52)		
Full time			-4,819.84		
			(0.83)		
Part time			4,148.79		
			(0.54)		
Not in labour force			-463.30		
			(0.11)		
Occupation					
Manager				901.63	
				(0.08)	
Professional				-8,739.28	
				(0.81)	
Technical				-9,012.84	
				(0.93)	
Clerical				730.09	
				(0.08)	

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Service and Sales				-308.91	
				(0.05)	
Agriculture and fisheries				5,735.91	
				(0.75)	
Trades				2,833.67	
				(0.41)	
Plant & Mach. Operator				-3,347.42	
				(0.37)	
Elementary				769.41	
				(0.14)	
Not specified				-19,601.91	
				(0.79)	
Unemployed				4,630.30	
				(1.01)	
Age of youngest child					-261.31
					(0.72)
Total Children					-5,227.49
					(2.67)**
Children at home					1,862.54
					(0.89)
Constant	128,933.81	25,659.40	119,459.24	124,156.42	136,637.01
	(4.77)**	(1.35)	(4.46)**	(4.16)**	(4.47)**
Pseudo R-squared	0.246	0.292	0.248	0.249	0.249

Note:
Absolute value of t-statistics in parentheses calculated from 20 bootstrap replications, where the sample drawn during each replication is a sample of clusters (defined by confidentialised stratum and PSU identifiers); * significant at 5%; ** significant at 1%; + significant at 10%.
Number of observations 2392

Appendix Table 6 – Regression results for the net worth of couples with the characteristics of each person specified

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Respondent: Age	-34,299.04	-26,332.51	-30,640.76	-32,666.67	-41,675.89
	(2.05)*	(1.60)	(1.81)+	(1.79)+	(2.19)*
Respondent: Age sq	782.81	611.02	698.86	745.70	927.37
	(2.35)*	(1.88)+	(2.09)*	(2.11)*	(2.47)*
Respondent: Age cubed	-4.71	-3.58	-4.24	-4.54	-5.54
	(2.29)*	(1.78)+	(2.01)*	(2.12)*	(2.44)*
Partner: Age	-7,062.68	7,596.23	-11,558.03	-174.06	-16,052.82
	(0.47)	(0.49)	(0.77)	(0.01)	(1.17)
Partner: Age sq	320.60	102.40	439.91	198.67	506.57
	(1.04)	(0.32)	(1.45)	(0.60)	(1.79)+
Partner: Age cubed	-2.58	-1.49	-3.30	-1.88	-3.69
	(1.30)	(0.73)	(1.68)+	(0.90)	(2.01)*
Respondent: Male	126,891.43	117,378.13	128,509.85	154,563.92	109,755.92
	(1.58)	(1.52)	(1.64)	(1.98)*	(1.39)
Partner: Male	124,592.94	116,074.88	128,151.54	132,628.47	107,116.25
	(1.48)	(1.44)	(1.55)	(1.61)	(1.31)
Couple is married	57,629.23	55,131.30	56,975.43	50,262.42	52,586.53
	(2.58)*	(2.43)*	(2.51)*	(2.19)*	(2.45)*
Respondent: Maori	-27,644.94	-39,397.04	-27,440.74	-23,418.91	-34,028.37
	(0.98)	(1.38)	(0.97)	(0.83)	(1.19)
Respondent: Pacific	-38,435.56	-24,972.56	-45,026.22	-43,876.80	-53,967.59
	(0.73)	(0.53)	(0.85)	(0.88)	(1.00)
Respondent: Asian	26,643.46	47,531.54	17,998.60	12,534.86	25,607.51
	(0.63)	(1.06)	(0.43)	(0.29)	(0.63)
Respondent: Other	79,327.76	77,943.19	78,890.28	72,621.62	74,464.89
	(1.62)	(1.49)	(1.62)	(1.40)	(1.55)
Partner: Maori	-42,926.51	-32,775.95	-45,690.53	-37,743.94	-52,871.51
	(1.51)	(1.24)	(1.60)	(1.39)	(1.93)+
Partner: Pacific	44,854.53	23,108.09	40,164.76	50,391.47	30,365.38
	(0.92)	(0.53)	(0.84)	(1.08)	(0.65)
Partner: Asian	14,465.36	25,231.44	16,462.86	22,623.71	20,817.12
	(0.37)	(0.59)	(0.43)	(0.55)	(0.55)
Partner: Other	-109,148.13	-112,443.55	-100,326.84	-106,358.69	-106,286.61
	(2.34)*	(2.22)*	(2.17)*	(2.19)*	(2.31)*
Respondent: Migrant	-82,041.90	-86,536.86	-87,183.76	-83,368.51	-81,790.34
	(3.11)**	(3.28)**	(3.32)**	(3.20)**	(3.15)**
Partner: Migrant	-17,949.67	-11,230.50	-18,654.32	-22,424.39	-16,938.60
	(0.68)	(0.43)	(0.69)	(0.87)	(0.64)
Rural	134,959.20	119,548.87	135,791.30	63,446.82	132,457.07
	(4.40)**	(4.14)**	(4.46)**	(2.41)*	(4.37)**

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Metro	23,046.37	27,226.92	24,185.88	26,068.82	26,766.43
	(1.09)	(1.28)	(1.14)	(1.24)	(1.25)
Respondent: Sec Sch Yrs	32,126.85	28,963.57	31,240.62	30,744.03	32,809.41
	(3.61)**	(3.21)**	(3.49)**	(3.53)**	(3.75)**
Partner: Sec Sch Yrs	17,334.08	17,537.73	18,573.10	20,013.41	18,021.79
	(1.53)	(1.59)	(1.67)+	(1.77)+	(1.58)
Respondent: Post Sec Yrs	-2,946.01	-1,757.50	-5,103.21	-876.34	-3,276.88
	(0.62)	(0.38)	(1.07)	(0.17)	(0.70)
Partner: Post Sec Yrs	-3,064.93	-3,276.15	-2,766.37	991.03	-3,091.13
	(0.41)	(0.44)	(0.38)	(0.12)	(0.41)
Couple: Ever Inherit?	37,632.47	36,633.88	36,157.14	33,394.63	39,385.20
	(1.38)	(1.36)	(1.33)	(1.21)	(1.46)
Couple: Inherit amount	0.61	0.55	0.62	0.65	0.61
	(2.44)*	(2.35)*	(2.50)*	(2.69)**	(2.49)*
Couple: Expect to inherit	44,636.46	42,601.15	45,306.88	36,418.30	43,828.65
	(2.30)*	(2.17)*	(2.32)*	(1.93)+	(2.26)*
Self-employment	174,733.06	142,787.47	176,283.65	140,279.42	170,368.76
	(4.48)**	(3.56)**	(4.56)**	(3.70)**	(4.31)**
NZ Super	-130,848.54	-118,273.66	-143,485.26	-132,615.93	-145,611.24
	(3.09)**	(2.72)**	(2.81)**	(2.57)*	(3.38)**
Other Pension	-157,671.30	-158,159.66	-175,265.98	-181,570.23	-173,353.93
	(2.28)*	(2.43)*	(2.39)*	(2.53)*	(2.46)*
Other income support	-46,184.93	-59,614.94	-62,978.23	-71,520.62	-54,987.91
	(1.74)+	(2.14)*	(1.98)*	(2.06)*	(2.11)*
Investment	378,963.24	340,499.62	356,936.12	358,797.70	368,853.21
	(4.01)**	(3.52)**	(3.48)**	(3.57)**	(3.91)**
Other regular	140,440.52	162,055.08	133,489.59	107,991.49	133,004.57
	(1.27)	(1.41)	(1.21)	(0.89)	(1.16)
Not specified	102,034.99	103,361.86	97,807.17	82,466.26	91,924.44
	(2.11)*	(2.26)*	(1.93)+	(1.49)	(1.89)+
Total income	3.27	3.09	3.29	3.37	3.31
	(5.37)**	(5.19)**	(5.40)**	(5.07)**	(5.38)**
[Total income]^2	-0.00	-0.00	-0.00	-0.00	-0.00
	(1.46)	(1.45)	(1.52)	(1.60)	(1.50)
Respondent: Age buy prop		-876.83			
		(0.69)			
Partner: Age bought proprty		-3,114.85			
		(2.27)*			
Property share of NetWorth		-164,882.26			
		(4.96)**			

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Shares share of Net Worth		315,963.45			
		(1.51)			
Respondent: Age at first job			4,394.62		
			(2.57)*		
Partner: Age at first job			-2,323.62		
			(1.16)		
Respondent: Yrs of work			948.00		
			(0.63)		
Partner: Yrs of work			-1,497.29		
			(0.77)		
Respondent: Employed			-93,234.93		
			(1.85)+		
Partner: employed			-66,914.22		
			(1.29)		
Respondent: not in lab force			-69,724.47		
Partner: not in labour force			-85,824.97		
			(1.56)		
Partner: Manager				109,779.10	
				(1.79)+	
Partner: Professional				-69,344.75	
				(1.67)+	
Partner: Technical				-64,918.26	
				(1.83)+	
Partner: Clerical				11,127.14	
				(0.27)	
Partner: Service and Sales				892.62	
				(0.03)	
Partner: Agriculture & fishery				140,633.93	
				(2.33)*	
Partner: Trades				-12,600.95	
				(0.36)	
Partner: Plant Operator				-37,208.36	
				(1.32)	
Partner: Elementary				-17,512.01	
				(0.47)	
Partner: Not specified				-56,740.23	
				(0.57)	
Partner: Unemployed				79,554.57	

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
				(1.47)	
Respondent: Manager				-29,147.49	
				(0.51)	
Respondent: Professional				-25,103.80	
				(0.35)	
Respondent: Technical				-69,436.61	
				(1.82)+	
Respondent: Clerical				-16,638.81	
				(0.31)	
Respondent: Service & Sales				-49,537.27	
				(1.42)	
Respondent: Agriculture etc				77,977.58	
				(1.51)	
Respondent: Trades				-95,871.30	
				(2.40)*	
Respondent: Plant Operator				-38,663.03	
				(1.01)	
Respondent: Elementary				-57,546.25	
				(1.74)+	
Respondent: Not specified				102,074.86	
				(0.99)	
Respondent: Unemployed				48,954.45	
				(0.99)	
Age of youngest child					-1,077.59
					(1.06)
Total children					10,365.91
					(1.48)
Children at home					13,478.14
					(1.08)
Constant	-23,346.93	-203,530.13	101,740.32	-150,561.53	205,801.05
	(0.11)	(0.93)	(0.48)	(0.70)	(0.76)
R-squared	0.31	0.33	0.31	0.33	0.31

Note:
Coefficients and absolute value of t-statistics (in parentheses) corrected for complex sample design effects (weighting, clustering and stratification); + significant at 10%; * significant at 5%; ** significant at 1%.
Number of sample observations is 2976, corresponding to a population total of 853,900.

Appendix Table 7 – Regression results for the net worth of couples: characteristics defined for the couple

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Age of couple	-22,822.26	-11,093.09	-22,838.32	-18,275.22	-30,632.44
	(3.23)**	(1.58)	(3.29)**	(2.58)*	(3.38)**
[Age of couple] squared	300.17	198.00	305.09	257.28	380.03
	(4.16)**	(2.74)**	(4.26)**	(3.62)**	(4.23)**
[Age of couple] cubed	-1.00	-0.71	-1.02	-0.88	-1.24
	(4.50)**	(3.15)**	(4.49)**	(4.05)**	(4.63)**
Couple: Both male	296,979.63	262,821.55	298,459.61	322,523.86	272,692.41
	(1.92)+	(1.77)+	(1.94)+	(2.13)*	(1.80)+
Couple: Male-Female mix	236,640.49	183,924.23	235,284.75	228,043.24	218,855.08
	(2.07)*	(1.79)+	(2.05)*	(2.16)*	(1.98)*
Couple is married	52,023.85	52,981.78	51,049.80	46,652.21	47,899.48
	(2.28)*	(2.24)*	(2.20)*	(1.94)+	(2.17)*
Couple: Pakeha-Maori mix	-42,095.82	-41,657.23	-41,435.05	-33,250.16	-47,000.69
	(1.32)	(1.34)	(1.31)	(1.08)	(1.50)
Couple: Pakeha-Other mix	10,223.54	37,858.62	7,538.78	22,337.14	10,483.35
	(0.29)	(1.09)	(0.22)	(0.64)	(0.31)
Couple: Both Maori	-67,942.90	-67,366.45	-70,415.71	-59,689.39	-83,140.14
	(2.86)**	(2.69)**	(2.93)**	(2.57)*	(3.20)**
Couple: Other-Other mix	-43,048.75	-43,685.67	-45,213.37	-49,361.96	-54,469.10
	(0.81)	(0.91)	(0.86)	(0.99)	(1.05)
Couple: Both Other	22,664.80	28,303.66	12,832.03	18,806.61	12,076.31
	(0.77)	(0.92)	(0.41)	(0.63)	(0.40)
Couple: Both Migrants	-97,983.38	-96,658.99	-101,660.71	-106,308.05	-96,231.14
	(3.43)**	(3.35)**	(3.47)**	(3.83)**	(3.43)**
Couple: Migrant – non-Mig mix	-47,806.08	-46,152.26	-48,147.30	-47,187.79	-49,196.83
	(1.68)+	(1.62)	(1.70)+	(1.78)+	(1.74)+
Rural	132,858.07	118,772.10	133,061.44	61,102.59	130,913.15
	(4.31)**	(4.10)**	(4.30)**	(2.41)*	(4.29)**
Metro	21,892.46	26,146.63	21,603.97	24,484.51	25,269.26
	(1.04)	(1.24)	(1.03)	(1.18)	(1.19)
Couple: Total Sec Sch Years	24,786.71	23,733.98	24,426.47	25,645.69	25,566.18
	(3.92)**	(3.78)**	(3.89)**	(4.02)**	(4.02)**
Couple: Total Post Sec Sch Yrs	-2,933.88	-2,274.85	-3,380.92	50.49	-3,009.92
	(0.71)	(0.57)	(0.87)	(0.01)	(0.74)
Couple: Ever Inherit?	37,598.66	37,002.77	38,677.18	32,906.00	39,575.82
	(1.40)	(1.40)	(1.44)	(1.20)	(1.49)
Couple: Inherit amount	0.60	0.53	0.59	0.64	0.60
	(2.37)*	(2.26)*	(2.38)*	(2.58)*	(2.40)*

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Couple: Expect to inherit	43,376.45	41,286.29	44,585.30	34,301.56	42,902.89
	(2.23)*	(2.11)*	(2.30)*	(1.79)+	(2.20)*
Self-employment	178,163.36	148,598.30	180,209.30	142,928.35	175,033.95
	(4.66)**	(3.80)**	(4.76)**	(3.84)**	(4.54)**
NZ Super	-129,052.27	-113,365.72	-125,585.30	-132,978.96	-142,944.54
	(3.18)**	(2.69)**	(2.61)**	(2.63)**	(3.47)**
Other Pension	-159,431.70	-160,450.34	-154,237.37	-185,675.36	-174,465.28
	(2.32)*	(2.47)*	(2.19)*	(2.56)*	(2.49)*
Other income support	-41,275.41	-52,171.34	-41,791.76	-67,690.64	-48,712.70
	(1.56)	(1.87)+	(1.21)	(1.92)+	(1.85)+
Investment	385,306.78	348,642.55	386,572.62	362,181.66	376,379.52
	(4.13)**	(3.68)**	(3.88)**	(3.65)**	(4.05)**
Other regular	144,777.37	167,185.78	142,164.77	115,143.52	136,504.51
	(1.32)	(1.50)	(1.25)	(0.96)	(1.21)
Not specified	118,595.96	110,864.96	113,122.54	93,463.87	110,347.44
	(2.54)*	(2.50)*	(2.25)*	(1.75)+	(2.37)*
Total income	3.30	3.11	3.34	3.39	3.34
	(5.51)**	(5.31)**	(5.52)**	(5.12)**	(5.53)**
[Total income] squared	-0.00	-0.00	-0.00	-0.00	-0.00
	(1.53)	(1.52)	(1.59)	(1.63)	(1.57)
Age couple bought property		-1,933.19			
		(3.58)**			
Property as share of net worth		-161,190.46			
		(4.95)**			
Shares as share of net worth		319,802.59			
		(1.56)			
Couple: age at first employment			882.55		
			(0.63)		
Couple: years of employment			-348.70		
			(0.25)		
Couple: one employed			22,729.43		
			(0.76)		
Couple: neither employed			-6,617.16		
			(0.15)		
Partner: Manager				101,359.85	
				(1.51)	
Partner: Professional				-72,956.29	
				(2.00)*	
Partner: Technical				-62,738.04	
				(1.96)+	

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
Partner: Clerical				10,929.07	
				(0.28)	
Partner: Service and Sales				3,019.12	
				(0.09)	
Partner: Agriculture & fishery				135,157.38	
				(2.24)*	
Partner: Trades				-22,794.50	
				(0.71)	
Partner: Plant Operator				-42,841.90	
				(1.69)+	
Partner: Elementary				-23,240.31	
				(0.66)	
Partner: Not specified				-89,822.44	
				(1.10)	
Partner: Unemployed				77,786.39	
				(1.45)	
Respondent: Manager				-22,586.98	
				(0.37)	
Respondent: Professional				-27,202.62	
				(0.42)	
Respondent: Technical				-66,679.62	
				(1.65)	
Respondent: Clerical				-19,726.96	
				(0.36)	
Respondent: Service & Sales				-49,572.69	
				(1.38)	
Respondent: Agriculture etc				80,914.86	
				(1.56)	
Respondent: Trades				-94,231.98	
				(2.49)*	
Respondent: Plant Operator				-34,664.34	
				(0.90)	
Respondent: Elementary				-53,664.32	
				(1.56)	
Respondent: Not specified				114,019.73	
				(1.12)	
Respondent: Unemployed				48,885.42	
				(0.98)	
Age of youngest child					-1,128.55
					(1.09)
Total children					8,785.27

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Occupation	Core + Children
					(1.25)
Children at home					13,531.91
					(1.10)
Constant	-69,803.94	-231,355.70	-106,841.59	-179,526.49	146,704.90
	(0.32)	(1.06)	(0.50)	(0.81)	(0.54)
Observations	2982	2976	2982	2982	2982
R-squared	0.31	0.32	0.31	0.33	0.31

Note:
Coefficients and absolute value of t-statistics (in parentheses) corrected for complex sample design effects (weighting, clustering and stratification); + significant at 10%; * significant at 5%; ** significant at 1%.
Number of sample observations is 2976, corresponding to a population total of 853,900.

Appendix Table 8 – Median regression results for the net worth of couples

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Children
Age of couple	-10,385.38	-3,467.67	-9,961.45	-14,270.60
	(3.70)**	(1.39)	(4.36)**	(5.10)**
[Age of couple] squared	146.24	87.50	99.85	194.21
	(5.15)**	(3.46)**	(4.21)**	(6.74)**
[Age of couple] cubed	-0.49	-0.33	-0.22	-0.65
	(5.35)**	(4.00)**	(2.86)**	(7.06)**
Couple: Both male	91,570.14	137,274.99	28,163.12	105,951.43
	(1.64)	(2.88)**	(0.62)	(2.03)*
Couple: Male-Female mix	71,641.76	80,903.36	44,572.95	81,121.35
	(1.62)	(2.17)*	(1.25)	(1.97)*
Couple is married	21,380.21	14,593.70	114,349.69	16,598.26
	(2.48)*	(1.90)+	(16.36)**	(2.03)*
Couple: Pakeha-Maori mix	-37,470.44	-37,693.24	-29,898.71	-38,135.75
	(3.73)**	(4.23)**	(3.70)**	(4.08)**
Couple: Pakeha-Other mix	34,745.29	36,230.22	-39,425.68	26,192.56
	(1.88)+	(2.25)*	(2.78)**	(1.58)
Couple: Both Maori	-37,297.69	-24,779.73	-1,573.51	-37,191.36
	(3.64)**	(2.69)**	(0.19)	(3.80)**
Couple: Other-Other mix	18,507.94	13,160.35	-46,411.27	15,463.46
	(0.70)	(0.56)	(2.16)*	(0.62)
Couple: Both Other	-5,201.26	-8,300.02	-178,620.90	-8,368.79
	(0.34)	(0.61)	(14.34)**	(0.59)
Couple: Both Migrants	-17,120.77	-6,568.50	74,378.11	-26,320.28
	(1.42)	(0.61)	(7.60)**	(2.35)*
Couple: Migrant – non-Mig mix	-14,865.43	-11,097.16	67,480.02	-21,076.89
	(1.68)+	(1.42)	(9.43)**	(2.55)*
Rural	40,794.55	29,131.29	98,453.21	43,456.24
	(4.38)**	(3.51)**	(13.09)**	(5.01)**
Metro	-1,775.61	-1,307.48	-4,737.06	5,618.58
	(0.28)	(0.23)	(0.93)	(0.95)
Couple: Total Sec Sch Years	7,673.71	6,840.80	-61.61	8,080.88
	(4.48)**	(4.43)**	(0.04)	(4.96)**
Couple: Total Post Sec Sch Yrs	-2,727.87	-1,898.73	-1,003.54	-1,831.53
	(2.70)**	(2.13)*	(1.22)	(1.95)+
Couple: Ever Inherit?	43,211.67	43,618.23	52,181.39	38,460.68
	(5.34)**	(6.04)**	(7.92)**	(5.08)**
Couple: Inherit amount	0.69	0.59	0.80	0.69
	(13.20)**	(12.64)**	(18.25)**	(14.17)**
Couple: Expect to inherit	24,139.20	23,532.54	-60,499.38	21,651.46
	(3.46)**	(3.81)**	(10.73)**	(3.33)**
Self-employment	152,742.62	154,636.70	128,539.68	152,082.16

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Children
	(16.98)**	(19.01)**	(17.73)**	(18.19)**
NZ Super	-76,418.15	-70,664.30	-73,384.82	-78,009.32
	(4.98)**	(5.24)**	(5.39)**	(5.42)**
Other Pension	-74,618.93	-55,333.69	154,823.85	-74,418.14
	(2.84)**	(2.38)*	(6.61)**	(3.02)**
Other income support	-8,491.76	-26,797.69	145,037.59	-16,455.64
	(0.62)	(2.22)*	(11.87)**	(1.28)
Investment	369,309.46	316,399.24	476,126.01	372,979.80
	(14.94)**	(15.43)**	(22.89)**	(16.14)**
Other regular	99,911.11	86,362.82	128,229.67	79,448.40
	(2.49)*	(2.43)*	(3.89)**	(2.09)*
Not specified	43,050.22	32,755.59	92,708.09	36,341.00
	(1.93)+	(1.68)+	(4.88)**	(1.69)+
Total income	2.06	1.73	1.86	1.98
	(16.19)**	(15.41)**	(17.99)**	(16.76)**
[Total income] squared	-0.00	0.00	0.00	-0.00
	(0.34)	(2.30)*	(1.70)+	(0.38)
Age couple bought property		-1,741.65		
		(11.78)**		
Property as share of net worth		-21,365.98		
		(2.72)**		
Shares as share of net worth		437,240.78		
		(9.43)**		
Couple: age at first employment			613.80	
			(1.71)+	
Couple: years of employment			79.38	
			(0.27)	
Couple: one employed			-21,720.16	
			(3.41)**	
Couple: neither employed			-172,383.43	
			(15.12)**	
Age of youngest child				20.58
				(0.05)
Total children				-7,720.19
				(3.99)**
Children at home				15,211.67
				(4.68)**
Constant	-230.08	-126,618.20	130,574.98	78,952.42
	(0.00)	(1.49)	(1.63)	(0.84)
Pseudo R-squared	0.250	0.261	0.253	0.252

Note:
Absolute value of t-statistics in parentheses calculated from 20 bootstrap replications; * significant at 5%; ** significant at 1%; + significant at 10%. Number of observations 2982

Appendix Table 9 – Median regression results for the net worth of couples: standard errors and t-statistics account for clustering

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Children
Age of couple	-10,385.38	-3,467.67	-9,961.45	-14,270.60
	(0.60)	(0.10)	(0.80)	(3.64)**
[Age of couple] squared	146.24	87.50	99.85	194.21
	(0.75)	(0.21)	(0.70)	(4.63)**
[Age of couple] cubed	-0.49	-0.33	-0.22	-0.65
	(0.73)	(0.23)	(0.46)	(4.89)**
Couple: Both male	91,570.14	137,274.99	28,163.12	105,951.43
	(0.47)	(0.66)	(0.12)	(0.48)
Couple: Male-Female mix	71,641.76	80,903.36	44,572.95	81,121.35
	(0.46)	(0.45)	(0.33)	(0.62)
Couple is married	21,380.21	14,593.70	114,349.69	16,598.26
	(0.54)	(0.14)	(2.09)*	(0.64)
Couple: Pakeha-Maori mix	-37,470.44	-37,693.24	-29,898.71	-38,135.75
	(1.83)+	(0.34)	(2.21)*	(1.92)+
Couple: Pakeha-Other mix	34,745.29	36,230.22	-39,425.68	26,192.56
	(1.01)	(0.18)	(0.18)	(0.74)
Couple: Both Maori	-37,297.69	-24,779.73	-1,573.51	-37,191.36
	(3.58)**	(0.09)	(0.14)	(1.87)+
Couple: Other-Other mix	18,507.94	13,160.35	-46,411.27	15,463.46
	(0.31)	(0.08)	(0.58)	(0.36)
Couple: Both Other	-5,201.26	-8,300.02	-178,620.90	-8,368.79
	(0.11)	(0.09)	(1.00)	(0.48)
Couple: Both Migrants	-17,120.77	-6,568.50	74,378.11	-26,320.28
	(1.20)	(0.10)	(1.27)	(1.40)
Couple: Migrant – non-Mig mix	-14,865.43	-11,097.16	67,480.02	-21,076.89
	(0.31)	(0.16)	(1.67)+	(1.01)
Rural	40,794.55	29,131.29	98,453.21	43,456.24
	(0.45)	(0.02)	(1.45)	(1.43)
Metro	-1,775.61	-1,307.48	-4,737.06	5,618.58
	(0.03)	(0.42)	(0.06)	(0.47)
Couple: Total Sec Sch Years	7,673.71	6,840.80	-61.61	8,080.88
	(1.96)+	(0.89)	(0.01)	(1.36)
Couple: Total Post Sec Sch Yrs	-2,727.87	-1,898.73	-1,003.54	-1,831.53
	(1.11)	(0.27)	(0.21)	(1.04)
Couple: Ever Inherit?	43,211.67	43,618.23	52,181.39	38,460.68
	(3.05)**	(1.00)	(3.31)**	(1.51)
Couple: Inherit amount	0.69	0.59	0.80	0.69
	(4.38)**	(0.77)	(3.14)**	(3.92)**
Couple: Expect to inherit	24,139.20	23,532.54	-60,499.38	21,651.46
	(0.35)	(0.23)	(5.89)**	(1.88)+

Dependent Variable: Net Worth	Core	Core + Portfolio	Core + Lab Force State	Core + Children
Self-employment	152,742.62	154,636.70	128,539.68	152,082.16
	(2.83)**	(0.84)	(7.17)**	(5.58)**
NZ Super	-76,418.15	-70,664.30	-73,384.82	-78,009.32
	(1.96)+	(1.14)	(1.55)	(2.60)*
Other Pension	-74,618.93	-55,333.69	154,823.85	-74,418.14
	(1.01)	(0.58)	(1.45)	(1.98)+
Other income support	-8,491.76	-26,797.69	145,037.59	-16,455.64
	(0.18)	(0.70)	(2.13)*	(0.60)
Investment	369,309.46	316,399.24	476,126.01	372,979.80
	(3.31)**	(1.99*	(3.59)**	(4.84)**
Other regular	99,911.11	86,362.82	128,229.67	79,448.40
	(1.02)	(0.70)	(0.52)	(0.33)
Not specified	43,050.22	32,755.59	92,708.09	36,341.00
	(1.01)	(0.33)	(1.69)+	(1.09)
Total income	2.06	1.73	1.86	1.98
	(2.55)*	(0.74)	(3.33)**	(3.45)**
[Total income] squared	-0.00	0.00	0.00	-0.00
	(0.04)	(0.08)	(0.16)	(0.05)
Age couple bought property		-1,741.65		
		(1.71)+		
Property as share of net worth		-21,365.98		
		(0.37)		
Shares as share of net worth		437,240.78		
		(0.84)		
Couple: age at first employment			613.80	
			(0.56)	
Couple: years of employment			79.38	
			(0.02)	
Couple: one employed			-21,720.16	
			(0.29)	
Couple: neither employed			-172,383.43	
			(3.44)**	
Age of youngest child				20.58
				(0.03)
Total children				-7,720.19
				(1.74)+
Children at home				15,211.67
				(1.91)+
Constant	-230.08	-126,618.20	130,574.98	78,952.42
	(0.00)	(0.15)	(0.38)	(0.35)
Pseudo R-squared	0.250	0.261	0.253	0.252

Note:
Absolute value of t-statistics in parentheses calculated from 20 bootstrap replications, where the sample drawn during each replication is a

sample of clusters (defined by confidentialised stratum and PSU identifiers.
* significant at 5%; ** significant at 1%; + significant at 10%. Number of observations 2982

Appendix Table 10 – Intra-household model of net worth for couples

	Ordinary Least Squares		Median Regression	
Female minus male:	Controls for Each Person	Controls for Each Couple	Controls for Each Person	Controls for Each Couple
Age	-1807.04	-1351.44	-259.85	230.15
	(0.99)	(0.71)	(0.49)	(0.34)
Secondary school years	-12080.72	-11984.35	-5699.99	-1739.20
	(1.67)+	(1.66)+	(2.70)**	(0.68)
Post-secondary school years	2692.36	2372.56	-785.45	-628.23
	(0.66)	(0.60)	(0.66)	(0.43)
Inheritance amount	-0.37	-0.36	-0.01	0.01
	(1.59)	(1.52)	(0.15)	(0.03)
R-squared	0.31	0.39	0.25	0.25

Note:

Absolute value of t-statistics in parentheses corrected for complex sample design effects (weighting, clustering and stratification) in the OLS regression; * significant at 5%; ** significant at 1%; + significant at 10%.

Number of observations is 2976.

Each of the four regressions also includes as control variables, all of the variables included in the "core" model. When the controls are for each person, these variables are reported in Appendix Table 6, and when the controls are for each couple they are reported in Appendix Table 7.

Appendix Table 11 – Core model including portfolio preferences for Pakeha individuals

Dependent Variable: Total Net Wealth	Type of Variable	Pakeha Model		Maori Observations	Pakeha Observation
		Coefficient	t value[b]	Means	Means
Age	C	-24,093.2	**-2.59**	34.48	44.13
Age^2	C	632.95	**3.32**	1,430.48	2,392.56
Age^3	C	-4.02701	**-3.53**	69,895.98	149,888
Male	D	5,593.132	0.5	0.41	0.43
Never Married	D	29,660.05	1.13	0.70	0.56
Migrant	D	-42,268.6	**-2.87**	0.022	0.142
Rural	D	93,074.83	**2.65**	0.1296	0.09796
Metro	D	21,081.41	**1.82**	0.4146	0.54351
Region 10	D	67,578.55	1.60	0.02429	0.03357
Yrs Sec School	C	14,488.07	**2.84**	3.338327	3.55052
Yrs Post Sec	C	-5,491.91	-1.44	1.459691	1.89764
Ever inherited	D	7,962.11	**0.40**	0.062505	0.16814
Amt inherited	C	0.716946	**2.77**	5043.4	13,581
Expect inheritance	D	16,598.13	1.24	0.280748	0.35060
Age bought property	C	-1,671.14	**-2.29**	29.99254	31.57318
Property as share of NW	C	34,954.62	1.90	0.173911	0.32380
Shares as share of NW	C	153,986.5	1.01	0.006847	0.01806
Main income self-emp	D	253,557.8	**5.61**	0.024284	0.08870
Main income NZ Super	D	-65,121.6	-1.58	0.059788	0.18363
Main income other pension	D	-15,318.6	-0.32	0.003909	0.01900
Main income other support	D	35,521.04	**2.20**	0.419726	0.16588
Main income investment	D	47,871.09	**1.74**	0.017648	0.01420
Main income other	D	78,521.28	**2.13**	0.026087	0.01279
Total income	C	3.927143	**4.00**	20,180	26,861
Total Income^2	C	-8.30E-06	**-3.46**	9.89E+08	13.90E+08
Constant term		104011.7	0.91	1	1.00000
Number of obs		1,572			
F(27, 2364)		21.31			
Prob > F		0.00			
R-squared		0.40			
Root MSE		210,000.00			

Appendix Table 12 – OLS Regression Results for the Models of Augmented Net Worth for Unpartnered Individuals and Couples

Dependent Variable	Unpartnered Individuals		Couples	
Augmented Net Worth				
	Including Income	Excluding Income	Including Income	Excluding Income
Age	21,084.64	39,852.30	41,744.50	58,681.91
	(2.92)**	(5.95)**	(5.70)**	(7.60)**
$[Age]^2$	-513.02	-853.58	-482.08	-637.59
	(3.37)**	(5.91)**	(6.50)**	(8.07)**
$[Age]^3$	3.29	5.22	1.53	1.99
	(3.55)**	(5.76)**	(6.70)**	(8.21)**
Male	174,913.48	183,851.71		
	(17.11)**	(16.64)**		
Never Married	22,025.54	21,926.42		
	(1.24)	(1.15)		
Couple: Both male			637,931.91	563,725.67
			(3.42)**	(4.67)**
Couple: Male-Female mix			441,969.88	336,492.69
			(3.12)**	(5.20)**
Couple is married			53,813.97	57,097.76
			(2.18)*	(2.12)*
Ethnic group				
Respondent: Maori	-67,597.63	-72,423.93		
	(6.41)**	(6.43)**		
Respondent: Pacific Island	-100,207.90	-107,746.22		
	(4.05)**	(4.16)**		
Respondent: Asian	-139,007.69	-165,949.73		
	(6.64)**	(8.61)**		
Respondent: Other	129,701.82	188,292.90		
	(2.76)**	(2.42)*		
Couple: Pakeha-Maori mix			-106,730.16	-131,732.91
			(3.39)**	(4.08)**
Couple: Pakeha-Other mix			-39,032.80	-100,770.04
			(0.92)	(2.30)*
Couple: Both Maori			-179,543.52	-201,839.48
			(6.97)**	(8.08)**
Couple: Maori-Other mix			-143,160.01	-156,321.34
			(1.86)+	(3.31)**
Couple: Both Other			-161,432.68	-232,763.84
			(4.34)**	(6.11)**
Migrant	-6,819.98	-16,634.93		

Dependent Variable	Unpartnered Individuals		Couples	
Augmented Net Worth				
Couple: Both Migrants			-83,636.86	-108,842.48
			(2.54)*	(3.02)**
Couple: Migrant – non-Mig mix			-44,996.37	-50,891.53
			(1.44)	(1.60)
Rural	55,503.94	64,148.95	148,144.03	133,533.13
	(2.33)*	(2.62)**	(5.05)**	(3.94)**
Metro	25,849.41	33,850.22	27,904.94	56,591.47
	(2.41)*	(2.97)**	(1.27)	(2.38)*
Years Secondary School	19,558.95	24,466.04	40,179.05	53,017.74
	(4.42)**	(5.29)**	(6.19)**	(7.82)**
Years Post Sec School	18,714.13	22,569.54	22,352.55	28,891.08
	(5.23)**	(6.36)**	(5.14)**	(6.18)**
Ever inherited	36,806.04	33,383.37	31,885.04	26,062.94
	(1.60)	(1.41)	(1.13)	(0.88)
Amount inherited	0.56	0.64	0.54	0.62
	(2.37)*	(2.46)*	(2.09)*	(2.36)*
Expect inheritance	37,733.85	32,764.71	66,747.64	83,631.62
	(3.13)**	(2.43)*	(3.16)**	(3.50)**
Main Income Source				
Self-employment	227,522.59	258,600.70	160,628.79	219,593.99
	(4.40)**	(4.66)**	(4.01)**	(5.30)**
NZ Superannuation	-48,990.12	-99,781.30	-68,101.04	-202,520.16
	(1.68)+	(2.89)**	(1.63)	(3.63)**
Other pension	-63,048.18	-70,999.70	-209,521.14	-257,734.44
	(1.41)	(1.53)	(2.99)**	(2.25)*
Other income support	-460.85	-56,733.36	-28,873.05	-164,395.93
	(0.04)	(5.78)**	(0.99)	(5.92)**
Investment	225,160.12	245,148.91	341,269.58	288,505.71
	(2.78)**	(2.53)*	(3.93)**	(3.05)**
Other regular	136,167.51	104,103.57	72,369.06	111,873.68
	(4.12)**	(3.01)**	(0.67)	(1.29)
Source not specified	49,488.83	-37,450.66	126,347.23	4,788.00
	(1.67)+	(1.46)	(2.38)*	(0.09)
Total income	4.27		4.35	
	(5.64)**		(7.40)**	
[Total income]^2	-0.00		-0.00	
	(2.99)**		(3.00)**	
Constant	-107,238.57	-317,870.85	-1,140,904.53	-1,468,073.16
	(1.12)	(3.21)**	(4.70)**	(6.48)**
Observations	2392	2392	2982	2982
R-squared	0.53	0.49	0.50	0.44

Note:
For characteristics such as age, years of schooling and amount inherited, the variable for couples refers to the combined total across the two members, while for dummy variables such as 'ever inherited' the variable reflects whether *either* member of the couple inherited.
Augmented networth is calculated as networth plus the net present value of expected earnings.
Absolute value of t-statistics in parentheses corrected for complex sample design effects (weighting, clustering and stratification);
* significant at 5%; ** significant at 1%; + significant at 10%.
For the couple ethnic characteristics, 'Other' includes Asian.