Women's Retirement Incomes in New Zealand: A Household Bargaining Approach

John Gibson, Trinh Le, Grant Scobie

THE TREASURY
Kaitohutohu Kaupapa Rawa

A U T H O R S	John Gibson Department of Economics University of Waikato and The Department of Economics Williams College, Massachusetts
	Email jkgibson@waikato.ac.nz or jgibson@williams.edu
	Telephone +41 3 597 3086
	Fax +41 3 597 4045
	Trinh Le Department of Economics University of Canterbury Private Bag 4800 Christchurch New Zealand
	Email Trinh.Le@canterbury.ac.nz
	Telephone +64 3 364 2987 ext 7622
	Fax +64 3 364 2635
	Grant Scobie Policy Co-ordination and Development New Zealand Treasury PO Box 3724 Wellington New Zealand
	Email Grant.Scobie@treasury.govt.nz
	Telephone +64 4 471 5005
	Fax +64 4 473 1151

Abstract

Bargaining models of household wealth accumulation point to a potential conflict of interest between husbands and wives. Since wives are typically younger than their husbands and have longer life expectancy, they have to finance a longer expected retirement period. Thus, it is argued that when women have greater relative bargaining power, households will accumulate higher levels of wealth. However, in this paper, exactly the opposite pattern is reported for New Zealand. To explain this contradiction of the pattern reported in the literature, we construct a consumption smoothing model of saving for retirement. The results suggest that in this setting it may be rational for women with greater bargaining power to favour greater current consumption rather than wealth accumulation. These results indicate the importance of defining the policy context precisely when considering the implications of household bargaining models.

Table of Contents

List of Tables

List of Figures

Household Bargaining over Wealth and the Adequacy of Women's Retirement Incomes in New Zealand

1 Introduction

The objective of this paper is to examine the effect of women's bargaining power on the accumulation of retirement income by couples in New Zealand. Bargaining models of household wealth accumulation[1] point to a potential conflict of interest between husbands and wives[2] Since wives are typically younger than their husbands and have longer life expectancy, they have to finance a longer expected retirement period. Indeed, in some countries a middle-aged wife can expect a retirement period that is, on average, 50 percent longer than her husband's (Browning, 2000). Thus, it is argued that preferences about saving for old age may differ between a husband and wife. Because women may prefer to save more for retirement than men, in couples where women have greater relative bargaining power, households may accumulate higher levels of wealth.

This bargaining over retirement wealth has a number of implications. First, to the extent that the intra-household distribution of bargaining power affects savings rates, reforms that aim to stimulate household savings may need to consider the impact of policy on bargaining relationships as well as on individual incentives. The desire to stimulate household savings is often driven by concerns about the adequacy of retirement incomes. Thus, concerns about poverty amongst the elderly (who are disproportionately women) might best be addressed by interventions that alter women's bargaining power within marriage. Second, bargaining is also claimed to explain the observed drop in household consumption around the age of retirement. The idea is that if the husband's bargaining power depends upon his current income or employment status, retirement from a career job will cause a relative deterioration in his influence, so there will be a sudden shift toward the preferred (lower) consumption profile of the wife (Lundberg, Startz and Stillman, 2003).[3] Third, some conventional conclusions from theory, such as the neutrality of household saving decisions to the introduction of an actuarially fair state pension, may not hold when bargaining is important (Browning, 2000).

---

[1] See for example Lundberg (1999), Lundberg and Ward-Batts (2000a and b) and Lundberg, Startz and Stillman (2003)).

[2] Throughout the paper we use "husbands" and "wives" as convenient terminology, which also includes male and female partners in cohabiting relationships.

[3] Bernheim (1999) suggests that this is not a compelling explanation because the husband's bargaining power should decline gradually with the present discounted value of his future earnings, not discontinuously with his retirement.

Despite the potential importance of household bargaining over wealth, there is only limited empirical evidence on this effect. The main result is from the United States, where household net worth in the Health and Retirement Survey is found to be about 35 percent lower when the husband has eight or more years of education more than his wife (Lundberg and Ward-Batts, 2000b). If education gaps are a good proxy for bargaining power, this suggests that when a wife is in an especially weak position, the household saves less. However, in the same model, other educational differences do not show any effect, and nor does the effect seem to be symmetric because when the wife has more education there is no increase in net worth. Evidence from an earlier specification of the model also suggested that when the wife is older (and presumed to have more power) the household has higher net worth (Lundberg and Ward-Batts, 2000a). Contrary evidence comes from Canada, where household saving rates are lower when the wife's share of the couple's income is higher (Browning, 1995). But this evidence is clouded by the possible endogeneity of income shares and also because the sample included younger couples. At younger ages the divergent interests of husbands and wives may be in terms of the consumption needs of children rather than the retirement income needs of the wife, so women's exercise of bargaining power might lead to greater current consumption rather than less.

In this paper, we present evidence on the effect that women's bargaining power has on the wealth of couples in New Zealand. This is a setting where wives are younger than their husbands (by about three years) and at retirement can expect to live for six years longer than their husbands. Thus, there are the same ingredients that, in other countries, are claimed to fuel the demand for greater wealth accumulation by wives. New Zealand is also a setting where it is argued that women are less likely to save for retirement because their economic position tends to be inferior to that of men (Gee et al., 2002). Despite these similarities, the results reported in this paper suggest a very different relationship between women's bargaining power and wealth than has been reported previously in the literature.

In our empirical application we construct an index of power based on whether women are older, more educated and inherit more than their male spouses. An alternative index also includes the gap between husband's and wife's income. Using recently collected household survey data, we find that when these power indexes are higher, net worth is lower for a cohort of pre-retirement couples. Thus, improvements in women's bargaining power appear to be associated with lower levels of wealth accumulation.

To explain this contradiction of the pattern found in the United States, we construct a consumption smoothing model of saving for retirement, following Moore and Mitchell (1997). The results from this model show that the public pension system in New Zealand replaces a larger fraction of pre-retirement income for women than for men, so the required saving rate for women's retirement is considerably lower than for men. In this setting, it may be rational for women with greater bargaining power to favour greater current consumption rather than wealth accumulation. These results indicate the importance of specifying a precise policy context when considering the implications of household bargaining models.

2   Previous Evidence on Marital Bargaining and Household Savings

Most theoretical models of wealth accumulation for retirement focus on the optimal behavior for a single individual.   When these models are applied to data, a unitary model of the household is typically assumed and there is no treatment of bargaining issues.   An alternative theoretical approach is offered by the model of Browning (2000) but it does not lend itself to straightforward empirical investigation of the relationship between bargaining power (as measured in the model by the wife's share of income) and the level of wealth. Another approach is offered by Lundberg and Ward-Batts (2000b), and this approach has proved influential in the development of the empirical model used in this paper and so is summarized below.

Lundberg and Ward-Batts (2000b) start with a simple multi-period unitary model in which the lifetime utility of the couple is:

$$V(\bullet) = \int U(C_t)e^{-\rho t}a_t dt + \int M(w_t)e^{-\rho t}p_{mt}dt + \int F(w_t)e^{-\rho t}p_{ft}dt + \int B(w_t)e^{-\rho t}m_t dt \qquad (1)$$

where $U(\bullet)$ is the couple's utility from consumption, ρ is their subjective discount rate and a_t is the probability at time t that both partners are alive. The second and third terms are for when one spouse dies, with $M(\bullet)$ the widower's utility of wealth, p_{mt} the probability that the husband becomes a widower at time t (i.e. that the wife dies and the husband is still alive), $F(\bullet)$ is the widow's utility of wealth, and p_{ft} is the probability that the wife becomes a widow at time t.   The final term, $B(\bullet)$ gives the couple's expected discounted utility from bequests of wealth, w_t given at the time of death of the last surviving partner.   In the unitary model the couple would maximize this common objective function subject to a pooled resource constraint.

In the collective model that Lundberg and Ward-Batts use to guide their reduced form econometric specification, the couple bargain over the consumption path because the male and female partners have separate utility functions:

$$V^M(\bullet) = v^M(C_t, M, F, B)$$
$$V^F(\bullet) = v^F(C_t, M, F, B). \qquad (2)$$

In these separate utility functions, each person may place a different weight on joint consumption, on the value of bequests, and on the value of wealth that they or their spouse receives upon death of the other partner.   Both cooperative bargaining models (e.g., McElroy and Horney 1981) and more general collective models, such as Chiappori (1992), impose a Pareto efficient solution to this bargaining problem, in the sense that decisions are made such that no-one can be made better off without making their spouse worse off.   In the current context, this requires the couple to maximize a weighted sum of their individual utilities:

$$\mu(Z)V^M + (1 - \mu(Z))V^F \qquad (3)$$

where the "sharing rule" $\mu(Z)$ depends upon variables that affect the relative bargaining power of husband and wife, such as each spouse's control over household resources and the value of the best alternative to agreement, which may be outside the marriage.

The sharing rule is not identified by Lundberg and Ward-Batts.   Instead, factors that may belong in Z are inserted into an econometric model of household net worth

$$Net\ Worth = \mathbf{X\beta} + \mathbf{Z\gamma} + \varepsilon \qquad (4)$$

where **X** is a matrix with a 'standard' set of covariates, such as the age, education and income of each partner and **Z** is a matrix of factors that affect bargaining power. The hypothesis that they test with this model is that, in periods near retirement, the net worth of households in which the wife has greater bargaining power will be greater than the net worth of households that possess the same total lifetime resources but in which the wife has less power. Thus, as long as the Z's are defined appropriately (higher when the women has greater power), the $\hat{\gamma}$ coefficients should be positive. It is important to note that this hypothesis does not necessarily apply across all ages. For example, a wife's optimal saving rate may be lower than her husband's in some periods if she prefers greater expenditure on some children's goods than he does.

When estimating equation (4), Lundberg and Ward-Batts include three variables in **Z** as measures of the wife's relative bargaining power:

- The difference in age between the husband and wife

- The difference in education between the husband and wife, and

- The wife's share of current income.

They raise doubts about the interpretation of the income share variable because relative earnings will reflect relative wage rates, which affect time use and savings through the relative prices of husband's and wife's time. Thus, this measure is likely to be endogenous with respect to savings behavior. There are also doubts about older wives having more power if their re-marriage probabilities deteriorate with age. Therefore, their preferred measure of power is based on differences in education. According to this measure, when the husband has eight or more years of education more than his wife, the net worth of the couple is about 37 percent lower, even after controlling for levels of education.

In the current paper, we use a similar empirical framework to equation (4) to see whether evidence from New Zealand is as striking as the evidence reported by Lundberg and Ward-Batts. The data and empirical specification issues for that model are discussed in the next section.

3   Data and Estimation Issues

In this paper we use the Household Saving Survey (HSS), a survey of the assets and liabilities, household characteristics, and income of New Zealand residents conducted in 2001 by Statistics NZ for the Office of the Retirement Commissioner (Statistics New Zealand 2002). This survey is most comparable in coverage and methodology to the Canadian Survey of Financial Security (Statistics Canada, 2001) and the U.S. Survey of Consumer Finances. The survey covered those over 18 years old living in private dwellings and usually resident in New Zealand. It is important to stress that the term household refers to the unit of selection. One person from those qualifying in a selected 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, i.e., where the respondent and his/her partner were living in the same household the couple was interviewed as a single unit. Thus, we have data on couples, and on uncoupled individuals. This is a useful feature because couples who are engaged in bargaining are likely to look at the wealth status of uncoupled individuals when forming their views about utility outside of the marriage.

We focus on those aged between 45 and 55 (inclusive) because this an age group that is near retirement but which is still actively saving.[5] The effects of bargaining, due to gender differences in preferences for wealth accumulation, should be more apparent in this group than for other ages. All of our analyses are based on weighted results, to reflect the sample design, so that we can make inferences about the population. The weights reflect the probability of selection of an individual within the household, of the household within the Primary Sampling Unit (PSU), and of the PSU within its stratum. In addition there are adjustments for non-response and to ensure the population counts for age, sex and ethnicity correspond to national benchmark estimates.

We study total net worth, which is defined as the difference between total assets and liabilities. The assets covered by the survey include residential and investment property, farms, businesses, life insurance, bank deposits, positive credit card balances, shares and managed funds, money owed, motor vehicles, cash, collectibles, and holdings in personal superannuation and defined contribution schemes. The liabilities include property mortgages, student loans and other bank debt, and negative credit card balances

Table 1 - Net Worth of Individuals and Couples in New Zealand

Age Group	All Ages		45-55 Cohort[a]	
	Couples[b]	Individuals[c]	Couples[b]	Individuals[c]
Mean Net Worth	$322,300	$97,900	$412,330	$183,240
Median Net Worth	$172,900	$10,300	$268,900	$99,770
Sample Size	2982	2392	892	361
Population Represented	1,711,800	930,300	262,700	120,400

Notes: Net worth estimates are in NZ$. At the time of the survey, NZ$2.38 = US$1.00.

[a] For couples, membership of this cohort occurs if either the respondent or their partner is 45-55 years old.

[b] A respondent with a partner, the net worth estimate is for the couple.

[c] A respondent who was not living with a partner.

The mean net worth of the couples in the cohort we study is NZ$412,330 (Table 1). The mean is more than 50 percent above the median, and for uncoupled individuals it is more than 80 percent above the median. The difference between means and medians is even greater when we consider all age groups. 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 created by a few very wealthy individuals and couples.

---

[5] Gibson and Scobie (2001) create synthetic panel of household income, expenditure and savings from repeated cross-sectional surveys in New Zealand. They find that the saving rate peaks at around age 50 for the household head.

This skewness indicates a major problem in fitting wealth regressions to these data. When net worth is used in linear form as the dependent variable, the results will tend to be dominated by those with very high wealth. Alternatively if one takes the logarithm of wealth then a significant number of households with zero or negative wealth would have to be deleted from the sample, reducing the applicability of any findings to a subset of the population. Our solution is to rely mainly on regressions through the median of the net worth distribution, using the least absolute deviations (LAD) estimator (Koenker and Bassett, 1978). These median regressions are more robust to the presence of outliers, and in the case of wealth it is arguable that the median is a better summary measure than is the mean.

The second estimation issue is how to define empirical measures of bargaining power. In the literature, at least six different measures of power have been used. Three of these – relative education, relative age, and female share of income – were used by Lundberg and Ward-Batts (2000b). The others include family status (Beegle et al., 2001), female share of assets in the marriage (Doss, 1996), and female share of assets brought to the marriage (Quisumbing, 1994). In the HSS data we use there are no family status indicators because questions were not asked about the parents of the respondents. There are also no reliable measures of female control of assets because most of the assets of couples are reported jointly. However, that still leaves four measures: age, education, income and assets brought to the marriage (as proxied by individual inheritances).

The differences between women and men in the sample, in terms of each of these four indicators, is reported in Table 2. On average, wives are 2.6 years younger than their husbands, have 0.6 years less post-secondary education, inherit NZ$700 less, and have annual incomes that are NZ$20,000 lower. While these differences are easily understandable, it is not clear that any one of them by itself adequately captures the theoretical notion of bargaining power. Thus, one approach would be to use all four indicators at once. However, to the extent that they may be highly related (for example, the daughters of wealthy families receive more education and inherit more) multicollinearity may cloud the effects.

Table 2 – Means of Proxy Variables for Women's Bargaining Power

Variable Definition	Abbrev.	Mean	(Std Dev)
Her age minus his age	ΔAGE	-2.646	(5.021)
Her years of secondary school minus his years	ΔSCHOOL	0.092	(1.323)
Her years of post-secondary school minus his years	ΔUNIV	-0.595	(2.365)
Her amount inherited minus his amount inherited ($'000)	ΔINHERIT	-0.712	(64.550)
Her income minus his income ($'000)	ΔINCOME	-19.757	(39.976)
Women's Power Index #1	POWER1	0.000	(1.085)
Women's Power Index #2	POWER2	0.000	(1.103)

Note: Means and standard deviations are based on weighted data.
Power Index #1 is the first principal component of ΔAGE, ΔSCHOOL, ΔUNIV, and ΔINHERIT. Power Index #2 is the first principal component of those four variables and ΔINCOME.

Another approach, recently used by Varadharajan (2003), is to use factor analysis to form an index for the underlying latent concept of power. The weights are estimated from the data, and the created index, which is a Principal Component, captures the common

elements in each of several measures. Varadharajan (2003) found many inconsistencies when six individual proxies for bargaining power were used to explain outcomes such as children's school enrolment, children's health and households' food budget shares. But when one or two factors were extracted from the common elements in all of the proxies, using Principal Components analysis, there was much greater success at explaining outcomes in a way that was consistent with prior notions of bargaining power.

We follow this approach and construct two Principal Components as indexes of women's bargaining power. The first captures the common elements from the difference in age, years of secondary school and post-secondary school, and inheritances. The second power index uses these four proxies and also the difference in income between women and men. If there is endogeneity in this income difference term (because of the link to savings through relative wages and time use), it will only affect interpretations of results for the second power index. Because the mean for each power index is zero and the standard deviation is close to one, an easy interpretation of the results using these variables are that unit changes represent an approximate standard deviation increase in the latent variable, women's bargaining power.

The third estimation issue is how to specify the other covariates in the model of net worth (that is, the columns of **X** in equation (4)). The characteristics we use are age, education, ethnicity, marital and migration status, inheritances, location, and income levels and sources. Work status is not used because labour force participation and retirement are affected by wealth, so are endogenous. Neither health status nor the age of children is included as neither was not collected by the survey.[6] Another issue concerns *whose* characteristics to use. Many studies simply use a husband's characteristics as explanatory variables, but Lundberg and Ward-Batts show that this ignores relevant information. We agree, and our explanatory variables always reflect the characteristics of both the respondent and their partner. However, in the presentation of the results, a specification where the characteristics of both people are combined is often used because this is more efficient (fewer explanatory variables) and in no way affects the results of interest.[7]

4   Econometric Results

Table 3 contains the results of the econometric model of the net worth of couples in the 45-55 year old cohort in New Zealand. The key result is that, conditional on a set of variables for the characteristics of the couple that are assumed to affect total lifetime resources, in couples where the women has more power, the net worth is lower. Specifically, a one standard deviation increase in the women's bargaining power (using POWER1 as the measure) would reduce the median net worth of the couple by about NZ$9,600. The effect is slightly smaller, but still statistically significant when the power index that includes income differences is used. Thus, we find exactly the opposite result to that obtained by Lundberg and Ward-Batts (2000b) using a similar model with a similar sample, but a different economic environment.

---

[6] Only the age of the youngest child is known from the survey.

[7] For example we use the combined age and combined years of schooling .

Table 3 – Collective Models of Household Net Worth

	Excluding Income Differences			Including Income Differences		
Power Index	-8.849	***	(3.344)			
Power Index (w/ income difference)				-6.129	***	(2.341)
Age of couple (combined)	5.291	***	(0.392)	5.403	***	(0.293)
Couple is married	30.059	***	(10.412)	24.690	***	(8.057)
Both are migrants	-101.127	***	(14.567)	-82.973	***	(10.729)
One person is a migrant	-89.454	***	(10.472)	-91.547	***	(7.612)
Secondary school years (combined)	14.396	***	(2.127)	12.169	***	(1.561)
Post-secondary school years	2.610	**	(1.167)	1.485	*	(0.858)
Did either inherit money?	32.843	***	(8.918)	20.943	***	(6.640)
Amount inherited ($'000)	0.459	***	(0.051)	0.486	***	(0.037)
Main income source for the household						
Self-employment	160.830	***	(9.107)	170.012	***	(6.726)
Investment	434.733	***	(27.152)	458.898	***	(18.953)
Not specified	56.458	**	(26.935)	923.916	***	(23.339)
Total household income ($'000)	3.081	***	(0.113)	3.142	***	(0.084)
Total income squared	0.000	***	(0.000)	0.000	***	(0.000)
Pseudo-R^2		0.237			0.236	
No. of Observations		923			877	

Note: The dependent variable is the net worth of the couple in NZ$'000. Models also include a constant and control variables for ethnicity, location, same-sex couples, location, expectations of inheritance and dummy variables for whether the main income is from government benefits or from other regular sources. Both the event of inheritance and the amount are included as the amount is recorded in the survey only if it exceeded $10,000.
Coefficients and standard errors (in parentheses) are based on weighted estimates;
* statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

A range of sensitivity analyses are reported in Appendix Table 1. These vary the estimation method (OLS rather than LAD), the sample, and whether the control variables are measured for each individual in the couple, or as an average of the characteristics of the two persons. The coefficient estimates range from -2.5 to -11.4 for the first power index, and from -4.5 to -24.6 for the second power index. The standard errors are also somewhat variable. However, the overall impression is to support the result from Table 3 of a negative and statistically significant effect of increases in women's bargaining power on the net worth of pre-retirement couples.

Additional sensitivity analyses in Appendix Table 2 use the individual proxies for bargaining power, rather than the indexes created from the factor analysis. None of the individual proxies for bargaining power attract positive and statistically significant coefficients, which is once again contrary to the finding of Lundberg and Ward-Batts (2000a&b). Usually, amongst the four individual proxies, it is the difference in the years of secondary education that has the largest effect on differences in net worth.

In an effort to explain why the results for New Zealand are diametrically opposed to those found in the United States by Lundberg and Ward-Batts (2000b), we will argue that the policy context plays a critical role. Specifically, New Zealand's universal public pension scheme plays a major role in retirement savings decisions. This scheme is explained in the next section.

5   The New Zealand Pension System [8]

New Zealand has a two-tier system of retirement income provision.   The first tier is provided by NZ Superannuation.   This is a universal public pension, funded on a pay-as-you-go basis from general taxation.   There has been some form of NZ Superannuation since 1938 (and an age pension dating from 1898) and the electorate is committed to maintaining this form of public pension. [9] The second tier consists of voluntary private provision by individuals to enhance their standard of living in retirement.   Some of the wealth observed by the Household Saving Survey is likely to have been accumulated by households to provide this second tier of retirement income, although the role of private provision generally in New Zealand has been rather limited.

The key feature of NZ Superannuation is that it is paid to everyone aged over 65 who meets a residency requirement, [10] at a standard amount that is unrelated to previous earnings.   There is no income or asset test to determine eligibility.   Recipients are also eligible for other forms of means-tested income support (including accommodation allowances), on the same basis as people of any age.   Over 93 percent of people over age 65 receive NZ Superannuation.   Because of this (almost) universal eligibility, O'Connell (2004) considers NZ Superannuation to be an example of a "Citizen's Pension" – a basic amount payable to all citizens.

The level of NZ Superannuation benefits is reviewed each year, but legislation mandates that it has to be kept between 32.5 and 36.25 percent of the net average wage.   This is usually described by '65 at 65', that is, at age 65 a married (or cohabiting) couple will receive at least 65 percent (two times 32.5 percent) of the net average wage.   The married person rate is the base rate for NZ Superannuation, and the rates for single pensioners living alone and single pensioners sharing accommodation are set higher to reflect the extra costs of maintaining either single-person or shared, non-cohabiting households.   In 2003, the rate for a single person sharing accommodation was equivalent to 40 percent of the average weekly wage, while for those living alone it was equivalent to 44 percent (MSD, 2003).

---

[8] This section draws heavily on O'Connell (2004).

[9] In a 1997 referendum, 92 percent of voters (with a turnout of 80 percent in a postal ballot) voted against replacing NZ Superannuation with a compulsory private savings system.

[10] A person must have lived in New Zealand for ten years since age 20, five of which must be since age 50.

Figure 1 – Average Total Weekly Incomes and Superannuation Rates in New Zealand
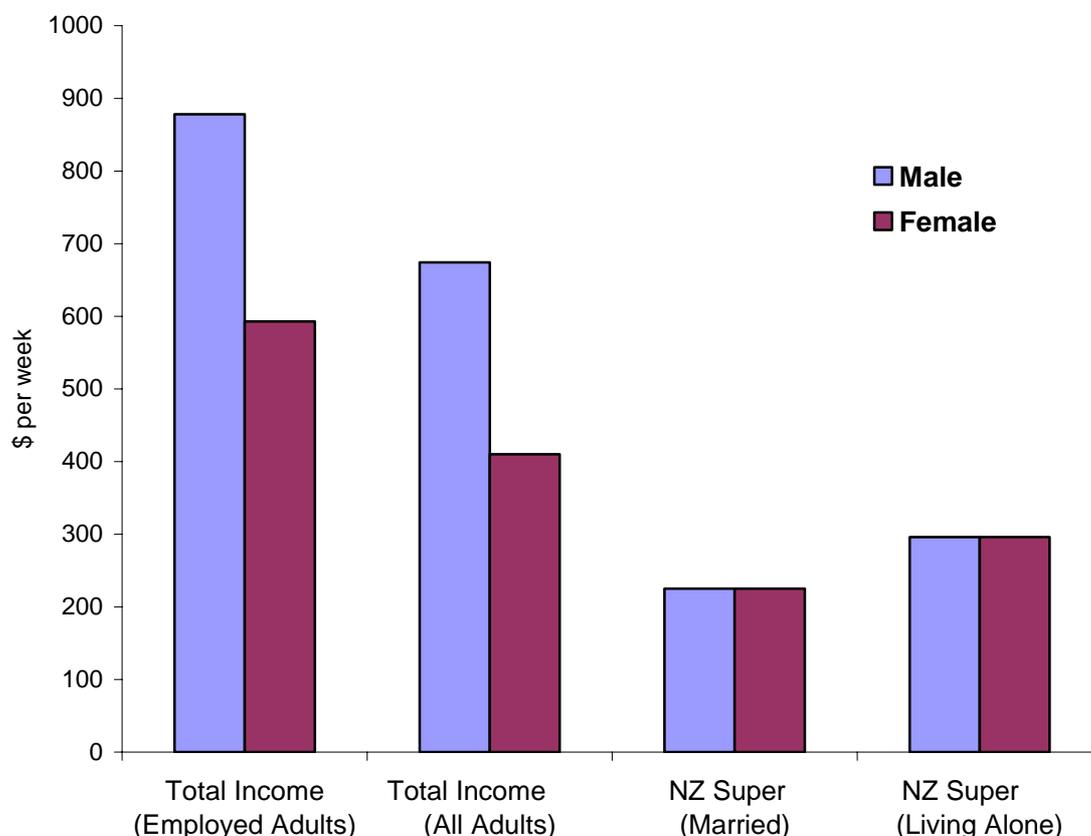
 Several features of NZ Superannuation have favourable impacts on women, and thus are likely to affect household bargaining over retirement wealth.   Indeed, Ginn et al.   (2001) describe it as a "women-friendly" model of pension provision.   First, because there are no earnings-related contributions, women receive the same payments as men even though their average incomes are lower and they have fewer years in the labour force.   Figure 1 shows average weekly incomes for the employed adult population and for all adults.   On average, women's incomes are only 68 percent of men's for the employed population (and only 61 percent for all adults).   This contrasts with the gender neutrality in the payments made by NZ Superannuation.   Second, the payments are financed from general tax revenues rather than some form of payroll tax such as national insurance or social security contributions.   Because of the progressive New Zealand tax structure and the fact that women on average earn less than men and have greater life expectancy, women effectively pay less of the cost of NZ Superannuation and receive more of the benefit. Third, because each individual receives the pension in their own right, changes in marital status do not affect the access to or level of the pension.   Thus, except for the adjustment for the different costs of two-person versus one-person households, there is no difference in the NZ Superannuation that married and single women receive.   Finally, the higher rates for those living alone mean that older women are not economically disadvantaged by the fact that, due to their younger age at marriage and higher life expectancy, they are more likely to face higher housing costs (due to living alone) than are older men.

6   A Model of Prescribed Saving Rates for Retirement

The system of retirement income provision in New Zealand means that for many wives, retirement, and the receipt of NZ Superannuation, may mark an improvement in their economic status relative to their husband.   Hence, in this setting, working age women with more bargaining power than their husbands will not necessarily have wealth accumulation as their goal.   Instead, it may be rational for these women to finance greater current consumption, by reducing household wealth.   This hypothesis is certainly consistent with the finding from Section IV that various measures of women's relative bargaining power are associated with lower net worth for couples.

To explore this hypothesis we construct a consumption smoothing model of saving for retirement, following Moore and Mitchell (1997).   Our purpose is to see whether, given an objective of smoothing their consumption through retirement, women in New Zealand have lower saving requirements than men.   While our interest is mainly in couples, because of the tension that may exist between husbands and wives when making savings plans, we have no way to determine the individual wealth and prescribed saving rate for each person in a couple.   While the Household Saving Survey has individual data for some components of net worth (inheritances, work-related pension schemes, and student loans) the major components of wealth (real estate, businesses, farms, and financial assets) are reported on a joint basis.   We therefore apply the model to the uncoupled individuals from the 45-55 year old cohort.   This group is still relevant because many women in couples will eventually become uncoupled due either to the death of their spouse or divorce (which might be precipitated by conflict over wealth bargaining).[11] If women in couples observe that uncoupled women have lower saving requirements than do uncoupled men, it presumably will affect their own decision on optimal wealth accumulation.

Our simple model of saving for retirement is built on the life cycle approach to consumption and saving.[12] We estimate the saving rates and the replacement rates that are implied if individuals attempt to sustain an equal level of consumption before and after retirement; i.e., we invoke *consumption smoothing as the aim of retirement saving*.   In this simple model the person chooses a constant level of consumption that can be financed from income over the working life, and then from savings during retirement. This ignores the fact that when life expectancy is uncertain consumption will tend to rise until retirement and fall subsequently, rather than remaining uniform throughout. According to Mitchell and Moore (1997), "The effect of this uncertainty is to make the consumption line become humped, rising during the working years and declining during the retirement years.   (In any event it still changes less drastically with age than does earned income.) This new shape is the result of the household weighing needed saving to

---

[11] In divorce-threat bargaining models the threat point is the maximal level of utility attainable outside the marriage (Lundberg, 1999).

[12] Studies such as Bernheim (1992) and Scholz, Seshadri and Khitatrakun (2004) use a formal optimisation approach based on maximising consumer utility subject to an intertemporal budget constraint.   We follow Moore and Mitchell (1997) who note in relation to their choice of a simpler framework: "From a theoretical perspective, this is less appealing than a true life cycle-dynamic programming approach as it ignores utility theory and behavioural responses to uncertainty.   However it is a popular model among retirement planning practitioners and can be seen as a relatively tractable approximation or rule of thumb to the life cycle model".   For a comparison of a utility maximising approach and the model used here see Scobie and Gibson (2003) who find that the results from both models are remarkably similar.

finance future consumption by the probability of living, and comparing that to the value of wasted consumption due to saving if the household does not survive" (p.11) .   Other forms of uncertainty that give rise to precautionary saving are also ignored.

A graphical illustration of the model we apply is given in Figure 2.[13] An individual has a net worth (depicted as W_a) as measured in the Household Saving Survey.   This is projected to grow to an amount denoted W_p by the time they reach a predetermined retirement age (here we assume 65).   In order to have a given level of income in retirement they would need to have accumulated retirement wealth depicted in Figure 2 as the stock, W_r.   Part of their retirement income is provided by NZ Superannuation so the stock of wealth at retirement equivalent to this flow of income is incorporated in W_r and W_p.   The difference between the required wealth (W_r) and the projected wealth W_p is labelled as the shortfall and is the amount which would need to be accumulated between now and retirement in order to add to the projected stock and hence support an income in retirement of level (denoted Y_r).   This additional amount, in the absence of inheritances or unanticipated windfall gains or losses in asset values, would need to be accumulated through savings.
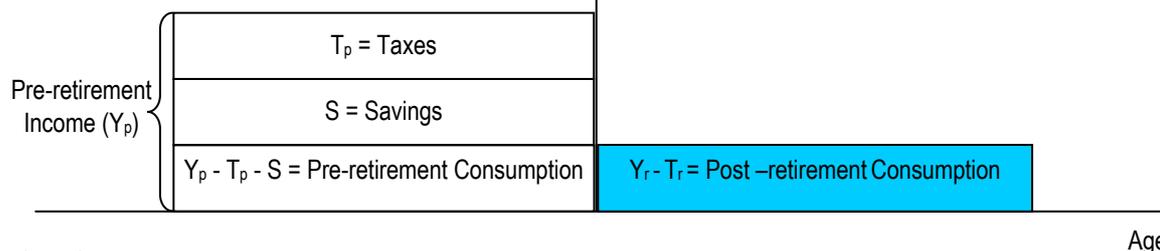
---

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

Figure 2 – A Stylised View of Stocks and Flows of Income, Savings and Retirement Wealth in a Model of the Joint Determination of Saving and Replacement Rates

(a) Stocks
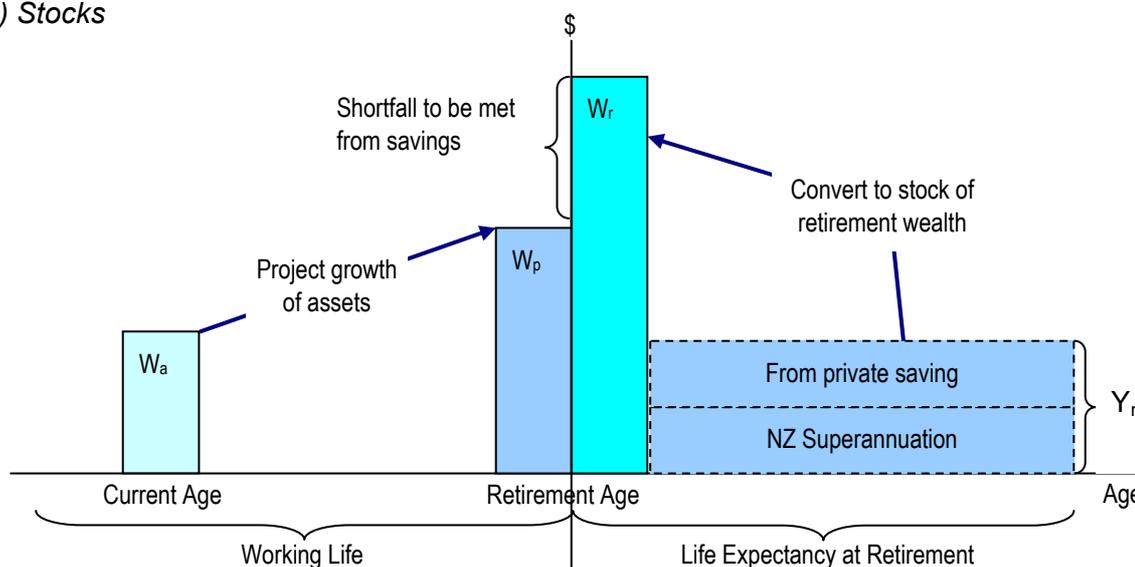
(b) Flows

Legend:

Y_p = Pre-retirement income

T_p = Pre-retirement taxes

Y_r = Post-retirement income

T_r = Post-retirement taxes

W_a = Wealth at current age

W_p = Projected wealth at retirement

W_r = Wealth at retirement needed to supply a post-retirement income of Y_r

S = Savings

The flows of income, consumption, savings and taxes that are derived from the projected and required wealth stocks, and the shortfall, are depicted in Figure 2(b). It is assumed that some fixed share *s* of pre-retirement income will be saved ($s=S/Y_p$) and the replacement rate (R) is given by the ratio of gross income in retirement to gross income pre-retirement (i.e., R= Y_r/Y_p). Under the New Zealand taxation system, post retirement taxes (denoted as T_r) can be assumed to be zero, so real after tax consumption is equal to total post-retirement income.[14] Clearly some values of retirement income could imply a substantial shortfall in retirement wealth, which might in turn require unrealistic or unfeasible levels of saving pre-retirement. It is for this reason that the prescribed saving rate and predicted replacement rates are jointly determined. While some people will already have sufficient existing wealth to retire with full replacement of their pre-retirement

---

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

income, for others the stock of wealth will not be enough.   Therefore, there is no expectation that replacement rates will be equal to unity and nor are they expected to be the same for men and women.

A number of additional factors arise which are not depicted in Figure 2.   Uncertainty is ignored by assuming that individuals correctly predict their life expectancy.   Instead of a constant pre-retirement income we assume that income grows from its actual level (as observed in the survey) by a fixed annual growth rate of one percent (chosen to approximate the average annual rate of labour productivity and real wage growth in the economy).   Similarly, NZ Superannuation payments grow at one percent annually in real terms, matching the growth in average real wages.   Housing wealth, which is the current equity in the principal residence, is excluded from the calculation of retirement wealth, W_r. A somewhat typical pattern is for those owning a primary residence to retain this, partly as a precautionary investment and partly as a potential bequest.   In such cases it would not be appropriate to include the net value of housing assets as part of retirement wealth and thereby available to be converted into an annuity along with other accumulated assets.

7   Results of the Retirement Savings Model

The model in Figure 2 was used with three categories of wealth: Financial, Private Pension and NZ Superannuation.   Financial wealth includes farms, businesses, other property (holiday homes, rental property, commercial and overseas property) together with life insurance, bank deposits, positive credit card balances, shares and managed funds, money owed, motor vehicles, cash, collectibles and other assets.. Private pension wealth is based on the holdings in personal superannuation schemes, defined contribution schemes and defined benefit schemes. The final category is computed by converting the expected flow of NZ Superannuation payments into a lump sum at retirement age. This amount is simply that, which if converted to a series of annual payments, would, for the number of years of life expectancy at retirement age, be equivalent to the payments under NZ Superannuation, assuming a continuation of current policy.

Table 4 presents the projected wealth levels at retirement (age 65) for the cohort aged 45-55 years. These projections (corresponding to W_p in Figure 2) are derived from the levels of reported wealth at the time of the survey.[15] An important conclusion is that the projected total wealth at retirement of uncoupled women exceeds that of uncoupled men. This is despite the fact that women have lower levels of financial wealth. Private pensions are a relatively minor source of wealth, and are not held by the median person of either gender. The shortfall in financial wealth for women is more than made up for by a greater expected value of NZ Superannuation.   On average, NZ Superannuation provides 66 percent of mean wealth at retirement for women in this cohort, compared with only 57 percent of the mean wealth for men.   At the (lower) median wealth levels, the reliance on NZ Superannuation is even more marked, as it provides 89 percent of women's projected wealth at retirement.

---

[15] Details of the methods used to make the projections are given in Scobie and Gibson (2003).

Table 4 – Projected Wealth at Retirement (Age 65) for Male and Female Individuals Currently Aged 45-55

Age Group	Male		Female	
	Mean	Median	Mean	Median
Financial Wealth	141,144	26,587	103,579	26,564
Private Pension Wealth	20,026	0	25,030	0
NZ Superannuation Wealth	216,639	220,334	252,149	256,254
Total Wealth (excluding dwelling)	377,809	254,462	380,758	288,520

Note: Net worth estimates are in NZ$.   At the time of the survey, NZ$2.38 = US$1.00.

The next use of the model in Figure 2 is to estimate the average annual (constant) saving rate that would be required in order to achieve consumption smoothing. These saving rates are denoted "prescribed". At the same time the replacement rate can be derived. These results are summarised in Table 5.

The median uncoupled male in the 45-55 year old cohort would need to save 6.2 percent of his pre-retirement income, in order to provide for post-retirement consumption (Table 5). The median value of this post-retirement consumption (which equals income) would be at a level equivalent to two-thirds of pre-retirement income. In contrast, the median female from the same cohort does not need to save for retirement, because under the consumption smoothing objective her prescribed saving rate is essentially zero. Yet despite this lack of saving, the median replacement rate for women is 11 percentage points higher than for men.

Table 5 – Prescribed Saving Rates and Replacement Rates to Achieve Consumption Smoothing for Male and Female Individuals, Aged 45-55

	Mean		Median	
	Prescribed Saving Rate	Replacement Rate	Prescribed Saving Rate	Replacement Rate
Men	-6.4%	77.1%	+6.2%	66.0%
Women	-10.9%	85.0%	-0.2%	76.5%

Note:

The prescribed saving rate is that rate (as a percentage of before tax pre-retirement income) which would be required for an individual to allow consumption smoothing, given their current wealth as measured in the survey.   The replacement rate is the ratio of post to pre-retirement income (i.e., $R = Y_r/Y_p$).   Some individuals have such high levels of wealth accumulated already that, given their incomes, they would be able to smooth consumption with no further saving - in fact the model gives the result that they could "dissave" and run down current wealth (i.e. $s<0$).

When means are used to summarise the distributions, the prescribed saving rates are negative for both men and women, although more so for women. How can these negative prescribed saving rates be interpreted? For people with either high wealth and/or low incomes, no further saving is required in order to smooth consumption. In the case of wealthy individuals, this simply means that they already have accumulated sufficient wealth to sustain consumption given their reported incomes. For those with low incomes, NZ Superannuation offers them an income in retirement that is comparable to or higher than that which they have pre-retirement. In such a case, they would be disinclined to save further now. It is true that additional pre-retirement saving would provide them with a higher income in retirement– but that would come at the expense of reducing their already low level of pre-retirement consumption.

Overall, the results of the model suggest that for many uncoupled New Zealand women in the pre-retirement cohort, it is rational to have no other savings for retirement, and rely solely on NZ Superannuation. Note that if housing wealth had been included in the calculations, this conclusion would have been reached evenly more strongly. Given this finding for uncoupled women, it is not surprising that those married (or cohabiting) women who have greater relative power choose to bargain for lower levels of household net worth. Thus, the pattern in Section IV, whilst the opposite to what has been found in the U.S., appears to be entirely consistent with the rational exercise of bargaining power.

8   Conclusions

Bargaining models of household wealth accumulation point to a potential conflict of interest between husbands and wives. Since wives are typically younger than their husbands and have longer life expectancy, they have to finance a longer expected retirement period. Thus, it is argued that when women have greater relative bargaining power, households will accumulate higher levels of wealth. Some evidence for this effect has been found in the United States by Lundberg and Ward-Batts (2000a&b). Yet in New Zealand, the evidence is exactly the opposite. We find that the higher is women's bargaining power, the lower is net worth for a sample of pre-retirement couples.

Our explanation for this apparent empirical anomaly is that the public pension system in New Zealand replaces a larger fraction of pre-retirement income for women than for men. Thus, the required saving rate for women's retirement is considerably lower than for men. Our results are consistent with the observation of Bernheim (1999) that, despite their longer lives, single women in the U.S. appear less inclined to save than single men. So as long as married women have the same gender specific proclivities, any shift towards the preferred profile of the wife would increase consumption, not decrease it.

 Our results suggest that bargaining has very important effects of a range of outcomes of interest to policy makers. However the particular outcome of bargaining will depend on the policy context in each country. Thus, even when bargaining is over the same problem -- ensuring adequate retirement incomes for women – we should not expect to find the same patterns of either more or less wealth accumulation, because of the variation across countries in the level of public support for women's retirement incomes. In settings where public pensions are relatively generous and have features that do not disadvantage women, but where working age women have significantly lower incomes than men, it makes sense for bargaining power to be directed at increasing current consumption by women. Thus, power and wealth need not necessarily go hand-in-hand.

References

Beegle, K., Frankenberg, E., and Thomas, D. (2001) "Bargaining power within couples and use of prenatal and delivery care in Indonesia." *Studies in Family Planning* 32(2): 130-146.

Bernheim, B. D. (1992) "Is the Baby Boom Generation Preparing Adequately for Retirement?" Technical Report. Princeton, NJ: Merrill Lynch.

Bernheim, B. D. (1999) Comment. In H. Aaron (ed) *Behavioral Dimensions of Retirement Economics* Brookings Institution Press, Washington DC, pp. 273-281.

Browning, M. (1995) "Saving and the intra-household allocation of income." *Ricerche Economiche* 48(3): 277-292.

Browning, M. (2000) "The saving behaviour of a two-person household." *Scandinavian Journal of Economics* 102(2): 235-251.

Chiappori, P.-A. (1992) "Collective labour supply and welfare." *Journal of Political Economy*, 100(3): 437-467.

Doss, C. (1996) "Testing among models of intra-household resource allocation." *World Development* 24(10): 1597-1609.

Gee, Susan, Hung Ng, Ann Weatherall, Jim Liu, Cynthia Loong, and Te Ripowai Higgins. (2002) "Saving Ourselves: Gender Issues in Making Provision for One's Own Retirement." *Australasian Journal on Ageing* 21(1): 30-35.

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

Ginn, J., Street, D., and Arber, S. (2001) *Women, Work and Pensions: International Issues and Prospects* Open University Press.

Koenker, R. and Bassett, G. (1978) "Regression quantiles." *Econometrica* 46(1): 33-50.

Lundberg, S. (1999) "Family bargaining and retirement behaviour". In H. Aaron (ed) *Behavioral Dimensions of Retirement Economics* Brookings Institution Press, Washington DC, pp. 253-272.

Lundberg, S., Startz, R., and Stillman, S. (2003) "The retirement-consumption puzzle: a marital bargaining approach." *Journal of Public Economics* (forthcoming)

Lundberg, S. and Ward-Batts, J. (2000a) "Saving for retirement: Household bargaining and household net worth." *Mimeo* University of Washington, January.

Lundberg, S. and Ward-Batts, J. (2000b)" Saving for retirement: Household bargaining and household net worth." Contributed Paper, Econometric Society World Congress, August.

McElroy, M. and Horney, M. (1981) "Nash bargained household decisions: toward a generalization of the theory of demand." *International Economic Review*, 22(2): 333-349.

Ministry of Social Development (2003) A Description of New Zealand's Current Retirement Income Framework. *Background Paper for the Periodic Report Group*, Ministry of Social Development, Wellington.

Moore, J. and Mitchell, O. (1997) *Projected Retirement Wealth and Savings Adequacy in the Health and Retirement Study*. Cambridge MA: National Bureau of Economic Research, Working Paper No W6240, October. http://www.nber.org/papers/w6240>

O'Connell, A. (2004) Citizen's Pensions: Lessons from New Zealand. *Discussion Paper* Pensions Policy Institute, London.

Quisumbing, A. (1994) "Intergenerational transfers in Philippine rice villages: Gender differences in traditional inheritance customs." *Journal of Development Economics* 43(2): 167-195.

Scholz, J., Seshadri, A. and Khitatrakun, S. (2004) Are Americans saving "optimally" for retirement? Cambridge MA, National Bureau of Economic Research, Working Paper No10260, February. http://papers.nber.org/papers/w10260

Scobie, G. and Gibson, J. (2003) Retirement Wealth of New Zealand Households: An Initial Analysis based on the Household Savings Survey. Paper presented to a Symposium on Wealth and retirement. Office of the Retirement Commissioner, Wellington.

Statistics Canada (2001) The assets and debts of Canadians: An overview of the results of the financial survey. Ottawa, Statistics Canada.

Statistics New Zealand (2002) The net worth of New Zealanders: A report on their assets and debts. Wellington, Statistics New Zealand.

Varadharajan, S. (2003) "The pitfalls of proxies of power in intra-household analysis." Paper Presented at the NEUDC Conference, Yale University, October.

Appendix

Appendix Table 1 – Sensitivity Analysis for Collective Models of Net Worth, Using Principal Components Index for Women's Power

Model Specification and Sample	Dep. Var.	POWER1	POWER2
Characteristics for each individual, 44-55 years cohort	Median	-9.926***	-8.840**
		(2.640)	(3.579)
Characteristics for the couple, full sample	Median	-2.495	-4.485**
		(3.234)	(1.879)
Characteristics for each individual, 44-55 years cohort	Mean	-2.402	-10.392
		(16.106)	(16.062)
Characteristics for each individual, full sample	Mean	-10.759	-23.200*
		(9.529)	(13.361)
Characteristics for the couple, full sample	Mean	-11.378	-24.567*
		(9.319)	(12.746)

Note: Coefficients are from a weighted regression of net worth, with standard errors in ( ). The coefficients show the effect of a one-unit increase in the power index on net worth in $'000.

* statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

The full specification of the base model is described in Table 3, with the changes to the specification of the model or the estimation sample listed in the first column.

The "Dep. Var" column specifies whether the dependent variable is the mean net worth (OLS estimation) or the median net worth (least absolute deviations estimation).

Power Index #1 is the first principal component of ΔAGE, ΔSCHOOL, ΔUNIV, and ΔINHERIT. Power Index #2 is the first principal component of those four variables and ΔINCOME.

Appendix Table 2 – Sensitivity Analysis for Collective Models of Net Worth, Using Proxy Variables for Women's Power

Model Specification and Sample	Dep. Var.	ΔAGE	ΔSCHOOL	ΔUNIV	ΔINHERIT
Characteristics for the couple, 45-55 years cohort	Median	-2.834*** (0.342)	-10.173*** (1.435)	-2.601*** (0.735)	-0.130*** (0.022)
Characteristics for each individual, 45-55 years cohort	Mean	-2.532 (3.674)	-0.283 (12.617)	5.575 (6.700)	-0.386* (0.199)
Characteristics for the couple, full sample	Median	0.230 (0.670)	-1.739 (2.564)	-0.628 (1.451)	0.001 (0.056)
Characteristics for each individual, full sample	Median	-0.260 (0.527)	-5.700** (2.110)	-0.785 (1.189)	-0.007 (0.047)
Characteristics for each individual, full sample	Mean	-1.839 (1.821)	-12.110* (7.225)	2.740 (4.045)	-0.368 (0.231)
Characteristics for the couple, full sample	Mean	-1.534 (1.807)	-12.268* (7.323)	2.569 (4.013)	-0.355 (0.235)

Note: Coefficients are from a weighted regression of net worth, with standard errors in ( ). The coefficients show the effect of a one-unit increase in the power index on net worth in $'000.

* statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

The full specification model includes the variables described in Table 3, except POWER1 and POWER2. The changes to the specification of the model or the estimation sample listed in the first column.

The "Dep. Var" column specifies whether the dependent variable is the mean net worth (OLS estimation) or the median net worth (least absolute deviations estimation).