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How Portfolios Evolve After Retirement: Evidence from Australia

CAMA Working Paper 39/2015
November 2015

Revision - CAMA Working Paper 40/2013

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Abstract

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Keywords

Retirement wealth, Life-cycle saving, Public pension, Portfolio choice

JEL Classification

D91, E21, G11

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HOW PORTFOLIOS EVOLVE AFTER RETIREMENT: EVIDENCE FROM AUSTRALIA

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Households in many countries reach retirement with lump sums of financial wealth accumulated in defined contribution (DC) retirement plans. Retired households need to manage risks and generate income from their savings. We study the dynamics of retirement wealth and portfolio allocation using the three wealth waves of the Household, Income and Labour Dynamics in Australia panel survey. The average retired household maintained or accumulated wealth in 2002-06 and decumulated in 2006-10 consistent with trends in financial asset prices. At older ages, households prefer portfolios with less risk and more liquidity, while maintaining ownership of the family home. The probability of households exhausting financial assets increased over the sample but households who depleted financial wealth did not liquidate their housing wealth at higher rates than other households. In contrast to the U.S., the overall effect of health shocks on the wealth of retired Australian households is minimal but financial shocks have large effects.

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* This paper is based on work undertaken while this co-author was at the University of Technology, Sydney.

We thank Elizabeth Savage, Mario Fiorini, and conference participants at the 2013 HILDA Survey Research Conference seminar and the 1st CEPAR International Conference for helpful comments. The study uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. The HILDA project was initiated and funded by the Australian Government Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA) and is managed by the Melbourne Institute of Applied Economic and Social Research (MIAESR). The findings and views reported in this paper, however, are those of the authors and should not be attributed to either FaHCSIA or MIAESR, and do not necessarily reflect those of their respective institutions. Thorp acknowledges support from ARC DP120102239. This study was partly supported by the Chair of Finance and Superannuation UTS: Sydney Financial Forum (through Colonial First State Global Asset Management), the NSW Government, the Association of Superannuation Funds of Australia (ASFA), the Industry Superannuation Network (ISN), and the Paul Woolley Centre for the Study of Capital Market Dysfunctionality, UTS.

I. INTRODUCTION

Retiring members of defined contribution (DC) retirement savings plans confront the daunting task of generating sustainable income from their lump sum of savings. Voluntary life annuity purchases are very low in many countries (Bateman and Piggott, 2010), and insurance against health and aged care costs is often expensive or incomplete. Many retirees are exposed to longevity, health and investment risk throughout the remainder of their lives. If retired households fail to manage these risks well, pressure on public safety nets will increase. How retirees choose and adjust their asset portfolios, and how they decumulate their savings, are critical questions for the individuals themselves, policymakers and financial service providers. Retirement wealth dynamics is a particularly pressing concern in Australia, which already has the second largest accumulation of DC assets in the world, after the U.S. (Towers Watson, 2014).

Here we investigate the decumulation dynamics of retired Australians, documenting the evolution of their asset portfolios and their susceptibility to financial and health shocks. Accurate inference about decumulation depends on access to panel data (Börsch-Supan and Lusardi, 2003) so using the Household, Income and Labour Dynamics in Australia (HILDA) panel, we study around 1200 non-institutionalised, retired households between 2002 and 2010, as financial markets cycled from boom to bust to recovery.

The period of time we study is particularly informative because the progress of the DC retirement savings system coincided with the financial crisis of 2007-2009. It allows us to see how retiree portfolios were affected by financial shocks. Since the early 1990s, almost all Australian workers have contributed to publicly mandated, privately managed superannuation accounts, similar to U.S. 401(k) plans and U.K. Workplace Pensions.[1] Thus a large proportion of our panel retired with a (typically small) defined contribution accumulation, a pattern that is set to be repeated across the globe in coming decades as auto-enrolment accelerates. Australian retirees often carry substantial exposure to financial market risk into retirement and purchase longevity insurance at very low rates (Mercer, 2014). At the same time, public retirement income provision is limited to a modest, means-tested pension (Age Pension). Around 75% of people over 65 years

[1] The 'Superannuation Guarantee' was established in 1992, originally stipulating that 3% (rising to 9.5% over several years) of an individual's earnings be placed into a complying superannuation fund until preservation age at 55 years (now increasing to 60 years) (*Superannuation Guarantee (Administration) Act 1992* (Commonwealth)). The mandatory contribution rate is set to rise to 12% by 2020.

of age receive a full or part age pension, which pays 28% of average male earnings to singles, and 40% to couples. However, the family home is excluded from the age pension means tests. Around 80% of elderly own their home and most do not run down their housing assets, so our panel has a large stock of illiquid housing wealth (Bradbury, 2008; Cho and Sane, 2011; Bradbury, 2010). In addition, retired Australians are relatively well insured against health shocks, with estimated spending on health at around only 3% of total expenditure (Jones *et al.,* 2008).

Australian retirees thus face an unusual mix of high exposure to investment risk, high exposure to longevity risk, high rates of home ownership and low exposure to health risks. Our study of how these risks influence the evolution of retirement wealth has serious implications for individual and aggregate welfare, and can inform policy settings.

We build our analysis in three stages. First we measure decumulation between the wealth waves in HILDA: 2002, 2006, and 2010. We describe wealth by household type and then calculate the level and rate of decumulation conditioning on household characteristics and portfolio allocations. Analysis shows that households with larger allocations to risky assets reported reductions in wealth in the 2006-10 compared with households that were less exposed to investment risk. Older, pension-receiving households with defensive asset allocations accumulated wealth over the same period.

Secondly, we focus on retirees' buffers against uninsured shocks by investigating the probability that households ran out of financial assets. Conventional financial advice recommends that households hold emergency funds equal to one to three months' expenses, but we observe that the proportion of households dropping below this critical threshold increased over the sample period. Using an Oaxaca-Blinder decomposition (Oaxaca, 1973; Blinder, 1973), we found that the main drivers were changes in environmental factors (which could include social changes, changes in government regulations or policy, or changes in the investment landscape), or unobservable households characteristics, rather than changes in observed characteristics, such as aging or the loss of a partner. However running out of financial assets did not cause people to draw on housing equity: homeowners reaching very low liquid assets did not reduce housing assets at higher rates than the better-off.

Thirdly, we describe how portfolio allocations changed with age and health. Using specifications that separate age, cohort and household effects, we confirm results from other

studies that holdings of risky assets, such as superannuation and equity, decline at older ages (e.g., Coile and Milligan, 2009; Van Ooijen *et al.,* 2014). By contrast, our investigation of the effect of health status on portfolio allocations and wealth shows little effect, in contrast to results from the U.S. (De Nardi *et al.,* 2015). Overall, we conclude that while health shocks appear to have little effect on portfolio allocations and decumulation, probably because of high levels of public insurance, many Australian retirees experienced damaging investment shocks during this period of financial turbulence. As the Superannuation Guarantee continues to mature and Australians retire with larger lump sums, policymakers and industry need to look into ways to help unsophisticated households manage investment and longevity risk.

We contribute to the literature on decumulation and portfolio management in retirement. Standard life-cycle theory predicts that households will choose portfolios to cover both longevity risk and uninsurable consumption shocks (French *et al.,* 2006), while drawing down their wealth judiciously over their remaining lifetime. However panel studies of decumulation find unexpectedly low rates of drawdown, even after allowing for uninsured expenses, and puzzlingly low rates of insurance against longevity and other risks (Börsch-Supan, 2003; Love *et al.,* 2009; Poterba *et al.,* 2011; Poterba *et al.,* 2013, De Nardi *et al.,* 2015). Our results largely support other Australian empirical studies showing that decumulation rates are cautious and that portfolio allocations change with age (Hulley *et al.,* 2012; Wu *et al.,* 2015).

We also add to understanding of how the composition of asset holdings varies over the lifecycle. Veld-Merkoulova (2011) finds an increasing share of risky financial investments associated with a longer planning horizon in the Netherlands; Poterba and Samwick (2001) and Hurd (2001) finds large differences across ages and cohorts in the U.S. Ameriks and Zeldes (2004) estimate a 'hump-shaped' age effect on the fraction of household assets held in equity, peaking in mid-life (late 40s-50s).[2] Similarly, Heaton and Lucas (2000) show a distinct decline in equity share above age 65 for U.S. households, and Guiso *et al.,* (2001) report risky asset ownership peaks in a person's 50s in Germany, Italy and the U.K.[3] Coile and Milligan (2009), using panel data from the

[2] Proposed reasons for the mid-life peak and subsequent decrease in risky asset holdings include declining human capital (Ibbotson *et al.*, 2007), the need for liquid precautionary balances, especially for out-of-pocket medical expenses later in life (French *et al.,* 2006; Frostin *et al.*, 2008), bequest motives (Hubbard *et al.,* 1995), and racial or cultural differences such as having a non-English speaking background (NESB) (Cardak and Wilkins, 2009).

[3] Interestingly however, Guiso *et al.* find an exception to their results to be households in the Netherlands who see a continual increase in risky asset ownership with increasing age, consistent with Van Ooijen *et al*., (2014).

HRS, also show a reduced likelihood of holding risky assets and increased proportions of more liquid assets with increasing age. Sinai and Souleles (2007) emphasize the difficulty of consuming wealth that is embedded in the family home (typical of the less wealthy), compared with the relatively liquid financial assets of wealthier households. For Australia, Kohler *et al.* (2004) report that older households were more likely than young households to hold low-risk bonds and deposits, and are less likely to hold riskier equity investments.

In the next section we describe the data sample. Section III presents analyses of wealth decumulation, of rates of depletion of financial assets and of the influence of ageing and health on asset portfolios. Discussion and conclusions follow in section IV.

II. DATA

The Household, Income and Labour Dynamics in Australia (HILDA) survey covers socio-demographic characteristics, wealth, health, labour market activity, and a range of other household and personal characteristics.[4] The same households are interviewed in each annual survey ('wave'), and in waves conducted in 2002, 2006 and 2010 respectively, a special wealth module collected data on households' financial and non-financial assets and liabilities. We analyse data from retired households in the wealth waves.

From the over 7,000 households (approximately 20,000 non-institutionalized individuals) surveyed, we select only single or coupled retired households where the older member of a couple is at least 60 years of age.[5] All household members were fully retired from paid work and give answers to questions on nine specified asset classes.[6] After exclusions for attrition or crucial missing values, the 2002-06 sample includes 895 households and the 2006-10 sample includes 883 households. Of these, 667 appear in all three wealth waves and answer all the relevant questions.

[4] HILDA consumption data is only available for waves 2006 and 2010, and hence our paper focuses on the decumulation of wealth across waves rather than comparing changes in consumption.

[5] We do not include any retired couples or singles that are living with other friends or family. We investigated living arrangement of retired households in waves 2002, 2006 and 2010 of HILDA. Of retired households who have non-missing wealth data and are 60 or older, a large majority are either couples with no dependent relatives or lone persons. For example in 2002 wave of HILDA this proportion is 88%, so any bias created by omitting retirees in other household structures is minimal.

[6] Where available, we make use of HILDA's imputed wealth variables so that we maximize the number of households included in our sample. Refer to Summerfield *et al.,* (2011) (*HILDA User Manual – Release 10*), pp 69-73 for more information on imputation methods used.

A limitation of the HILDA panel is that the data of individuals who reside in nursing homes or other institutions are not collected. This matters to wealth analysis, since retired households will preserve assets, including the family home, to cover the possible expenses of entering an aged care facility. (Although public support for aged care is available, it is means-tested and capped, and private insurance options are very limited.) Of the 895 retired households in the 2002-2006 sample, one was in a non-private dwelling in 2002 and nine households were institutionalised by 2006. Similarly, of the 883 households in the 2006-2010 sample two households were institutionalised in 2006 and 18 by 2010. While it is not possible to trace a household if they do not appear in subsequent survey waves, only 1-2% of our sample drop out for this reason so we do not think the dynamics reported here are likely to be significantly affected. [7]

Death and attrition account for a much larger proportion of the households that drop out between waves. Around 9% of households die during each of the four year phases, but the largest losses are due to attrition, at 16% between each wave. We continue to include couple households where one partner has passed away in our sample.

Table 1 reports the sample means of household characteristics in different survey waves for the 2002-06 and 2006-10 samples, as well as for the subsample of households that appear in all three waves. The 2006-10 sample are more educated and in worse health than the 2002-06 sample, and also have higher average wealth by $100K (or by $200K when housing equity is included), probably because the 216 households that joined the panel in 2006 are younger and wealthier than the 228 households who left before 2010 (columns 7 and 8). The younger cohort are also likely to have accumulated more superannuation savings.

As expected, households appearing in all three waves show, on average, deteriorating health, more singleness, lower rates of risky asset and home ownership over time and increasing rates of financial wealth depletion (lower panel). However, the average change in wealth between 2002 and 2006 was an increase of $9K (excluding net housing equity) compared with an average decrease of $52K between 2006 and 2010. We note that many households experienced unusually large swings in financial asset values over this sample period so observed patterns in decumulation

[7] Wu *et al.,* (2015) present some analysis of the wealth and decumulation patterns of institutionalized age pensioners using longitudinal data from 1999 to 2007.

might not generalize to financially tranquil periods. In the next section we study the effect of financial shocks on decumulation and portfolio dynamics in more detail.

PLACE TABLE 1 HERE

III. METHOD AND RESULTS

In this section we analyse wealth by household type, then patterns of retirement decumulation and portfolio structure among the HILDA panel of retirees. As well as studying the general evolution of portfolio dynamics for Australian households (c.f. Coile and Milligan (2009) for the U.S.), we are particularly interested in how retirees manage financial and health shocks.

(i) Determinants of Wealth

Households in the HILDA survey report wealth in nine asset classes: liquid assets; cash investments; superannuation; equity (shares); principal residence; business; real estate; vehicles; and "other savings".[8] To reduce the number of null categories for individual households, we aggregate the asset classes into five groups consisting of defensive financial assets; growth financial assets; residence; other real estate and businesses; and vehicles:[9]

1. *Liquid Assets and Cash Investments* – defensive financial assets including bank accounts and cash investments, bonds, debentures and mortgage-backed securities.[10]
2. *Superannuation and Equity* – growth assets including the value of superannuation holdings and life insurance (if cash-out before death is available) plus shares, managed funds including real estate investment trusts, and children's trust funds.[11]
3. *Principal Residence* – the value of the household's own residence.

[8] 'Other savings' (such as collectables and antiques) is not included in any of the five asset categories for our analysis in subsection *(v) Effect of ageing and health on asset holding,* in order to be comparable with Coile and Milligan's (2009) study. However, 'other savings' is one of the nine asset types that is summed to calculate the value of household wealth which is summarized in Table 1, and analysed in subsections *(i)-(iv).* A detailed variable summary can be found in Appendix A.

[9] Most superannuation assets carry high growth exposure so we group them with direct equity holdings. In 2014, 94% of superannuation assets in the pension phase were in account based pensions, with an average exposure to growth assets of 57% (Mercer 2014).

[10] The HILDA dataset does separately identify the components of 'cash investments'.

[11] We would ideally exclude the value of children's trust funds (given retirees cannot draw them down for consumption) but this is not possible due to data limitations.

4. *Business and Real Estate* – the value of business(es) owned by the household plus direct property investments.[12]
5. *Vehicles* – cars, motor homes etc.

The sum of all five categories (plus the value of "other savings") equals gross assets by household. Household net wealth is the sum of gross assets less total debt holdings. [13] We also calculate *wealth ex-residence*, the sum of gross assets less total debt holdings, excluding home-owner equity. We exclude the family residence because it is not likely to be used for consumption. Few households used reverse mortgages during this period (Reed 2009) and most Australian households preserve housing equity through retirement (Cho and Sane, 2011; Bradbury, 2010).

We start by modelling the level of *wealth ex-residence* to get insight into the variation of wealth by household types.[14] However, wealth data in our sample is highly right-skewed, which can make OLS inefficient and can cause bias in the OLS standard errors. Also, the conditional mean function for this type of data can exhibit non-linearities that are difficult to handle with the usual linear model. Drawing on the health expenditures literature (e.g. Buntin and Zaslavsky, 2004), we investigated the fit of untransformed and log-transformed OLS models as well as generalized linear models (GLM, McCullagh and Nelder, 1989) with log link and Gaussian and gamma distributional families.[15] The GLMs significantly outperform both OLS specifications by mean squared and absolute prediction error criteria (MSE and MAE) in both samples, while among the GLMs, the specification with the Gaussian family had lower MSE in both samples.[16]

We denote wealth ex-residence of household i (i=1,…,N) in period t (t=2002, 2006) as W_{it}. The GLM with the log link and Gaussian family specifies that the distribution of W_{it}, conditional on explanatory variables X_{it}, is normal with mean $E(W_{it}|X_{it}) = e^{\beta' X_{it}}$ and constant variance.[17] In the vector of explanatory variables X_{it} we include the household characteristics summarized in Table 1. We specify a quadratic polynomial in age and estimate the log-Gaussian models

[12] Business premises are typically a large proportion of business assets. Few households report holding business assets, so we group them with non-residential real estate.
[13] Debt not only includes debt attributable to the assets listed above, but also credit card debt, HECS (Higher Education Contribution Scheme), car loans, investment loans, personal loans, hire purchase and overdue bills.
[14]The full results for wealth including housing equity (principal residence) are available from the authors on request.
[15] To estimate specifications that require nonnegative data we dropped observations with negative financial wealth (2% of observations in 2002-2006 sample, and 1.4% of observations in 2006-2010 sample).
[16] The detailed results of the goodness of fit tests are available from the authors upon request.
[17] See Hardin and Hilbe (2012).

separately for the 2002-2006 and 2006-2010 samples. In the case of couples, the age of the oldest household member measures household age even if the older spouse dies during the sample period. Other explanatory variables include indicators for couple status, age pension receiving households, residence in a major city, post-high school education (for either spouse in couple households), and home-ownership. We also include indicators for speaking a language other than English, for households who report that they speak English "poorly" or "not at all", and for households who indicate particular health conditions (for either spouse in couple households).[18] Religious affiliation is classified into indicators for Christian, 'Other', 'None' and NR (non-response). (Appendix A has further details.) Households are counted as precautionary savers when they answer the question, "Which of the following comes closest to describing your (and your family's) current reason for saving?" with "medical/dental expenses" or "for emergencies/in case of unemployment or illness". If the household answers the question, "Which of the following comes closest to describing your (and your family's) current reasons for saving?" with "education for children or grandchildren" or "to help children or other relatives" we indicate a bequest intention.[19]

We also incorporate indicator variables for certain types of portfolio holdings.[20] These variables indicate the concentration of net wealth into defensive, growth or property assets:

i. $safe\_50_{it}$, takes the value 1 if household *i* has at least 50% of their non-residential assets invested in liquid or cash investments in time period *t*, or 0 otherwise.
ii. $superequity\_50_{it}$, takes the value 1 if household *i* has at least 50% of their non-residential assets invested in superannuation and/or equity in time period *t*, or 0 otherwise.
iii. $busrealestate\_50_{it}$, takes the value 1 if household *i* has at least 50% of their non-residential assets invested in business and/or real estate in time period *t*, or 0 otherwise.

The reference group for these indicators is "diversified" households that do not have more than 50% of their total non-residential portfolio holdings in any one of these three asset classes.

[18] See subsection (v) *Effect of ageing and health on asset holdings* for more details on these three health condition indicator variables.
[19] HILDA stopped asking this question in 2010.
[20] We cannot use the share in each of the assets as explanatory variables because the shares sum to one and hence are perfectly collinear. Using only selected shares (not all) as explanatory variable is also problematic because of this restriction. The estimated effect will not have a *ceteris paribus* interpretation because if one share changes the others must change too to ensure that all shares sum to one.

Diversified households are likely to experience less return volatility than those with higher concentrations in risky assets, and higher returns than those with concentrations in safe assets.

Estimation results in columns 1 and 4 of Table 2 show that those households with more than 50% of assets invested in superannuation/equity or business/real estate are wealthier than the reference group, as are couples, home-owners, and those with higher education. As expected, households receiving the Age Pension have lower wealth. Having a long-term health condition is associated with lower wealth in 2002, possibly due to the ongoing health care costs or lower accumulations because of limited labor market participation before retirement. These results are robust to the inclusion of housing equity in the net wealth measure, although households residing in a major city report significantly higher wealth in both 2002 and 2006, consistent with higher residential property prices in major cities. Other relationships are substantially unchanged.

PLACE TABLE 2 HERE

(ii) Changes in wealth levels

Level changes and rates give insight into different aspects of decumulation. In particular, households with extremely low or high wealth balances can distort averages of decumulation rates, so we study changes in the level of wealth and rates of change in wealth separately. First, we regress the change in levels of wealth-ex-residence for each household, ΔW_{it}, on the same set of explanatory variables:

$$\Delta W_{it} = \delta' X_{it} + \varepsilon_{it} \quad (1)$$

All controls in this model correspond to the beginning of the decumulation period, i.e., to year 2002 for the period 1 sample, and to year 2006 for the period 2 sample.

Estimation results show that households with large holdings in (riskier) superannuation/equity or business/real estate experienced a comparatively larger decumulation in the 2006-2010 period, when compared to more diversified reference households (Table 2, columns (2) and (5)). Decumulations differ also across several other dimensions, though in contrast to U.S. studies (e.g., Poterba, Venti and Wise, 2010, Poterba, Venti and Wise, 2013), we do not find any significant impact of education on changes in wealth. Having a long-term health condition is related to lower wealth in 2002, but there are no other statistically significant effects of health on changes in wealth.

To get a clearer idea of the effect of ageing itself on decumulation patterns we compute the predicted average and median household's age profiles of changes in the level of wealth using estimated models in Table 2, columns (2) and (5) (Figure 1, top two panels). The average and median profiles of changes in the level of wealth in the 2002-2006 period (top left panel) are similar and show zero wealth change for all ages. In the period 2006-2010 the average profile shows decumulation for all ages due to declines experienced by households who had a large exposure to growth assets. In contrast, the profile of a median household (which had more than 50% allocation to defensive assets) shows accumulation for all ages for this period. Thus, consistent with results from other local and international studies, we confirm that many Australian retired households did not spend down their financial wealth as they aged (see Wu *et al.,* 2015 and references therein).

PLACE FIGURE 1 HERE

Figure 2 shows fitted values of changes in wealth for median households by selected household characteristics.[21] In the period 2002-2006 both younger and older median households experienced zero decumulation whereas in the 2006-2010 period, older households accumulated (panel (a)). Panel (b) shows that couple households deplete their wealth faster than singles in both periods while panel (c) shows that Age Pensioners are more likely to increase wealth than non-pensioners, especially in the 2006-2010 period. Faster decumulation by couples and accumulation by older, pensioner households are results confirmed by the analysis of age pensioners by Wu *et al.,* (2015).

Note that in panels (a)-(c) the indicator of financial portfolio type was set to the sample median which is concentrated in safe assets, so for these types of households we do not see the large fall in wealth in the 2006-2010 period that was experienced by households with more risky portfolios. Panel (d) shows that households with a large share of assets in equity experienced a large decrease in wealth in the 2006-2010 period, in contrast to the households with less risky

[21] The median household is 72 years and single, with 12 years or less of school education, resides in a major city, speaks English at home, with no English language difficulties, is of Christian religion, receives the Age Pension, in good actual and expected health with a long-term health condition, with a financial portfolio at least 50% in defensive assets and no bequest or precautionary motives for saving.

portfolios who actually experienced modest wealth increases in both periods. The results for *net wealth* including wealth in the family home are similar.

PLACE FIGURE 2 HERE

(iii) Decumulation rates

Having studied the level changes, we now look into percentage changes in wealth. We regress the difference in the logarithm of *wealth ex-residence* on the same controls as in previous models:

$$100 \times \log(W_{it}/W_{it-1}) = \vartheta' X_{it} + \varepsilon_{it} \quad (2)$$

Table 2, columns (3) and (6), report the estimated coefficients. Confirming Betts and Bloxham's (2009) predictions,[22] the coefficients on $superequity\_50$ and $busrealestate\_50$ in the 2006-10 period are negative, statistically significant and larger in absolute value than estimated for 2002-06. In other words, households that had a high allocation to these asset categories experienced larger decumulation rates over the financial crisis and post-crisis recovery compared with those households that did not.[23] (For robustness, we repeat this process excluding the top and bottom 5% of households by decumulation rates across 2002-06 and 2006-10 and the results are similar.)

With this in mind, we compute age profiles for decumulation rates in 2002-06 and 2006-10 using predictions from the models in Table 2, columns (3) and (6) (Figure 1, bottom two panels). In 2002-2006, fitted values show negative average and median accumulation rates for all ages except for the oldest groups. The pattern is different from the changes in levels for this period because the majority of households decumulated, but by small amounts, and a minority accumulated by large amounts. In 2006-2010, a majority of households decumulated by a large

[22] Betts and Bloxham (2009) predict that given higher-wealth households hold larger shares in equity and superannuation, it is likely that the declines in net worth observed in 2008 would have a greater impact on these particular households.

[23] The relatively low R-squared values for these estimations are probably due to the fact that we cannot separately observe returns on wealth (which would ideally be included as explanatory variables in our wealth analysis), and are unable to account for heterogeneity in actual investment returns across our sample. This could help explain why we observe higher R-squared values for *levels* of wealth in any one wave (Table 2, columns 1 and 4) compared to decumulation estimation. Decumulations will be affected by unobservable heterogeneity (including risk preferences and where assets are invested etc.).

amount and a minority accumulated by a smaller amount, so median households of most ages decumulated at a close to zero rate, while average rates were negative.[24]

On one hand health and education are not significant factors in retirement wealth dynamics, possibly because neither public health insurance nor public pension payments in Australian are dependent on earnings or work history. On the other hand the increasing reliance of Australian retirees on defined contribution retirement savings combined with low rates of voluntary annuitisation may explain why better diversified households preserve their wealth more than less diversified households, as well as the greater vulnerability of wealthier households to financial shocks.[25]

(iv) Prevalence and determinants of low wealth

Retirement savings systems aim to support consumption at older ages, so one measure of success is whether households "run out of money" before the end of life. In Australia, where the Age Pension provides a safety net, eligible households do not run out of money in the sense of reaching zero income. However, many remain exposed to financial contingencies such as the need to pay for uninsured health or care expenses, to repair homes, or to replace durable goods. For example, 11% of our sample report wealth ex-residence of less than $22K (couples) or $13K (singles). Similarly, Poterba (2014) states that 50% of 65-69 year old U.S. households had less than US$20K in financial assets or retirement accounts. Standard financial advice recommends that households maintain emergency funds equal to between one and three months' expenses,

[24] Over 2002-06, 55% of households decreased their wealth holdings, on average, by $107.5K (43%). The remaining 45%, who increased wealth holdings, added on average $167K (76%), hence the average change in the level of wealth is positive even though a majority of households reduced their total financial wealth, and the average rate of change is negative. Median *wealth ex-residence* actually decreased from $70K in 2002 to $55K in 2006. (All percentiles up to the 79th decreased, while all but two higher percentiles increased.) Similarly, over 2006-10, 64% of households decreased their *wealth ex-residence*, on average $203.8K (46%) over four years. The remaining 36%, added on average $125.6K (77%), and the average level changes and percentage changes in wealth are negative.

[25] When housing equity is included (using the *net wealth* measure), fewer households (32%) reported lower wealth over 2002-06, with an average fall of $160K (30%) over four years. By contrast, the 68% who increased wealth added an average $221.1K (49%), making a positive average level change in wealth for all households. Median wealth including housing rose from $305K in 2002 to $355K in 2006 with all percentiles over the 25th showing a rise. But over 2006-10, 55% report lower wealth when housing is included, falling an average $265K (31%) over four years. The remaining 46% of households added on average $147K (31%), so the average level change and percentage changes in wealth including housing are negative. Median wealth decreased slightly from $415K in 2006 to $410K in 2010, and all but ten percentiles also decreased. Overall, residential housing values increased wealth at the median in the first period, but did not prevent declines in the second period.

where expenses are often proxied by income (Bi and Montalto, 2004; Bhargava and Lown, 2006).[26] Retired households can access the pension for regular expenses but are not likely to be able to rebuild lump sums to meet contingencies once they are exhausted. A related issue is whether households deplete asset classes in a particular order.

In this section we describe the proportion of retired households in the HILDA panel who are vulnerable to large financial shocks because they have very low liquid asset balances. We study the evolution of households through a series of financial wealth thresholds: either 4, 12, 24 or 48 weeks of equivalent Age Pension payment (or about 75% of four weeks' budget under the ASFA "modest' standard) stored as wealth ex-residence, and conditioning on single or couple status.[27,28]

We begin by presenting transition matrices showing the frequency with which those 667 households who appear in all three waves fall below the two lowest thresholds (4 or 12 weeks' Pension), from either a previously high or low financial wealth state (Tables 3A-B). These measures are similar to the one to three months expenses recommended in financial planning and studied elsewhere (Bhargava and Lown, 2006). We count 5.2% (10%) of households below the lowest (second lowest) wealth threshold in 2002, rising to 7.2% (12.4%) by 2010. The percentage of households below all thresholds is weakly increasing across all three waves.

PLACE TABLES 3A TO 3B HERE

[26] See, for example, ASIC's Money Smart advice, https://www.moneysmart.gov.au/managing-your-money/saving#Money

[27] The thresholds for couples in 2010 (in $2010) are $2,114, $6,342, $12,684 and $25,368, and for singles the thresholds are $1402, $4,207, $8,413, and $16,826. Age pension payments are calculated as maximum pension payment (excluding rental assistance) as outlined in the 2002, 2006 and 2010 December quarter 'Poverty Lines' publication by the Melbourne Institute of Applied Economic and Social Research, and inflated to 2010 dollars using Reserve Bank of Australia (2012) quarterly inflation figures (which are calculated based on the Consumer Price Index (CPI)). Refer to Appendix B for the equivalent of one week's Age Pension payment (excluding rent assistance) for couples and single households. These figures are multiplied accordingly to calculate each respective threshold of low financial wealth (4, 12, 24 or 48 weeks Age Pension saved, excluding housing equity).

[28] Our thresholds, based on multiples of the weekly Australian Age Pension, are comparable to the Association of Superannuation Funds of Australia Limited's (ASFA) (2013) "modest lifestyle" Retirement Standard, which suggests a yearly budget for retired (home-owning) couples and singles of $32,656 and $22,654 respectively. Our four ascending thresholds, as a proportion of this annual ASFA measure, equal approximately 6%, 19%, 38% and 76% respectively.

Next we estimate a linear probability model[29] by regressing an indicator for whether household *i* has low financial wealth in period t (Y_{it}) on the same explanatory variables as in previous models:

$$\mathrm{p}(Y_{it} = 1|\mathbf{X_{it}}) = \tau' X_{it}. \tag{3}$$

Estimation results for the linear probability models for households passing through a low financial wealth threshold are reported in Table 4. In 2002, the likelihood of reaching the lowest wealth threshold is 3.7 percentage points lower for couples than singles, and 14 percentage points lower for home-owners than non-homeowners. In 2002, households who report bad health are 9.8 percentage points more likely to be below the threshold, but not in other years. Other interesting statistically significant results include the effects of portfolio allocation (low risk portfolios are linked with low wealth, while high risk portfolios are associated with a lower probability of low wealth), while older households are less likely to deplete their resources. Estimations for thresholds 2, 3 and 4 (not reported here) show that higher post-school education protects household against low wealth in some waves, but that long-term illness makes low wealth more likely.

PLACE TABLE 4 HERE

Natural decumulation of savings could account for some of the decrease in wealth underlying the transition probabilities reported in Tables 3 and 4. So using the Oaxaca-Blinder decomposition technique,[30] we decompose changes in the transition probabilities over time into parts attributable to observed household characteristics and parts attributable to environmental factors or unobserved characteristics, such as time preferences. For example, changes to observable household characteristics such as being widowed or ageing could increase a household's probability of falling below a threshold, whereas changes in economic, social or regulatory environments, such as low interest rates or tightening of pension means tests, could also have similar effects by reducing retirees' wealth. The policy implications of each are different.

Tables 5A and 5B set out the decomposition results. For example, row 1 reports the average in-sample prediction from equation (3) estimated using year 2002 observations. Row 2 reports the out-of-sample prediction from the same equation for observations in year 2006. Then row 3 reports

[29] We also estimated logit models, with very similar results.
[30] See Oaxaca (1973) and Blinder (1973).

the average in-sample prediction from equation (3) estimated using year 2006 observations. Row 4 is the difference between rows 3 and 1 and measures the change in the low wealth probability between years 2002 and 2006. This probability could change over time because the averages of explanatory variables and/or parameters in equation (3) change over time. Rows 5 and 6 decompose the change into the contribution of explanatory variables (row 5) and parameters (row 6). In other words, changes due to parameter change (row 6) are attributed to external or unmeasured influences rather than due to changes in the value of the observed household characteristics in the model (row 5).

Starting with threshold one in 2002-06, the probability of having less than four weeks Age Pension saved (i.e., less than $1K in assets outside the family home for a single person) increased by 0.8 percentage points, of which -1.1 percentage points can be attributed to changes in observable household characteristics and 1.9 percentage points can be attributed to changes in environmental factors or unobservable characteristics. So changes households experienced in age, couple status, education, religion, health, portfolio allocation and home ownership on average made it *less* likely that households would fall into low wealth, with external or unobserved factors the drivers behind transitions to low wealth.

PLACE TABLES 5A AND 5B HERE

Analyzing the second period (2006-10) gives more evidence that simple ageing is not the main factor in the increased likelihood of falling below the threshold: the decomposition attributes -0.2 percentage points to changes in observable household characteristics and 1.4 percentage points to changes in environmental or unobservable factors. Again, we cannot isolate a particular external cause that increased the likelihood of retired households depleting their wealth, but deterioration in financial market conditions and a weaker macroeconomy during this period are possible causes. Increasing the threshold to 12, 24 and 48 weeks Age Pension saved (excluding housing equity) produces similar results across both 2002-06 and 2006-10 with most changes attributable to causes other than observable changes in household characteristics alone.[31] An increasing fraction of retired households have exhausted their emergency funds during the sample

[31] Results are available from the authors upon request.

we study and more than 10% of the sample do not have enough wealth outside the family home to absorb a significant financial shock.

Further analysis of changes in home-ownership and housing wealth do not support the idea that households use up financial assets and then liquidate their home equity. First, households who run down financial assets do not reduce homeownership rates or housing equity at a higher rate than households who are not poor. This finding fits the general pattern of preservation of housing wealth noted by Bradbury (2008, 2010) and Cho and Sane (2011). We do observe several cases between 2006-10 where households reduce housing equity and increase financial assets, consistent with Fischer and Stamos' (2013) observation that home ownership rates follow the house price cycle, but the reverse also happens in a few instances. Overall, even the poorest home-owning households maintain equity in principal residence when financial wealth is running out. The protection for the family home from the Age Pension means tests and the relative vulnerability of renting households, particularly in major cities, makes this an attractive, but not necessarily ideal, plan for retirees.

(v) Effect of ageing and health on asset holdings

The goal of this subsection is to analyze the evolution of retirement asset holdings. We begin with a 'snapshot' of the changes in gross assets of Australian retirees over the three waves of HILDA in Table 6. This table is constructed using data on 667 households who have non-missing wealth data in all three waves of HILDA (i.e., period 1 and period 2 household). We divide households into three equal-sized cohorts according to their age in 2002 (younger than 67, between 67 and 74, and 74 and older), and then trace their asset holdings as they age over the three waves of HILDA.

PLACE TABLE 6 HERE

The top panel shows how ownership rates of different asset types vary with age and cohort. Home ownership rates are around 70-80% except for the oldest old, with slowly declining ownership for all age cohorts. Superannuation holdings reflect the relatively recent introduction of the Superannuation Guarantee, where younger cohorts having longer to contribute. About one half of households own equities (separate from their superannuation investments) with lower

ownership rates for older cohorts, and a slow decrease in ownership rates with age for all age cohorts. The second panel presents the share of total wealth allocated to each asset category. The share of liquid assets is higher for older cohorts and increases with age. Shares in equity and superannuation decline with age, while shares in principal residence seem to grow with age, except for the oldest old. The proportion of households with vehicles as well as the wealth share of vehicles declines with age, especially for the older cohorts. Wu *et al.*, (2015) also report declines in ownership rates and wealth shares in superannuation, equities and real estate assets at older ages among the Australian age pension population, and small declines in homeownership among older wealthier households. Coile and Milligan (2009) find similar reductions in business, real estate and vehicles ownerships rates at older ages in their U.S. HRS sample, and their cohort analysis also confirms a decline in retired U.S. households' ownership of stocks as they age. However, according to Van Ooijen *et al.,* (2014), Dutch retirees have higher shares of wealth in safe liquid assets, and smaller allocations to growth assets than Australians.

To separately estimate the effect of ageing on asset holdings we consider the panel samples for periods 1 and 2, and regress gross asset holdings on age and characteristics for household *i* at time *t*. The dependent variables are either binary variables indicating participation (strictly positive holding) in each asset class or the share of total household assets in each asset class. We use three econometric specifications: no fixed effects (1); cohort fixed effects (2); and household fixed effects (3).[32] In particular, specification (1) is given by

$$Asset\ holdings_{jit} = \varphi_0 + \varphi_1 age_{it} + \varphi_2{}' X_{it} + \gamma_t + \varepsilon_{jit} \qquad (4)$$

where $Asset\ holdings_{jit}$ is the value of asset class *j* held by household *i* at time *t*, age_{it} is the age of the household, X_{it} is a vector of control variables, γ_t are survey wave dummies, and ε_{jit} is an independent and identically distributed error.

In specification (2), cohort dummies, C_k, group households by birth year (where two birth years form one cohort) in the following form:

$$Asset\ holdings_{jit} = \delta_0 + \delta_1 age_{it} + \delta_2{}' X_{it} + \gamma_t + C_k + \varepsilon_{jit} \qquad (5)$$

We introduce cohort dummies to better isolate the effect of ageing. Households born during different periods are exposed to different market environments across their working life, which

[32] We use OLS estimation with standard errors clustered by household ID.

may lead to differences in asset holdings that are correlated with age but are not directly caused by ageing.

Specification (3) includes household fixed effects, α_i:

$$Asset\ holdings_{jit} = \beta_0 + \beta_1 age_{it} + \beta_2' X_{it} + \alpha_i + \varepsilon_{jit}. \quad (6)$$

This specification controls for the cohort effects most fully, however wave dummies cannot be included in (6) because of the perfectly co-linear relationship between age and time (see Wooldridge, 2006, p. 489).

We run each of these regressions seven times: for each of the five asset categories described in section II, and for superannuation and equity separately. The control variables are an indicator of couple status, receipt of the age pension, residing in a major city, post-high school education, English language proficiency, and religious affiliation. The age of the oldest household member measures household age. We also include the following health variables: $badhealth_{it}$ equals 1 if household *i* reports being of 'poor' health in period *t* and zero otherwise, $expectedbadhealth_{it}$ equals 1 if household *i* answers 'definitely true' in period *t* to the statement "I expect my health to get worse", and $longtermhealthcondition_{it}$ equals 1 if household *i* reports having a long-term health condition, impairment or disability in period *t*.[33]

The age-evolution of portfolios is the main interest, so in Table 7 we omit coefficients on other controls and report only estimated coefficients on age for each of the three specifications.[34] Results in column 2 of panel 1 of Table 7 show each year of age lowers the probability of participation in superannuation and/or equity assets by 0.72 percentage points (similar to declines in risky asset holdings for Dutch retirees, (Van Ooijen *et al.,* 2014). Including cohort dummies (column 2) weakens the size but not the sign of this effect, hence shorter periods of participation in the superannuation system by older households is not the only reason for this decline.

PLACE TABLE 7 HERE

[33] This indicator equals 1 if respondent answers yes to the question "Do you have any long-term health condition, impairment or disability…that restricts you in your everyday activities, and has lasted or is likely to last, for 6 months or more?"

[34] Full estimation results are available from the authors. Bold italic typeface show cases where a quadratic in age was significant for some ages. In particular, for all asset types where age effects are reported in bold italics except liquid/cash investments the quadratic polynomial in age implies a significant positive effect of age for younger ages (i.e. 60-70) and a significant negative effect of age for older ages (i.e. 80 and older).

The third column of Table 7 incorporates household fixed effects and uses the panel structure to identify age coefficients. However, since it is not possible to separately estimate both time and age effects in this specification, the coefficient on age may include both the influence of ageing and exogenous changes in the external environment (or in the waves of the survey) not captured by other controls, and we interpret results with caution. Results show a decreased likelihood of participation in vehicle ownership, superannuation, equity, and business/real estate at older ages. The coefficient on holdings in cash and liquid assets is insignificantly different from zero, probably because high and relatively constant rates of participation in this class are captured by the household fixed effects. Interestingly, if quadratic terms in age are included, rates of ownership of principal residence peak at age 81, very close to the age at which Coile and Milligan (2009) report the start of a rapid rate of decline in home ownership for the U.S.

The effect of age on the share of each asset class in portfolios is presented in panel 2 of Table 7. Using equation (4) without cohort or household fixed effects, we see a decrease in the share of superannuation/equity and vehicles (of 0.45 and 0.42 percentage points respectively), and an increase in the proportion of principal residence and liquid/cash investments (of 0.32 and 0.58 percentage points respectively) with each additional year of age. Specifications (5) and (6), which control for cohort and household fixed effects, largely confirm that as households age they hold increasing proportions in liquid/cash investments and decreasing proportions in more risky asset types such as superannuation and equity.

Figures 3 and 4 graph the age profiles of asset class participation rates and portfolio shares, setting other control values at medians.[35] Coile and Milligan (2009) suggested that the shift towards cash and liquid assets among U.S. households could be due to transitory proceeds from the sale of principal residence (for example) on their way to other asset types, older households having greater loss aversion due to their exhausted human capital (and inability to make up for potential investment losses), and reduced mental capacity. However, a critical difference between the U.S. and Australian settings is the effect of the means-tested Age Pension on portfolio

[35] The median household in our sample is single, with high school or lower education, Christian, living in a major city, speaks English at home, has no English language difficulties, homeowner , in good actual and expected health with a long-term health condition and with safe financial portfolio (at least 50% of assets are liquid).

decisions, since the test excludes the value of the family home.[36] Consequently, the households in the sample studied here have a strong incentive to keep their principal residence.

PLACE FIGURES 3 AND 4 HERE

We now turn to the question of how health status affects the asset holdings of Australian retirees. Specifically, following Coile and Milligan (2009), we investigate households where either member reports poor health, expected poor health or having a long-term health condition. The coefficients on health status variables from the specification with household fixed effects - a preferred specification (equation (6)) - are presented in Table 8. Overall, we find few statistically significant effects of health variables on asset holdings. One exception is the negative effect of a long term health condition on principal residence holding and share, and a positive effect on the share of liquid assets. (Van Ooijen *et al.,* (2014) report a similar increase in financial assets among Dutch retired households who receive bad health news.) These households may be liquidating their housing equity preparing to alternative living arrangements (e.g. co-residence with other family members or nursing homes) or they may be less able to consume as their health status deteriorates.

The striking feature of these results is how few significant relationships there are. Out-of-pocket medical expenses for older Australian households are estimated to average only 3% of total household expenditure (Jones *et al.* 2008), or about $524 per year for households with no private health insurance (and hence fully reliant on public insurance cover provided by 'Medicare'[37]) and increasing from $469 per year for 60-64 year olds to $753 per year for those aged 80 and above (Johar and Savage, 2012). By contrast, U.S. households must manage a series of caps on public coverage for medical and pharmaceutical benefits: Fronstin *et al.* (2008, figure 2, p.8) estimate that for median drug expenses and additional insurance premia alone, men retiring in 2008 at age 65 need around US$80K savings and women around US$108K. Very serious and long-term treatments may cost much more. It follows that the effects of bad health on portfolio structure in Australia will be less than in U.S. studies.

IV. CONCLUSIONS

[36] See http://www.humanservices.gov.au/customer/enablers/assets for further details regarding those assets included and excluded from the Age Pension assets test.

[37] All recipients of the Age Pension are eligible for a "Pensioner Concession Card" which provides heavily subsidised prescription medicine (or fully subsidised for those who fill a large number of scripts per year), fee-free doctor's visits and full coverage for a range of in-hospital treatments.

Australian retirees' decumulation patterns reflect their exposure to longevity, investment and consumption risks. Unlike workers in many developed economies, Australians do not contribute to an earnings-linked social security system. Instead, around 75% of retirees aged over 65 receive a modest, means-tested public pension payment unconnected to work history. Australia was an early adopter of defined contribution retirement savings plans under the mandatory Superannuation Guarantee, which currently requires 9.5% of earnings for almost all workers to be paid into an accumulation plan but very little superannuation is annuitized and consequently many retirees bear financial market risk throughout retirement. And while aged care costs can be high, out-of-pocket spending on other health services is typically low by international standards, particularly for age pensioners.

The results reported here illustrate the ongoing exposure to investment risk, modest public pension provision and limited exposure to health costs of the retired cohorts interviewed for the 2002, 2006 and 2010 HILDA wealth waves. Consistent with existing Australian and international evidence, we find that wealthier retired households hold a higher proportion of their wealth as risky financial assets (superannuation, equity, business or real estate). On average, households accumulated wealth between 2002-06 as financial asset prices trended up, and decumulated wealth between 2006-10. However, regression analysis of level and percentage changes in wealth also shows the wide variation in decumulations both in the cross-section and over time, so that the median household accumulated modestly or maintained their wealth in both periods. Lower risky asset exposure was linked to smaller wealth reductions in the second period. Since the swings in financial returns over this period were very large, we view the responses of households from this sample with caution, but still conclude that investment risk matters for fully or partly self-funded Australian retirees.

The fact that there are periods in which many retired households in the sample add to their wealth can be at odds with retirement income products and policy settings. In Australia, the most popular form of retirement income stream product is a phased withdrawal account, typically invested in a balanced portfolio, called an Account Based Pension. The regulations surrounding this product stipulate that once it is set up, more money cannot be added to it, and that a minimum percentage of the balance must be drawn as income each year. These minimum percentages increase with age from 4% under age 65 to 14% at 95 years or older. The rules aim to stop the tax

concessions tied to retirement accumulations being applied to other funds, or passed on to estate beneficiaries. Even so, for a substantial number of households in this sample, these rules would be binding constraints, as shown by the pressure successfully applied to regulators that led to them temporarily halving the minimum drawdown rates during the Global Financial Crisis and its aftermath. Flexibility is valuable to people who cannot go back to work to recoup after unexpectedly severe shocks, and regulated drawdown rates from phased withdrawal products should accommodate precautionary savings. Finally, age pension means tests favour both risky asset holdings and the family home, creating biases in portfolios. These rules should be re-evaluated with a view to helping retirees better manage investment risk and maintain liquidity.

Are retirees in danger of depleting wealth to the point where they cannot cover emergency expenses? A close examination of the number of retired households depleting financial assets confirms an increasing, but, not necessarily alarming, drift into very low liquid wealth states. The most vulnerable households are single, non-home-owners and pensioners. Long-term health conditions also have an impact. A decomposition using the Oaxaca Blinder method points to external factors (possibly regulatory changes, low interest rates, higher utility bills etc.) and unobservables, as more important than observed household characteristics (such as ageing) in explaining the probabilities of running out of emergency funds. Data also show that households experiencing financial poverty do not reduce home ownership more than other households. There are several reasons why Australian retired households do not liquidate housing wealth, including transaction costs, bequest motives, insurance against long-term care expenses, and the inadequacy of Age Pension rental allowances. There is scope for a complete review and harmonization of the rules around housing before and during retirement to enable more liquidity while meeting other goals.

Poterba and Samwick (2001) and Coile and Milligan (2009) study the evolution of retirement wealth and portfolio structure in the U.S., and Van Ooijen et al. (2014) study retirees in the Netherlands. Consistent with these economies, in Australia we see declining rates of ownership of, and lower portfolio shares in, risky assets (including superannuation, equity, and business/real estate) at older ages, and a compensating increase in liquid/cash investments. Like the Netherlands, where households keep their residences at older ages, we find investment in principal residence peaks around age 81 before dropping off very slowly.

The starkest contrast between Australia and U.S. retired households is in the effects of poor health. Although reporting bad health or expected bad health can influence liquid asset holdings of retired households, and chronic conditions are linked to more cautious portfolio weighting, poor health and changes in health seem to explain little about wealth levels, decumulation patterns or portfolio choices in the HILDA sample. These findings are very similar to the well-insured Dutch sample of Van Ooijen *et al.,* (2014) who also report no significant relationship between decumulation and health shocks. Australian retirees, especially age pensioners, are well covered for most medical expenses and do not have to pay additional premiums or large co-payments. Unsurprisingly, the key issues for retired Australians are financial market and longevity risks rather than health risks.

Continuing study of Australian retirees can give insight into the way individuals manage lump sum wealth in retirement. Data from the next wealth survey in the HILDA series will show how retirees have adjusted portfolios in the recovery from the 2007-09 financial crisis. Moreover, additional consumption data is needed to see whether and to what extent retirees smooth consumption over these (possibly unexpected) events. By that time, more of the survey sample will have participated in the mandatory retirement savings system for the majority of their working lives, bringing richer data on how people manage retirement accumulations.

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APPENDICES

Appendix A. HILDA Variables Used

Note: where we use an underscore '_' in the variable name, there is an appropriate letter for each wave, namely 'b' for wave 2, 'f' for wave 6, and 'j for wave 10.

Variable	Description	Variable	Description
_hgage	person's age	_edhigh	Highest education level achieved
_hhtype	Household type, single or couple	_hstenr	Home owner
_hgeab, _iopeng	English language difficulties	_fisedch, _fishlpc	Bequest motives
_hgsex	gender	_hhmsr	Geographical location/region
_rtcomp, _rtcompn, _nlmact	Retirement	_hglote, _iopeng, _anengfn	Language other than English
_gh1	Bad health	_bncap	Age pension recipient (yes/no)
_gh11c	Expected health	_religb	Religion variable
_helth	Long term health	_fismed, _fisemr	Precautionary motives
_hwobani	*Liquid assets*, own bank account	_hwhmvai	*Real estate*, own home value
_hwjbani	*Liquid assets*, joint bank account	_hwhmdti	*Real estate*, own home debt
_hwcaini	*Cash investments* (bonds etc.)	_hwopvai	*Real estate*, other property value
_hwvech	*Vehicles*	_hwopdti	*Real estate*, other property debt
_hqsupei	*Superannuation*	_hwbusvi	*Business*, value
_hwinsui	*Superannuation*, life insurance	_hwbusdi	*Business*, debt
_hwcolli	*Other savings*, collectables and other assets	_pwhecdi	*Other debt,* Higher Education Contribution Scheme (HECS) debt
_hwtrusi	*Other savings*, trust funds	_pwoccdi	*Other debt*, own credit card debt
_hweqini	*Equity*, equity investments	_pwjccdi	*Other debt*, joint credit card debt
		_pwothdi	*Other debt*, car loans etc.

Appendix B. Age Pension payments, weekly, excluding rent assistance

These figures are multiplied accordingly to calculate each respective threshold of low financial wealth (i.e. 4, 12, 24 or 48 weeks Age Pension saved, excluding housing equity).

Weekly Age Pension per household (2010 dollars)

	2002	2006	2010
Couple	439.97	479.02	528.50
Single	262.41	286.77	350.55

Source: Melbourne Institute of Applied Economic and Social Research, *Poverty Lines*, December quarter 2002, 2006 and 2010

TABLES

TABLE 1. Sample Means of Household Characteristics

	Period 1 HH, 2002	Period 1 HH, 2006	Period 2 HH, 2006	Period 2 HH, 2010	Period 1 and 2 HH, 2002	Period 1 and 2 HH, 2006	Period 1 and 2 HH, 2010	Period 1 only HH, 2002	Period 2 only HH, 2006
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age	71.896	75.896	73.316	77.316	70.639	74.639	78.639	75.575	69.231
Couple Household	0.459	0.377	0.446	0.385	0.486	0.406	0.334	0.382	0.569
Greater than high school education	0.393	0.371	0.430	0.414	0.418	0.397	0.375	0.320	0.532
Language other than English	0.087	0.084	0.089	0.084	0.085	0.084	0.081	0.092	0.106
Language difficulty	0.055	0.040	0.039	0.041	0.051	0.034	0.040	0.066	0.051
Major City	0.531	0.520	0.529	0.531	0.544	0.531	0.534	0.491	0.523
Religion None	0.099	0.107	0.120	0.142	0.111	0.121	0.141	0.066	0.116
Religion Christianity	0.754	0.716	0.785	0.744	0.760	0.780	0.738	0.737	0.801
Religion Other	0.021	0.025	0.031	0.034	0.022	0.030	0.028	0.018	0.032
Religion NR	0.125	0.152	0.065	0.080	0.106	0.069	0.093	0.180	0.051
Received Age Pension	0.663	0.726	0.689	0.784	0.652	0.718	0.787	0.693	0.597
Reports bad health	0.096	0.085	0.072	0.087	0.079	0.067	0.087	0.145	0.088
Reports expected bad health	0.118	0.093	0.084	0.094	0.106	0.082	0.096	0.154	0.088
Reports a long-term health condition	0.554	0.678	0.624	0.677	0.522	0.636	0.688	0.649	0.588
At least 50% of assets are liquid	0.402	0.434	0.366	0.456	0.376	0.406	0.505	0.478	0.241
At least 50% of assets in super or equity	0.302	0.292	0.351	0.308	0.331	0.318	0.274	0.215	0.454
At least 50% of assets in business or real estate	0.042	0.045	0.050	0.043	0.036	0.039	0.036	0.061	0.083
Home owner	0.782	0.755	0.783	0.745	0.793	0.766	0.726	0.750	0.833
Bequest motives	0.114	0.101	0.117		0.120	0.114		0.096	0.125
Precautionary motives	0.266	0.297	0.339		0.276	0.325		0.237	0.380
Wealth, 2010$ in 1000s	471.9	566.9	675.1	595.7	495.2	585.9	523.5	403.8	950.2
Wealth, excluding housing, 2010$ in 1000s	235.9	252.90	332.9	259.3	251.6	266.3	214.0	190.2	538.9
Gross assets, 2010$ in 1000s	473.9	570.3	683.6	599.6	496.6	588.6	526.1	407.6	977.0
Gross assets, excl. housing, 2010$ in 1000s	235.8	254.1	338.1	259.5	251.2	268.1	212.6	190.8	554. 2
Below wealth (excl. housing) threshold 1	0.060	0.073	0.054	0.069	0.052	0.060	0.073	0.083	0.037
Below wealth (excl. housing) threshold 2	0.120	0.130	0.102	0.116	0.109	0.115	0.124	0.149	0.060
Below wealth (excl. housing) threshold 3	0.170	0.200	0.165	0.180	0.153	0.183	0.190	0.219	0.111
Below wealth (excl. housing) threshold 4	0.247	0.292	0.246	0.272	0.229	0.273	0.288	0.298	0.162
Wealth, excl. housing, 90th prc, 2010$ in 1000s	583.5	636.1	875.8	672.0	607.7	683.8	575.0	508.8	1362.2
Wealth, excl. housing, 95th prc, 2010$ in 1000s	1000.7	1130.1	1403.3	1276.0	1075.4	1150.8	992.0	860.0	2196.3
Observations	895	895	883	883	667	667	667	228	216

Notes: (i) Period 1 corresponds to 2002 and 2006 waves of HILDA. Period 2 corresponds to 2006 and 2010 waves of HILDA. Period 1 households appear in waves 2002 and 2006 with non-missing wealth information. Period 2 households appear in waves 2006 and 2010 with non-missing wealth information. (ii) Wealth thresholds are indicators of whether a household has less than a particular amount stored as wealth (excluding housing equity). For threshold 1 this is having less than $2114 for a couple, or $1402 for a

single. Wealth thresholds 2, 3 and 4 are defined similarly: threshold 2 is $5280 for couples and $3149 for singles; threshold 3 is $10559 for couples and $6298 for singles; and threshold 4 is $21119 for couples and $12596 for singles. (iii) HILDA stopped asking about reasons for saving (e.g. bequest or precaution) in 2010 .

TABLE 2
Non-residential Net Wealth: Level and Growth ($2010 in 1000s)

	Period 1 households			Period 2 households		
Dependent Variable	**Wealth level, 2002**	**Wealth growth, level, 2002-2006**	**Wealth growth, %, 2002-2006**	**Wealth level, 2006**	**Wealth growth, level, 2006-2010**	**Wealth growth, %, 2006-2010**
Explanatory Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Age	0.513	0.319	0.546	-2.023	0.673	0.882*
	(1.504)	(0.673)	(0.463)	(1.918)	(0.755)	(0.473)
Couple Household	58.35***	-16.93**	-4.185	60.18**	-16.91	-5.857
	(18.79)	(8.295)	(6.367)	(24.34)	(11.32)	(6.753)
More than high school education	70.58***	-6.180	1.144	41.84	-14.78	-1.307
	(22.73)	(8.946)	(6.757)	(34.01)	(11.20)	(7.017)
Language other than English	-23.15	2.476	-4.313	11.41	-15.74	4.577
	(29.38)	(14.63)	(14.65)	(37.34)	(18.87)	(13.70)
English language difficulties	-156.3***	0.447	-3.951	-192.9***	32.01	-10.83
	(23.69)	(17.61)	(21.82)	(39.50)	(20.74)	(22.90)
Major City	4.386	8.480	-4.186	2.421	-2.239	-7.612
	(18.52)	(8.318)	(6.218)	(24.34)	(10.13)	(6.092)
Religion None	8.247	-2.297	10.68	49.12	-2.079	6.154
	(27.38)	(14.28)	(8.947)	(37.64)	(17.30)	(8.304)
Religion Other	15.23	46.23*	12.69	93.93	-67.76*	-25.19
	(45.28)	(25.07)	(22.51)	(68.05)	(37.07)	(17.12)
Religion NR	-1.437	-2.716	3.093	-75.39**	1.837	8.810
	(34.16)	(14.50)	(11.59)	(38.39)	(13.14)	(16.18)
Receives Age Pension	-189.4***	-21.36**	-5.833	-281.9***	48.06***	-17.26**
	(25.13)	(10.86)	(7.224)	(28.93)	(15.72)	(7.614)
Reports bad health	-43.70	-1.474	13.76	-62.62	-0.165	-9.884
	(42.14)	(12.07)	(12.03)	(41.90)	(19.99)	(14.12)
Reports expected bad health	30.47	-19.62	-1.910	-35.31	12.41	10.73
	(30.61)	(12.94)	(9.156)	(43.84)	(19.89)	(12.20)
Has long term health condition	-45.40**	-9.958	-7.553	8.689	-9.314	-8.692
	(18.40)	(8.891)	(6.321)	(24.98)	(11.03)	(6.447)
At least 50% of assets are liquid	-42.82	-12.48	-14.18*	-26.18	0.205	-0.123
	(29.17)	(7.614)	(8.528)	(37.83)	(10.03)	(9.317)
At least 50% of assets in superannuation or equity	159.2***	-11.38	-15.03*	247.3***	-97.43***	-54.57***
	(36.12)	(11.53)	(8.338)	(41.86)	(14.05)	(8.983)
At least 50% of assets in business or real estate	96.11**	65.04**	3.915	335.5***	-64.27	-35.67**
	(46.97)	(28.69)	(15.53)	(58.36)	(43.93)	(15.27)
Home owner	26.82	7.407	-0.898	118.0***	-5.372	9.649
	(51.08)	(7.159)	(8.533)	(45.20)	(8.683)	(8.415)
Bequest motives	23.32	-22.62	4.516	11.63	-24.37	15.62*
	(35.14)	(15.35)	(9.550)	(32.87)	(23.07)	(9.094)
Precautionary motives	-1.395	25.86**	7.807	13.57	-22.89**	-0.703
	(24.83)	(11.53)	(6.887)	(24.40)	(11.37)	(6.418)
Constant		63.37	-5.47		254.5	-708.5
		(348.1)	(243.2)		(518.9)	(358.7)
Observations	861	843	815	849	831	802
Adjusted R^2		0.029	-0.007		0.166	0.081

Notes: (1) Robust standard errors in parentheses; (2) * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$;
Columns (1) and (4) report average marginal effects of explanatory variables derived from the generalized linear model with Gaussian family and log link; Quadratic polynomial in age has been used in all models, and the average marginal effect of age is reported.
(4) To minimize the influence of outliers the distribution of the dependent variable was cut off in the top and bottom 2% in columns (1) and (4), and in top and bottom 3% in columns (2), (3), (5) and (6).

TABLE 3A

Threshold 1: Percentage of Households with less than 4 weeks Age Pension saved*

Low Wealth 2006

Low Wealth 2002	Yes	No	
Yes	3.0	2.2	5.2
No	**3.0**	91.8	94.8
	6.0	94.0	

Low Wealth 2010

Low Wealth 2006	Yes	No	
Yes	4.3	1.6	6.0
No	**2.8**	91.2	94.0
	7.2	92.8	

Low Wealth 2010

Low Wealth 2002	Yes	No	
Yes	3.3	1.9	5.2
No	**3.9**	90.9	94.8
	7.2	92.8	

TABLE 3B

Threshold 2: Percentage of Households with less than 12 weeks Age Pension saved*

Low Wealth 2006

Low Wealth 2002	Yes	No	
Yes	7.5	3.4	10.9
No	**3.9**	85.2	89.1
	11.4	88.6	

Low Wealth 2010

Low Wealth 2006	Yes	No	
Yes	7.5	3.9	11.4
No	**4.9**	83.7	88.6
	12.4	87.6	

Low Wealth 2010

Low Wealth 2002	Yes	No	
Yes	6.6	4.3	10.9
No	**5.8**	83.2	89.1
	12.4	87.6	

Notes

*Excluding housing equity

(1) Balanced sample size across all three waves of 667 households

(2) Reported values are for percentage of total households that have total wealth (excluding housing equity) less than each respective threshold of low wealth.

(3) Grey shaded boxes highlight the percentage of *new* low financial wealth households in 2006 or 2010 (i.e. fall below a particular threshold in period 2)

(4) Threshold 1 is an indicator of a household having less than $2114 for a couple, or $1402 for a single, stored as wealth, excluding housing equity. Wealth thresholds 2, 3 and 4 are defined similarly: threshold 2 is $5280 for couples and $3149 for singles; threshold 3 is $10559 for couples and $6298 for singles; and threshold 4 is $21119 for couples and $12596 for singles.

TABLE 4
Coefficients from Linear Probability Model
Threshold 1: Probability of having less than 4 weeks Aged Pensions saved (ex-residence)

	(1) Wave 2002	(2) Wave 2006	(3) Wave 2010
Age	-0.00469***	-0.00378**	-0.00194
	(0.00151)	(0.00165)	(0.00180)
Couple Household	-0.0370**	-0.0566***	-0.0729***
	(0.0149)	(0.0142)	(0.0148)
Greater than high school education	-0.0218	0.00240	0.00753
	(0.0149)	(0.0171)	(0.0197)
Language other than English	0.0269	0.0211	0.0228
	(0.0402)	(0.0473)	(0.0533)
English language difficulty	0.0143	0.0261	-0.0587
	(0.0565)	(0.0713)	(0.0722)
Major City	-0.00683	0.0318*	0.0186
	(0.0167)	(0.0175)	(0.0194)
Religion None	0.0113	-0.0151	-0.0346*
	(0.0255)	(0.0228)	(0.0192)
Religion Other	-0.0514*	-0.0279	-0.0883***
	(0.0290)	(0.0499)	(0.0303)
Religion NR	0.0104	-0.0643**	0.152***
	(0.0338)	(0.0319)	(0.0553)
Received Age Pension	0.0240	0.0230	0.0508***
	(0.0162)	(0.0180)	(0.0157)
Reports bad health	0.0988**	-0.0510*	0.0209
	(0.0477)	(0.0302)	(0.0398)
Reports expected bad health	-0.0142	0.00459	0.000536
	(0.0166)	(0.0184)	(0.0211)
Reports a long-term health condition	0.00730	0.0203	0.0592
	(0.0293)	(0.0380)	(0.0413)
At least 50% of assets are liquid	0.0668***	0.0130	-0.0317
	(0.0255)	(0.0296)	(0.0355)
At least 50% of assets in superannuation/equity	-0.0129	-0.0690***	-0.0713***
	(0.0176)	(0.0228)	(0.0275)
At least 50% of assets in business/real estate	-0.0289	-0.0345	-0.0526
	(0.0229)	(0.0260)	(0.0343)
Home owner	-0.143***	-0.130***	-0.118***
	(0.0315)	(0.0298)	(0.0297)
Constant	0.487***	0.452***	0.305**
	(0.121)	(0.131)	(0.132)
Observations	667	667	667
Adjusted R^2	0.145	0.109	0.129

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

TABLE 5A
Estimated Probability of Low Financial Wealth (2002 vs 2006)
Linear Probability Model
Threshold 1: Probability of having less than 4 weeks Age Pension saved*

N=667	
Probability in 2002 using 2002 parameters	5.20%
Probability in 2006 using 2002 parameters	4.10%
Probability in 2006 using 2006 parameters	6.00%
Total Change in Estimated Probability (2002-06):	0.80%
Δ due to Δ household characteristics:	-1.10%
Δ due to Δ environmental factors:	1.90%

TABLE 5B
Estimated Probability of Low Financial Wealth (2006 vs 2010)
Linear Probability Model
Threshold 1: Probability of having less than 4 weeks Age Pension saved*

N=667	
Probability in 2006 using 2006 parameters	6.00%
Probability in 2010 using 2006 parameters	5.80%
Probability in 2010 using 2010 parameters	7.20%
Total Change in Estimated Probability (2006-10):	1.20%
Δ due to Δ household characteristics:	-0.20%
Δ due to Δ environmental factors:	1.40%

Notes

*Excluding housing equity

(1) 'Probability in *j* using *i* parameters' means that the probability was computed using linear probability model parameters (coefficients) estimated from data in wave *j* and sample covariates (control variables) from wave *i*

(2) We report average sample predicted probabilities

TABLE 6
Household Assets by Age: 2002-2010, HILDA

Asset Type	Age < 67 in 2002			Age 67-74 in 2002			Age >=74 in 2002		
	2002	2006	2010	2002	2006	2010	2002	2006	2010
Proportion of households with positive assets holdings									
Liquid/Cash Investments	0.976	0.976	0.985	1.000	0.982	0.996	0.987	0.991	0.970
Superannuation/Equity	0.668	0.590	0.532	0.509	0.482	0.408	0.419	0.397	0.338
Business/Real Estate	0.102	0.083	0.068	0.105	0.070	0.053	0.047	0.051	0.038
Principal Residence	0.761	0.771	0.737	0.789	0.768	0.754	0.782	0.752	0.671
Vehicle	0.873	0.854	0.839	0.851	0.838	0.798	0.756	0.701	0.556
Superannuation	0.493	0.468	0.434	0.281	0.268	0.237	0.188	0.162	0.128
Equity	0.541	0.454	0.371	0.417	0.408	0.342	0.355	0.355	0.291
Share of holdings in asset type									
Liquid/Cash Investments	0.130	0.121	0.165	0.197	0.187	0.244	0.228	0.229	0.326
Superannuation/Equity	0.272	0.232	0.180	0.160	0.149	0.116	0.106	0.115	0.074
Business/Real Estate	0.032	0.028	0.025	0.028	0.021	0.018	0.018	0.015	0.015
Principal Residence	0.418	0.484	0.508	0.529	0.557	0.567	0.570	0.584	0.525
Vehicle	0.112	0.095	0.098	0.073	0.061	0.049	0.065	0.037	0.023
Superannuation	0.145	0.146	0.110	0.084	0.065	0.047	0.028	0.028	0.021
Equity	0.127	0.086	0.069	0.076	0.084	0.068	0.078	0.087	0.053
Observations	205	205	205	228	228	228	234	234	234

Notes: This table is constructed using data on 667 households who have non-missing wealth and assets information in all three waves of HILDA where wealth module was conducted

TABLE 7

Effect of Age on Asset Holdings

We regress *asset holdings* (two measures: an indicator for a positive holding in a particular asset class; and the share of total assets in a particular asset type) on *age* (age of oldest household member) and other variables using the following three specifications:

With Wave Dummies: $Assetholdings_{it} = \varphi_0 + \varphi_1 age_{it} + \varphi_2 X_{it} + \gamma_t + \epsilon_{it}$

With Wave and Cohort Dummies: $Assetholdings_{it} = \delta_0 + \delta_1 age_{it} + \delta_2 X_{it} + \gamma_t + C_j + \in_{it}$

With HH Fixed Effects: $Assetholdings_{it} = \beta_0 + \beta_1 age_{it} + \beta_2 X_{it} + \alpha_i + \varepsilon_{it}$

where *Xit* also includes indicators for bad health, expected bad health or long-term health condition in period *t*.

Asset Type	Mean	With Wave Dummies	With Wave and Cohort Dummies	With Household Fixed Effects
Proportion of households with positive asset holdings				
Liquid/Cash Investments	0.9808	***0.0001***	0.0030 **	-0.0002
		(0.0004)	(0.0014)	(0.0009)
Superannuation/Equity	0.4918	-0.0072 ***	-0.0024	-0.0122 ***
		(0.0017)	(0.0054)	(0.0019)
Business/Real Estate	0.0838	-0.0011	-0.0022	-0.0046 ***
		(0.0010)	(0.0042)	(0.0012)
Principal Residence	0.7590	***-0.0004***	0.0113 **	-0.0058 ***
		(0.0017)	(0.0058)	(0.0015)
Vehicle	0.7762	-0.0099 ***	-0.0177 ***	-0.0101 ***
		(0.0015)	(0.0047)	(0.0014)
Superannuation	0.2924	-0.0145 ***	0.0001	-0.0051 ***
		(0.0015)	(0.0074)	(0.0017)
Equity	0.3986	-0.0021	-0.0003	-0.0119 ***
		(0.0017)	(0.0052)	(0.0021)
Share of holdings in asset type				
Liquid/Cash Investments	0.2014	0.0057 ***	0.0008	0.0061 ***
		(0.0012)	(0.0037)	(0.0013)
Superannuation/Equity	0.1535	-0.0045 ***	0.0000	-0.0076 ***
		(0.0009)	(0.0027)	(0.0010)
Business/Real Estate	0.0289	-0.0001	-0.0004	-0.0009
		(0.0004)	(0.0017)	(0.0005)
Principal Residence	0.5280	0.0032 *	0.0107 **	0.0042 **
		(0.0015)	(0.0048)	(0.0015)
Vehicle	0.0680	-0.0042 ***	-0.0095 ***	-0.0024 ***
		(0.0008)	(0.0032)	(0.0007)
Superannuation	0.0738	-0.0053 ***	-0.0011	-0.0033 ***
		(0.0006)	(0.0019)	(0.0007)
Equity	0.0797	***0.0008***	0.0011	-0.0043 ***
		(0.0006)	(0.0018)	(0.0008)

Notes

(1) Our sample includes 1111 households that appear in either waves 2002 and 2006, or in waves 2006 and 2010.

(2) Coefficient reported is for linear age. Those coefficients reported in ***bold italics*** are also for linear age, but indicate those asset types for which the marginal effect on quadratic age was reported to be statistically significant for some ages. In particular, for all asset types where age effects are reported in ***bold italics*** the quadratic polinomial in age implies a significant positive effect of age for younger ages (i.e. 60-70) and a significant negative effect of age for older ages (i.e. 80 and older).

(3) Standard errors appear in parentheses and statistical significance at the 10%, 5% and 1% levels is indicated by one, two, or three asterisks respectively.

TABLE 8

Effects of Health on Asset Holdings

This table presents the coefficients on three health status dummies in the household fixed effects specification reported in Table 7 column 5.

Bad Health = 1 if household reports having 'poor' health in period t, 0 otherwise; *Expected Bad Health* = 1 if household answers 'definitely true' to question "Do you expect your health to get worse?" in period t, 0 otherwise; and *Long-term Health Condition* = 1 if household reports having a long-term health condition, impairment or disability that has lasted or is likely to last for 6 months or more in period t, 0 otherwise:

$$Assetholdings_{it} = \beta_0 + \beta_1 badhealth_{it} + \beta_2 expectedbadhealth_{it} + \beta_3 longtermhealthcondition_{it} + \beta_4 age_{it} + \beta_5 X_{it} + \alpha_i + \varepsilon_{it}$$

Asset Type	Mean	With Household Fixed Effects		
		Bad Health	Expected Bad Health	Long-Term Health Condtion
% with positive asset holdings				
Liquid/Time Assets	0.9808	0.0032	-0.0186	0.0001
		(0.0200)	(0.0123)	(0.0081)
Superannation/Equity	0.4918	0.0474 *	0.0367	-0.0019
		(0.0278)	(0.0255)	(0.0165)
Business/Real Estate	0.0838	0.0147	0.0112	-0.0089
		(0.0193)	(0.0183)	(0.0105)
Principal Residence	0.7590	-0.0043	-0.0150	-0.0246 *
		(0.0218)	(0.0153)	(0.0121)
Vehicle	0.7762	-0.0048	0.0028	0.0067
		(0.0250)	(0.0211)	(0.0112)
Superannation	0.2924	0.0009	0.0230	-0.0197
		(0.0258)	(0.0232)	(0.0137)
Equity	0.3986	0.0542 *	-0.0173	0.0171
		(0.0283)	(0.0250)	(0.0176)
Share of holdings in asset class				
Liquid/Time Assets	0.2014	-0.0007	0.0069	0.0221 **
		(0.0218)	(0.0173)	(0.0104)
Superannation/Equity	0.1535	0.0085	0.0016	0.0078
		(0.0121)	(0.0143)	(0.0082)
Business/Real Estate	0.0289	0.0113	0.0031	0.0021
		(0.0102)	(0.0071)	(0.0048)
Principal Residence	0.5280	0.0035	-0.0122	-0.0266 **
		(0.0207)	(0.0153)	(0.0124)
Vehicle	0.0680	-0.0113	0.0075	-0.0087
		(0.0138)	(0.0100)	(0.0055)
Superannation	0.0738	0.0120	-0.0026	-0.0006
		(0.0093)	(0.0120)	(0.0060)
Equity	0.0797	-0.0035	0.0041	0.0084
		(0.0098)	(0.0104)	(0.0063)

Notes

(1) Our sample includes 1111 households who appear in either waves 2002 and 2006, or in 2006 and 2010.

(2) Standard errors appear in parentheses and statistical significance at the 10%, 5% and 1% level is indicated by one, two, or three asterisks respectively.

FIGURE 1
Estimated Change in Net Non-Residential Wealth According to Age, 2002-06 and 2006-10 periods

Notes: Average denotes the sample average of the wealth change predictions for varying values of age with other covariates set to their sample values. Median denotes prediction for varying values of age with other covariates set to their sample median values (non-couple household, with high school or lower education residing in major city, speaks English at home. with no English language difficulties, of Christian religion, receiving Age Pension, in good actual and expected health with long-term health condition, with safe financial portfolio (at least 50% of assets are liquid) and no bequest or precautionary motives for saving). Bands indicate 95% confidence intervals.

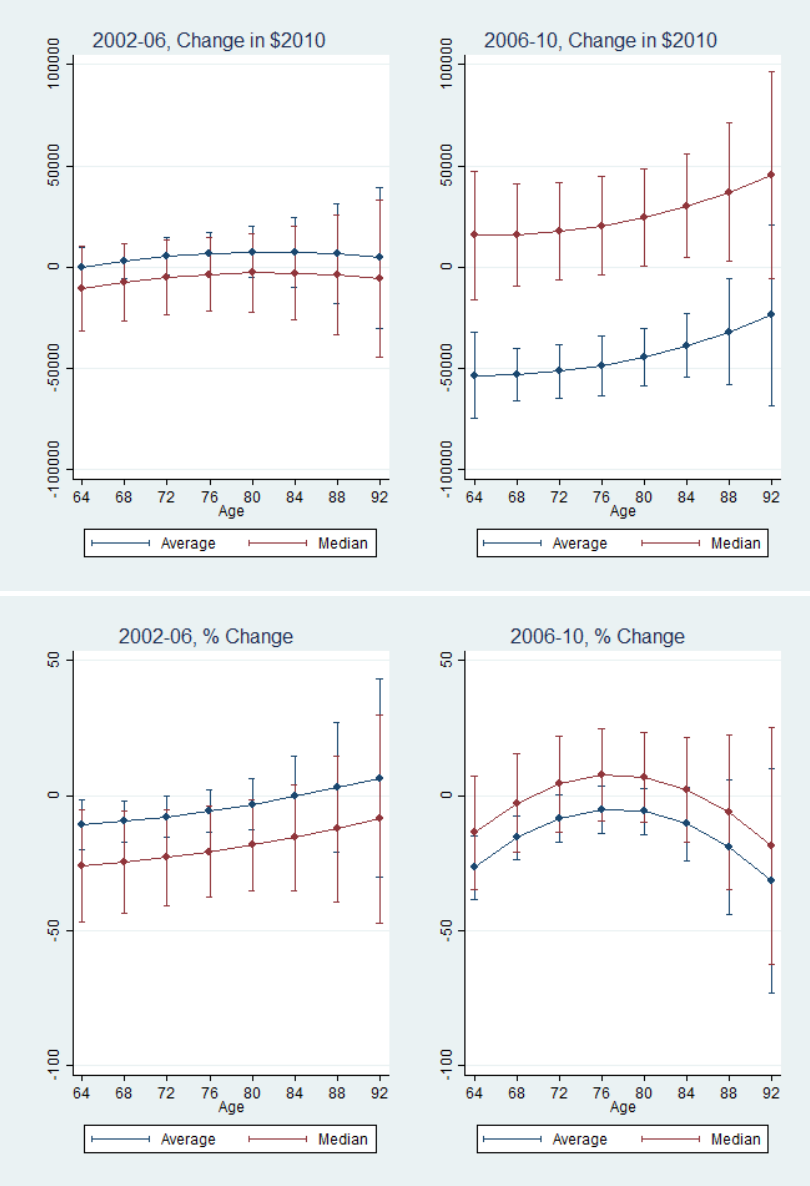
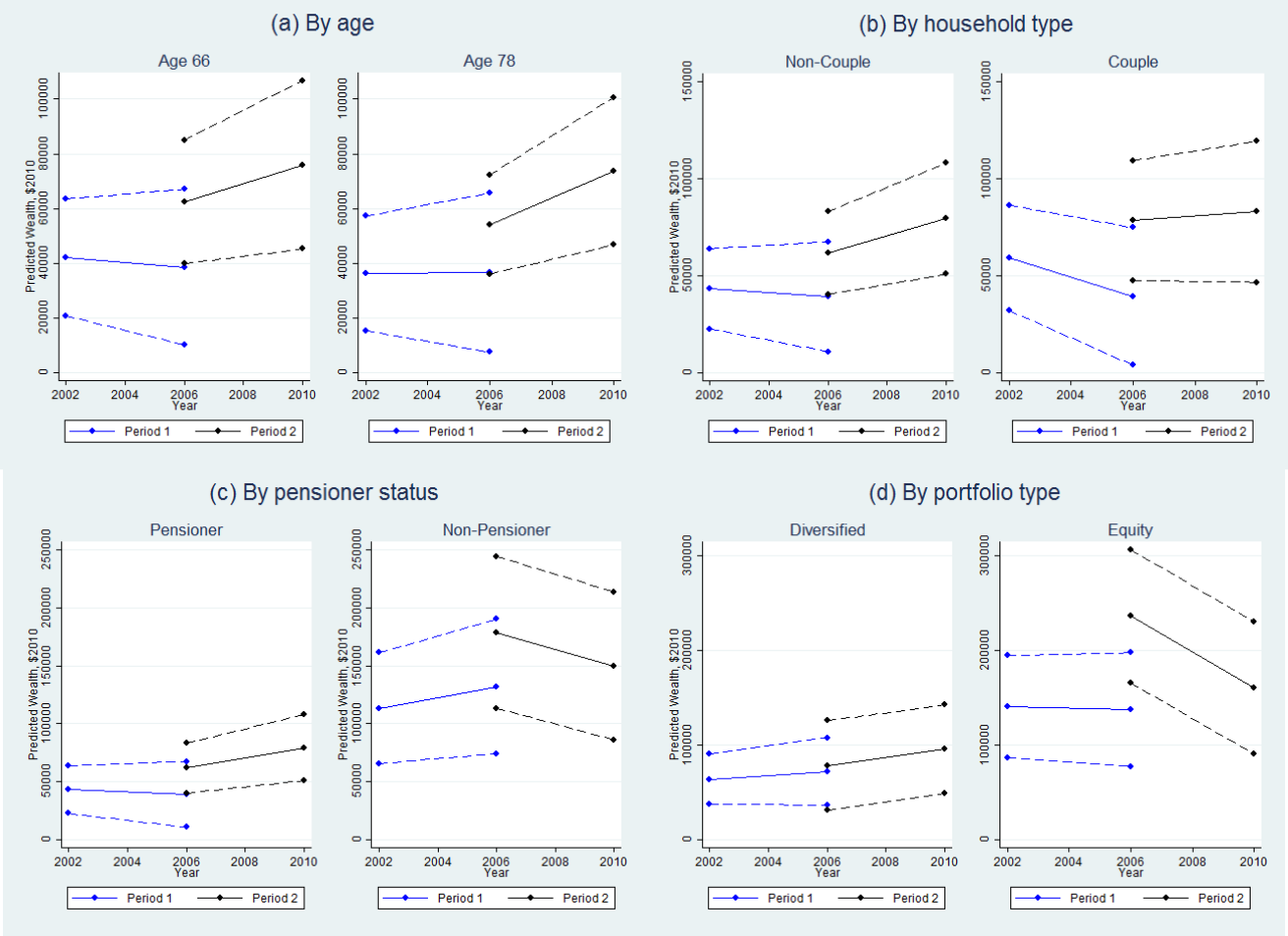


FIGURE 2
Net Non-Residential Wealth Profiles of Median Household by Selected Characteristics, $2010



Notes: The profiles are constructed using estimates in Table 2, columns (1), (2) and (4), (5). Dashed lines indicate 95% confidence intervals. These confidence intervals are constructed using the joint variance covariance matrix of coefficients from equations (1) and (4) computed by the Stata suest command for 2002-06 and 2006-10 wealth data. The profiles correspond to a median household (i.e. 72 years old non-couple household, with high school or lower education residing in major city, speaks English at home, with no English language difficulties, of Christian religion, receiving Age Pension, in good actual and expected health with long-term health condition, with safe financial portfolio (at least 50% of assets are liquid) and no bequest or precautionary motives for saving).

FIGURE 3

Predicted Ownership Rates According to Age

We estimate *asset holding* using coefficient output from the household fixed effects specification in Table 7, and take the median value across the sample for control variables.

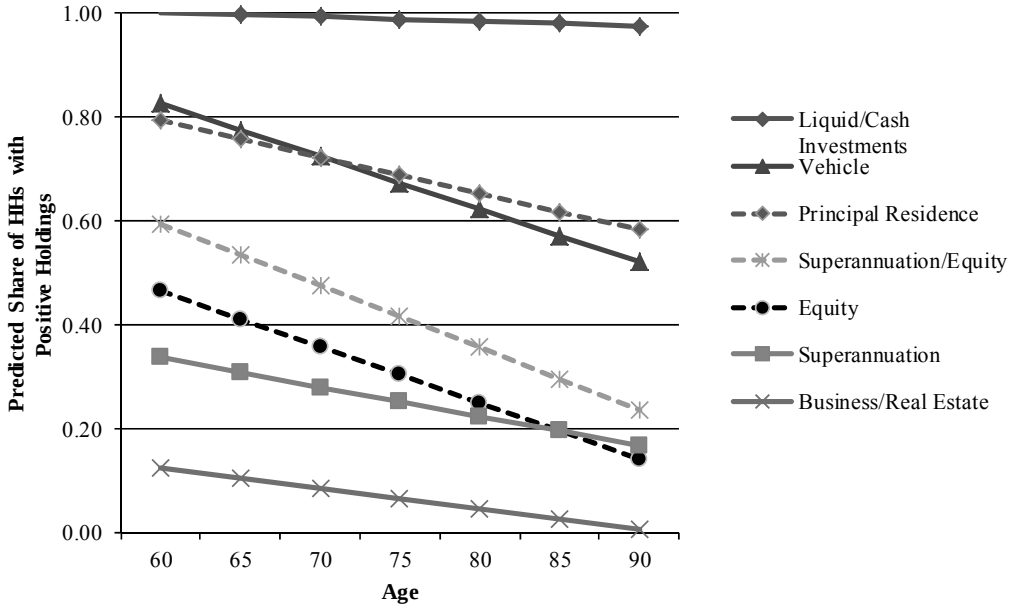


FIGURE 4

Predicted Share of Total Assets According to Age

We estimate *asset holding* using coefficient output from the household fixed effects specification in Table 7, and take the median value across the sample for control variables.