ARC Centre of Excellence in Population Ageing Research

Working Paper 2015/17

Age Pensioner Profiles: A Longitudinal Study of Income, Assets and Decumulation

Shang Wu1, Anthony Asher2, Ramona Meyricke1 and Susan Thorp3

1 CEPAR and School of Risk and Actuarial Studies, University of New South Wales

2 School of Risk and Actuarial Studies, University of New South Wales. Email: a.asher@unsw.edu.au

3 Discipline of Finance, University of Sydney

Age Pensioner Profiles: A Longitudinal Study of Income, Assets and Decumulation

Shang Wu

CEPAR and School of Risk and Actuarial Studies, University of New South Wales

Anthony Asher*

School of Risk and Actuarial Studies, University of New South Wales

Ramona Meyricke

CEPAR and School of Risk and Actuarial Studies, University of New South Wales

Susan Thorp

Discipline of Finance, University of Sydney

December 2014

Abstract

Using eight years of data drawn from the records of Australia's Centrelink agency, we describe the income, asset and decumulation patterns of over 10,000 age pensioners. Analysis of this longitudinal data set shows that age pensioners, on average, preserve both financial and residential wealth, consuming conservatively and, ultimately, passing on substantial bequests. While younger households do run down financial wealth early in retirement, older households generally maintain their assessable asset balances, and some even manage to save. The largest falls in assets are linked to changes in household structure due to death or the breakdown of a relationship. So, as in many other developed countries, age pensioners in Australia appear to 'under-consume', holding on to assets, and even building a buffer, well into their later years.

JEL Classifications: D91, E21, G11

Keywords: Retirement wealth; Life-cycle saving; Public pension; Portfolio choice

* Correspondence: Anthony Asher, School of Risk and Actuarial Studies, University of New South Wales 2052. Email: a.asher@unsw.edu.au

I. Introduction

Retired Australians can draw income from the publicly funded Age Pension, from mandatory and voluntary superannuation balances and from private savings. Even though superannuation savings enjoy generous tax concessions, the superannuation system offers retirees considerable freedom of choice once they reach the decumulation phase. Tax and social security regulations provide some inducements to invest in retirement income products, but there are no restrictions on drawing out lump sums (APRA, 2013) and consuming them quickly. In addition, the Age Pension means-testing tapers in effect tax wealthier pensioners at higher rates, making spending and risky investment more appealing (Hulley et al. 2013). The use of annuitisation is low in Australia, leaving retirees exposed to inflation and longevity risk and potentially increasing the demands on public safety nets (Agnew, 2013). At the same time, means testing and aged-care funding requirements encourage households to concentrate wealth in assets that are treated favourably, such as the family home (Chomik and Piggott, 2012).

As the Superannuation Guarantee matures and Australians live longer, the fiscal burden of tax concessions, health spending and social security payments continues to increase, raising concerns about the efficiency of current policy settings and about the suitability of the products and advice offered by the superannuation industry. However, before any revision of policy or restructuring of products and advice can be considered, a more detailed examination of decumulation under current settings is necessary. The contribution of our study is a description and analysis of the income and asset dynamics of a large, representative sample of Australian Age Pension households over an eight-year period.

Wealth drawdown patterns are best understood by observing the same set of households over time, so we use a longitudinal data set (LDS) compiled by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA). The LDS is a 1% sample of all Centrelink

benefit recipients over the period 1999 to 2007.[1] Compared to other sources, such as the Household Income and Labour Dynamics Australia (HILDA) survey, the LDS offers a larger sample and provides more information on the asset holdings of age pensioners at a higher frequency. It is likely to be more reliable because it is subject to external audit and penalties apply for non-disclosure. The LDS excludes people who are not eligible for the Age Pension due to means testing, which limits the scope of the sample but allows us to focus on the group of people whose drawdown patterns will affect the sustainability of the Age Pension.[2]

Rather than showing signs of profligacy and short-sightedness, we find the typical pattern of decumulation among age pensioners to be cautious. While, on average, younger and wealthier households decumulate financial assets, most households grow financial balances at later ages. Housing assets are usually preserved until very old ages unless a partner dies or is institutionalised. Moreover, consumption is low when compared with the ASFA Retirement Standard measures (2014) for "modest" and "comfortable" incomes, even for the wealthier households in our sample. This cautious pensioner spending, combined with public medical insurance, means Age Pension households leave as bequests a high proportion of their initial savings, in addition to the family home in most cases. While there is considerable heterogeneity in drawdown patterns – with over 10% of single-person households in the study exhausting 90% of their initial assets over the sample period, for example – the median pensioner passing away during our study left residual assessable wealth (mainly financial) equal to 90% of the assets recorded at first observation. We conclude that many households preserve a large proportion of assessable assets as a buffer or bequest.

---

[1] FaHCSIA has been renamed the Department of Human Services. Centrelink is the section of the Department responsible for the delivery of Federal Government social payments.

[2] We conduct a more extensive analysis than Lim-Applegate et al. (2006), who also used the LDS data set to show that new part-rate pensioners drew down their wealth slowly. We do not limit our analysis to a single cohort but look at all the available data by making appropriate allowances for left and right truncation. This enables us to identify more cohort effects on wealth decumulation. We also access eight, rather than four and a half years, of data.

Our findings contribute to a growing body of international evidence of slow decumulation in retirement. On the face of it, these findings are at odds with conventional life-cycle theory, which predicts that individuals will draw down their wealth, smoothing the marginal utility of consumption, over the life cycle, while purchasing longevity insurance and preserving savings to buffer unexpected shocks or for intentional bequests (e.g. French et al., 2006, Ameriks et al., 2011). However, empirical studies show low rates of voluntary annuitisation, along with an under-consumption puzzle, especially in the early retirement period. For example, using data from the Health and Retirement Study (HRS) and the Survey of Income and Program Participation in the USA (1997-2010), Poterba et al. (2011b) find a modest rate of withdrawal on personal retirement accounts before the minimum drawdown rule applies. Even with the minimum drawdown requirement, the average personal retirement account balance continued to rise until age 85. Outside North America, Börsch-Supan (2003) finds little evidence that older German households spend down their non-pension wealth in retirement, and Ooijen et al. (2014) confirm that the same holds for the Netherlands. Other international studies find similar results (see, among others, Guiso et al., 2002; Milligan, 2005; Bershadker and Smith, 2006; Love and Smith, 2007; Bryant et al., 2011).[3]

Results from other Australian research have suggested that more detailed study is needed. Using four-yearly wealth data from HILDA, Spicer et al. (2013) find the average wealth of all (not just age pensioner) retired households grew in the period from 2002 to 2006 then declined over the next four years. Hulley et al. (2013), using wealth levels inferred from the Age Pension payments reported annually in HILDA, find that wealthier Age Pension households accumulated, while poorer households decumulated slowly. Using the even more frequent LDS data, but again studying only age pensioners, Lim-Applegate et al. (2006) find that most younger households decumulated.

In the next section we describe the LDS data we use in this study and then in Section III the demographic characteristics of the sample. Section IV describes the sources of income received by

[3] Australia differs from many other countries by not forcing retirees to annuitise their mandatory retirement savings balances (Superannuation Guarantee balances).

the sample and Section V outlines household asset portfolios. We go on to study decumulation graphically and via econometric modelling in section VI, and section VII concludes.

II. Data

Our analysis of retired households is based on a sample of people receiving a full or part Age Pension from a longitudinal data set (LDS) compiled by the Department of Families, Housing, Community Services and Indigenous Affairs (FaHCSIA). The LDS is a random sample of 1% of all Centrelink benefit recipient fortnightly records, over the period 1999 to 2007. Age pensioners in the sample are identified by their benefit type. The number of age pensioners in the LDS rises from 15,938 in July 1999, when asset balance records start, to 19,016 in June 2007, an increase of 19% in the total number of pensioners. Over the period, the eligibility age for women increased from 61 to 63 years but this did not fully offset the effects of growth in the population eligible for the Age Pension and higher rates of survival at older ages. (We discuss the demographic characteristics of age pensioners in the next section.)

The LDS records contain fortnightly administrative data on individual pensioners, including information about assessed income and assets used for means testing and setting benefit payments. We study the period for which asset balances are recorded, from July 1999 to June 2007. The LDS does not have individual breakdowns of asset balances for each member of a couple because means testing applies to the household, so if a two-person (one-person) household dissolves (integrates with another) during the study period, the asset balances reflect the change in household structure, showing asset balances for the new single (couple) households.

If pensioners die or no longer qualify for a pension they are removed from the sample and are replaced by otherwise randomly selected entrants who are newly eligible for the Age Pension. Out of 26,488 individuals who appear in the initial sample, 6,942 – or just over a quarter – drop out before 8th June 2007, our last data point. Of the people who drop out, 75% are recorded as having died, while 11% have other reasons supplied but are most likely to have passed away. A further 11% were

removed by the means tests or began to qualify for a veteran's pension. The remaining 3% drop out of the sample for unexplained reasons.

Since we are interested in the decumulation patterns of surviving households, we mainly work with a balanced panel in the analysis below. This lets us minimise selection effects related to households whose assets are near the means test thresholds, who might be dropped or added to the sample as their asset holdings vary. We also exclude households whose asset balances are missing at some point in the sample period.[4] By this reasoning, and using households with complete records for the first payment date in July each year through to June 2007, we construct a balanced sample of 10,350 individuals: 3,683 males and 6,667 females. Of these, 6,316 are part of a couple at the start of the sample. Fortnightly records run from 16th July 1999 to 8th June 2007.

III. Demographics

In this section, we describe the wealth, household structure and institutionalisation of the longitudinal data set (LDS) sample. The median pensioner from the LDS balanced panel is a married, 74-year-old female homeowner who holds about $54,000[5] of assets outside the family home and receives around $13,900 per annum in Age Pension payments (Table 1). Despite the fact that means testing moderates right-skewness in the age pensioner wealth distribution, the average pensioner still has higher assessed assets than the median pensioner, at around $84,000, while average pension payments are higher than the median, at around $15,700 p.a.

Changes in household structure and shocks to health and/or the ability to live independently potentially have large effects on wealth (Coile and Milligan 2009; Poterba et al., 2011a).[6] The LDS

[4] About 4% of the individual in the total sample do not report asset balances. They are mainly single non-homeowners. On average, they are about two years older than the sample and the Age Pension benefit for this group is about $15 higher than for the sample. It is likely that no asset data was recorded because the amounts were trivial and, if so, they are irrelevant to our study.

[5] Amounts unless otherwise stated have been re-expressed in 2007 dollars by adjusting by changes in the consumer price index (CPI).

[6] While not easily seen over the eight years of our sample, Australians' remaining lifetimes at age 65 have risen by almost one third over just the past three decades, with the highest rates of improvement in survival among

sample records when and why couples switch to single status and we summarise these for the balanced panel in Table 2. About two thirds were widowed, around one fifth moved to nursing homes/aged-care facilities, while divorce or separation accounted for most of the remainder.

Pensioners in institutional care account for 3.6% of the membership of the balanced panel, or 3,343 individuals, as shown in Table 1. They are 10 years older, on average, than the average panel member and more likely to be female (77% compared with 64%) and widowed (62% compared with 28%). As we will discuss in more detail below, large reductions in asset holdings are linked to institutionalisation. Assessable assets for institutionalised people are about 20% lower, and 31% are homeowners as compared with 75% in the total panel. We evaluate below the changes in asset balances following changes in household structure and institutionalisation.

IV. Sources of income

Pensioner households can receive income from many sources other than public transfer payments, including labour income, income from superannuation and private savings, and bequests and gifts. While some pensioners would have superannuation from other sources, most people in the LDS sample would not have worked very long under the Superannuation Guarantee, which began in 1993. The LDS shows that Age Pension payments dominate incomes but that income from other savings contributes around one fifth of reported income each year to households of all wealth levels. Labour income goes to few households and is very small. A very small proportion of pensioner households are likely to receive bequests.

Table 3 sets out sources of income by assessable asset quintile over the last year in the sample period (2006-07). For all groups except singles in the highest asset quintile, the majority of income comes from Age Pension payments. Income from sources outside the pension, such as occupational

---

the oldest old (CEPAR 2013). Mortality improvements are disproportionately enjoyed by the wealthy. (See Poterba, (2014) for the USA, and Turrell and Mathers (2001) for Australia.)

pensions, retirement income streams and financial asset returns, is a significant component of income at all wealth levels, including for a majority of households in the lowest wealth quintile. Income from these sources contributes about one fifth of income for the median household. However, only 5.5% of couple households receive labour income (very few single households do) and the contribution to total income is very small. This suggests that improving labour force participation rates among the retired would increase diversification of income sources.

Not only is the Age Pension the main source of income for most households in the LDS, around two thirds receive the maximum pension payment. Table 4 reports means and standard deviations of the Age Pension benefit as a percentage of the maximum payment, and the proportion of households receiving a full pension by cohort and asset quintile in June 2007. On average, age pensioners are receiving 93% of the full pension amount. Just under two thirds (62%) of the payment observations are at the full pension. Under means testing, the pension payment goes down as assessable assets increase. However, even in the wealthiest quintile one fifth of pensioners receive the maximum payment. The average percentage payment declines slightly by age and assessable wealth cohort until the wealthiest asset quintile, at which point households surviving to ages over 80 are receiving only 75% of the maximum payment on average. This decline in average pension payments at older ages could be due to increased assessable asset balances once pensioners sell the family home.

Bequests are not reported as income in the LDS and the best we can do is estimate their contribution using other data. Kelly and Harding (2006), using HILDA data in 2002 and 2003, report that 1.7% of those aged in their 60s and 1.1% of those 70 and over received inheritances each year, which would yield an average of 1.3% for our sample.[7] Kelly and Harding put the average value for these bequests at around $60,000. Given that the LDS is representative of the lower 60% of wealth distribution, a better estimate of bequest size is the $40,000 average that Kelly and Harding report

[7] They report that only a very small proportion of these are inherited from spouses – presumably because they are not reported as such in the survey. As we are considering household wealth, such bequests are also not relevant for our purposes.

for the lower three quintiles of the wealth distribution. This suggests income from bequests of only $500 p.a. on average, or 0.7% of assets, although weighted towards the younger cohorts.

V. Asset allocation

Having shown that income from savings and superannuation is important to age pensioners' budgets, we now turn to stocks of assets. Allocation to assets such as real estate, shares, managed investments and bank deposits is likely to be another important influence on the decumulation behaviour of households.

(i) Home ownership

Around three quarters of age pensioners own their own homes, a proportion that does not vary much as they age. Looking at the different age brackets, home ownership rates rose over the study period for couples aged 80 or older, were stable for all households aged between 70 and 80, but declined for all other groups (see Panel A of Table 5). For all age groups, at all points in the study period, the home ownership rate of singles is at least 20 percentage points lower than for couples. This generation of pensioners may represent a high- water mark for home ownership even though it remained constant at 73% over the period.

(ii) Financial asset balances

Once we take out the value of the family home, age pensioners in the LDS had low asset balances. Table 5 (Panel B) reports aggregate data on asset holdings for three different age brackets. For all single households, the mean assessable asset balance was about $49,800 in 1999 and $57,300 in 2007.[8] Mean assessable asset balances for couple households were about twice those for singles, as would be expected. Average assessable asset balances decline by 7% in total (less than 1% p.a.)

[8] For comparison, single-person households with asset balances below (nominal amounts of) $127,750 in July 1999 and $166,750 in July 2007 would qualify for the full Age Pension.

for households observed over the full eight years, but we note that households could be moderating a decline in balances by adding to assets when they receive a bequest or sell their home.

(iii) Financial asset allocation

We categorise the financial assets of the LDS into six broad groups including "other" assets[9]. Table 6 summarises the percentage of households with holdings in each category in 2003[10], and averages, over the year's observations, the assessable asset balances.

Younger cohorts are generally wealthier, which is largely explained by higher superannuation balances than for older cohorts. That said, superannuation balances are small, on average, across the board – in most cases much less than shares and managed investments held outside superannuation. However this is changing as the Superannuation Guarantee system matures. ASFA (2014) reports that by 2012 the average cash and share holdings of employees nearing retirement age were about one quarter of superannuation balances – a much lower proportion of assets outside superannuation than in 2003.

Deposits with financial institutions are not reported separately in the LDS but we infer a value for deposits using the data for "deemed" assets. Under means testing, the income tests apply assumed or "deemed" rates of returns to certain classes of financial assets, rather than relying on the reporting of earned income and capital gains or losses. These deemed assets include all deposits with financial institutions as well as shares and managed funds. By assuming that financial assets other than deposits, shares and managed investments are negligible, we can infer a value for

[9] There are eight broad groups in the LDS, including a class of "other" assets. We group foreign assets and trust and company assets into the "other" category because the average ownership and balances are minor.

[10] We study the asset allocation in 2003, the mid of the sampling period, rather than 2007. For our balanced sample, if we study the asset allocation in 2007 the age group 60-69 would not be representative (there will be no males) due to the eligibility age requirement of the Age Pension.

deposits, and these values are reported for each cohort in the lower panel of Table 6. This data shows deposits become a more important element in asset allocation as pensioners age.

This is consistent with a pattern of portfolio allocation where exposure to risk is reduced as people age. Means testing ensures that the Age Pension is a hedge against wealth shocks, and theoretical models predict that optimal exposures to risk will be higher early in retirement for wealthier, means-tested households (Hulley et al. 2013). Consistent with this theoretical prediction, and with increased risk aversion and shorter life expectancy, Table 6 shows that older cohorts have a smaller proportion of risky assets on their balance sheets. This pattern of portfolio allocations in the LDS matches the HILDA panel (Spicer et al., 2013) and the US Health and Retirement Survey (Coile and Milligan 2009). Rates of return on financial assets were positive over most years in the study, apart from the early 2000s, but share market fluctuations appear to have a minimal impact on assessed asset value, possibly because changes in market values are not always reported immediately. Australian retirees do, however, maintain a substantial exposure to investment risk that is likely to increase as retirement savings become increasingly concentrated in superannuation accounts. Spicer et al. (2013) document the vulnerability to financial market shocks of some retired households, as became obvious during the Global Financial Crisis.

The means-tested Age Pension is intended to provide for the needs of the poorest of retirees and so might be expected to serve as a redistributive vehicle. In Appendix A we report tests of wealth inequality over time using the Gini index, looking at the changes in the index over the sample period. We also use the whole distribution of assets and test year-against-year Lorenz dominance using the method in Barrett et al. (2014). Results indicate that financial wealth inequality did not decrease over the period 1999-2007. Overall, average asset holdings – both home ownership and financial assets – are remarkably stable, apart from the decline in risky financial asset holdings as households age and the noticeably higher superannuation balances of younger households.

VI. DECUMULATION

Having described the stocks of assets in the LDS sample, we now turn to changes in assets, or decumulation. A key prediction of life-cycle theory is that households accumulate during working life with the intention of funding consumption in retirement, but many studies of retirement wealth conclude that evidence of decumulation of non-pension assets is at best weak, and at worst, non-existent. Pensions from defined benefit plans and some income stream products ensure regular and automatic distributions, but retirees might also hold on to wealth for bequests and as a precaution against uninsurable shocks.

Very few Australians use their savings and superannuation to purchase life annuities.[11] If pensioners are choosing to bear investment and longevity risks themselves, life-cycle theory still predicts decumulation but at rates related to increasing mortality at older ages. Life expectancy for retirees in the LDS sample falls by about 30% to 40%[12] over the eight years we study, based on the 2005-2007 Australian Life Tables, or around 5% p.a., consistent with slow drawdown. If retirees decide to self-insure, they are likely to leave significant bequests if they die early, or possibly face privation at very old ages if they live long. Risk-averse, self-insuring retirees could be expected to prepare for longer lives by decumulating very slowly.

In this section, we analyse the asset drawdown of age pensioners graphically to get a picture of decumulation. We begin with home ownership and then study financial asset decumulation for the balanced cohort. We also present estimates of consumption levels and residual wealth at the end of life, completing the analysis with panel estimates of decumulation.

(i) Home ownership

[11] The failure to annuitise can be partly explained by the poor returns offered by annuities, especially when compared to relatively high yielding Australian equities. The already high dividend yield on Australian equities, which stands at 4.5% at time of writing, is enhanced by the return of company tax in the form of imputation credits. The longevity insurance provided by the Age Pension crowds out private sources for many retirees (Iskhakov et al. 2015).

[12] E.g. (e.g. a male 80 year old at the end of the study would have a life expectancy of 8.4 against 12.6 at the age of 73 - eight years earlier.

Housing assets are the largest component of wealth for most Australian households, and rates of home ownership are high and persistent among age pensioners in this sample. (The ABS (2007) puts the average house value at around $300,000 in 2006.) When pensioners sell their homes the proceeds are assessed under the means test and raise asset balances, but we do not have data on the value of owner-occupied housing for our sample. For this reason, we can only report the year-to-year change in home ownership.

Figure 1 plots year-to-year changes in home ownership over the period 1999-2007 by household structure.[13] The lines between two connected points measure the difference in home ownership of individuals observed in two consecutive years, for each type of household. The gaps between two disconnected points arise from composition effects caused by changes in household structure.

Younger households are more likely to own their homes, but ownership declines among single households over time. This is clearly seen for singles over 80, where home ownership drops by around 3% from year to year, amounting to a 20% decline over the eight years. There is little change in home ownership rates among continuing couples. Apart from the drop-off in home ownership at older ages, the dissolution of households is the other cause of home sales, which is consistent with patterns in the USA (Poterba et al. 2011a). Individuals in a two-person household could lose home ownership via divorce, while those becoming widowed and/or institutionalised might sell houses to cover expenses or downsize to reduce the maintenance burden. The persistence in home ownership rates, when considered along with the evidence that few retired households use financial products such as reverse mortgages to consume their housing wealth, suggest Australian retirees hold on to houses for precautionary reasons or as bequests.

(ii) Assessable assets

[13] The method of our year-to-year change graphical analysis is that used by Poterba et al. (2011a).

The evolution of assessable asset balances provides the most relevant measure of decumulation of life-cycle savings in our sample. Most assessable assets are more liquid than housing assets, and so more easily used for consumption. Figure 2 plots year-to-year changes in the mean asset balances for continuing couples and singles, and for those that transition to single status, sorted into three age groups. Composition biases are captured by the gaps between line segments and the year-to-year changes show the effects of time. For continuing couple households under 80, and especially for the young, the graphs show a decline in asset values in each of the first four years.[14]

Dissolved two-person households report large falls in assets. The average decline in assets for dissolving households is 32% for those under age 70 and 20% for those between 70 and 80, but only 7% for those over 80. Possible explanations for falls in assets on dissolution of a couple are divorce (including legal and other costs), bequests to charities and other family members, and end-of- life costs. The division of assets on divorce accounts for some 5% of these decreases: divorce usually entails a 50% split of assets but only 10% of dissolutions are due to divorce. Bequests might make up another 5%: Baker and Gilding (2011) analyse probate distributions in Victoria and show that around 90% of a person's assets go to surviving spouses, leaving the residual for other beneficiaries. Some of the remaining declines could be explained by costs associated with divorce, but are more likely to be health and aged-care expenses.[15]

To get a fuller understanding of the pattern of drawdown we need to follow the same households over time. Figure 3 plots average asset balances at each age and family structure for selected cohorts (labelled by the cohort age in 1999). Each segment shows the same cohort of

[14] We had expected that the effect of changes in share prices might be visible in these graphs. However, as the Australian share market increased in all but 2002 and 2003, it seems that the changes in asset values arise mainly from other factors.

[15] People in ill health who die at at younger ages may incur higher costs than the very old – possibly because there are more years of life at risk. Kardamanidis et al. (2007) found that in New South Wales in 2002 and 2003, "Hospital costs fell with age, with people aged 95 years or over incurring less than half the average costs per person of those who died aged 65–74 years ($7,028 versus $17,927)".

pensioners over these years, for those aged 61, 66, 71, 76 and 81 in 1999, respectively. Couples are shown as transitioning to single if the transition occurs at any time during the period.

The assets of younger cohorts reduced in the first four years of the observation period, with the reduction being steepest for those losing partners. Older households mostly accumulated assets as they aged. The similarity in calendar year patterns among the different cohorts at younger ages suggests that time effects are important. (See Ooijen et al. (2014) for similar patterns among Dutch households associated with trends in returns on financial assets.)

Households that change from couple to single – the dashed lines – show a steep decline in assets. The fact that these households start at a significantly lower level of assets than couples that survive may arise from their socio-economic circumstances, or they may have already suffered from health-related costs in periods before the death of a spouse or being institutionalised (Colie and Milligan, 2009). We further study the dynamic effect of health shocks later in this paper.

This cohort analysis shows that pensioner households, especially singles, appear to be buffer stock savers, holding onto their relatively small pots of retirement savings and mainly consuming the current income generated by the Age Pension and investments. The asset balances shown here could supplement retirement consumption, but, after the first few years of retirement, households appear to be holding on to them, probably to cover the risk of long life, health and long-term care costs, other unforeseen expenses and bequests. It is possible that pensioners would be less cautious if they could access insurance against aged care, or if they could at least estimate future medical care costs accurately.

So far we have grouped households by age, but people with different levels of wealth may have different spending behaviours, as observed in other countries (e.g., Hurd, 1990; Börsch-Supan, 1992; Alessie et al., 1999) and in Australia (e.g., Hulley et al., 2013). Figure 4 plots the year-to-year changes in assessable asset balances by asset quintile of individuals aggregating over ages. Individuals are grouped by asset values in July 1999, and fixed thereafter, but classification by family structure depends on the year. We only look at the balanced panel so as to remove survivor bias.

The top two quintiles of all household types reduced their assets, on average, in the first four years, while the lowest two quintiles of couples and singles increased theirs over the whole period. Results for lowest quintile households transitioning to single are mixed: households with assets over $50,000 per person are prepared to spend the excess, while those with less than $50,000 tend to accumulate assets – presumably for precautionary purposes. If this precautionary saving is for medical and other costs associated with dying, $50,000 looks to be too much. The middle panel of Figure 4 shows that for households where one partner dies assets sometimes actually increase.

In Figure 5 we show the ratio of assets over time against assets in July 1999. For illustrative purposes, we have randomly selected 100 continuing couples and show the bottom, middle and highest quintiles of initial wealth. (The other household types are similar so we don't show them separately.) The heterogeneity is remarkable, particularly at the lowest quintile, where the initial wealth could be very small. There does however seem to be a bifurcation, with one group 10 to 100 times better off, and another group clustered around zero (meaning no change in their assets over the period). The same bifurcation is not visible in the middle and highest quintiles, where the ratios are more clustered. This suggests that most changes to assets are not related to investment returns, which would be proportionate to the asset values. While increases in assets could be due to receiving bequests or proceeds from the sale of the home, our earlier calculations suggest these would only apply to about 10% of the sample, so most of the increases will be related to other causes. Of most relevance to those interested in the financial security of retirees is the number of couples whose assets decline precipitously: over 10% of the sample experienced a decline in asset values of more than 50% over the period for reasons that cannot be identified.

(iii) Consumption

Using data from the balanced panel we can estimate annual household consumption by age and asset quintile in 1999 (Table 7). We calculate household consumption as income (including Age Pension payment, labour income and income from financial assets) less saving (where saving is the

change in the value of assessable assets). This measure excludes the consumption value of housing services for homeowners, as well as bequests and the proceeds of home sales.[16] We compare consumption in the sample to the ASFA Retirement Standard measures (ASFA, 2014) of spending for a "modest" or "comfortable" lifestyle, where households are assumed to own their homes and enjoy good health.

Average expenditure for the lower two quintiles of single homeowner households is slightly less than the full pension payment and increases to more than double that at higher wealth levels, although declining at older ages. The current ASFA estimate of the budget required for a modest lifestyle for a single, home-owning retiree in 2014 is around $23,500 p.a., or around $18,000 p.a. when deflated back to 2007 levels using a 3.75% p.a. (Average Weekly Earnings-based) deflator. The majority of single pensioners spent at a slower rate than this benchmark, with the average in the lower quintiles being less than $13,000 p.a. The related figure for a "comfortable" lifestyle, according to ASFA, is $33,000 (in $2007), close to the annual spending of only the wealthiest and youngest singles.

The ASFA "modest" standard for couples at 2007 rates would be around $26,000 p.a., higher than the spending of all but the top two couple quintiles in Table 7. Further, none of the couple averages approach the "comfortable" ASFA budget of around $45,000 p.a. We do not infer from this that the ASFA budgets are overstated, rather that even wealthier pensioner households are restrained in their current consumption spending and continue to preserve savings.

(iv) Residual wealth at death

[16] Our measure may understate the spending by bequest income (estimated at 0.6% p.a. above) and by the proceeds of home sales. About 5% of the sample sell their houses over the eight-year period, and the value of the home is reported as being two to three times the value of financial assets for those in the age and wealth groups (ABS, 2007). This suggests that home sales would have added about 1.6% p.a. to financial assets over the period. This brings the total drawdown to an average of perhaps 3% p.a. As we saw, however, a large proportion of this occurs in the transition from couple to single status.

Residual wealth at death of pensioners in the LDS confirms that low or slow decumulation is typical of many households. Table 8 shows the last observation on assessable asset balance of the 5,365 individuals who died over the sample period (and thus are from the unbalanced panel). The lower panel compares this amount with the real ($2007) wealth of the same individual in 1999. Residual wealth ratios are almost uniform across ages and wealth levels, at around 90% of assets recorded at the beginning of the sample. Apart from the wealthiest quintiles, individuals who pass away at younger ages leave a slightly higher percentage of their initial wealth, but the differences are very small by age at death.

In the LDS, intended and unintended bequests are observationally equivalent so we cannot infer the motivation for this conservative behaviour. If we assume that deaths are evenly spread through the sample so that the average time spent alive is four years, the implied decumulation rate for the average individual in Table 8 is about 2.5% p.a. from 1999 until death. Some of this decumulation could have been caused by medical and care costs associated with final illness and for which precautionary savings would be required. In the next subsection, we report estimates from a panel model of decumulation to get a clearer idea of the conditional effects of household characteristics on retirement wealth management.

(v) Panel estimation of decumulation

By estimating a panel model of decumulation, we can measure the marginal impact of the factors in the graphical analysis. While observations are available fortnightly, there is very little change over such short periods so we take observations at the first payment date of the Age Pension benefits in July (June for 2007), October, January and April over the sample period. We drop households that do not appear in every quarter of the sample to avoid selection effects, which gives 326,048 observations (for 10,189 individuals) to use in estimation. Wealth, income, portfolio structure and the implicit tax rates of the means test tapers are jointly (endogenously) determined, so we regress quarterly changes in financial wealth on lagged (predetermined) values of income,

portfolio allocation and taper status, and on current values of available demographics, which we treat as exogenous.

Using the sample of quarterly balanced panel data, we estimate two models to explore decumulation behaviour. First, we estimate a pooled OLS model:

$$\boldsymbol{log\left(Asset_{i,t}/Asset_{i,t-1}\right) \times 100 = \beta_0 + \beta_{age} Age_{i,t} + \beta_{inc} Income\ Variables_{i,t-1} + \beta_{hst} Household\ status_{i,t-1} + \beta_{ti} Taper\ Indicators_{i,t-1} + \beta_{hsh} Household\ shocks_{i,t} + \beta_{ao} Asset\ class\ ownership_{i,t-1} + \beta_s State_{i,t-1} + \beta_{demo} Demographics_i + e_{i,t}} \quad (1)$$

where $Asset_{i,t}$ is the household assessable assets for individual i at the end of quarter t (i.e., at time t), measured in 2007 dollars.[17] $Age_{i,t}$ is the age of individual i at the end of quarter t (i.e., at time t).[18] $Income\ Variables_{i,t-1}$ include labour income, non-labour income and the Age Pension benefits for the household of individual i in quarter $t-1$ (i.e., from time $t-2$ to $t-1$). $Household\ status_{i,t-1}$ includes binary variables for household structure (single, divorced/separated, widowed – and couple as the omitted base case), whether the individual is institutionalised and a non-homeowner for individual i at the end of quarter $t-1$, and the interactions of the non-homeowner indicator with household structure and institutionalisation indicators. $Taper\ Indicators_{i,t-1}$ are two binary variables that are equal to 1 if the individual i fails to receive the full Age Pension due to one of the assets or income tests in quarter $t-1$. $Household\ shocks_{i,t}$ include binary variables signalling whether shocks to household structure (becoming divorced/separated, widowed or forming a couple), home ownership (sale and/or purchase of a home) and institutionalisation happened to individual i in quarter t. Thus the binary variables are equal to 1 if the changes happened in quarter t and 0 for all other quarters. Also included in $Household\ shocks_{i,t}$ are one-quarter/two-quarter lead (and lag) terms for the widowhood shock that are equal to 1 if quarter t is one-quarter/two-quarters before (after)

[17] We also estimate the model with $Assets_{i,t} - Assets_{i,t-1}$ as the dependent variable. The results are similar.

[18] We also test the specification with Age^2. The sign and significance of the coefficients are materially the same and the estimates are very similar.

individual i becoming widowed, and one-quarter lag term for home sale. The lead and lag terms for widowhood control for changes to assets associated with the death of a partner, such as end-of-life health costs and bequests other than to the spouse.[19] The one-quarter lag term for home sale controls for delays in the receipt of the proceeds of a sale. $Asset\ class\ ownership_{i,t-1}$ includes five binary variables indicating ownership of five asset classes: shares and managed investment, implied deposits, superannuation, real property, and other assets.[20] The variables are equal to one if the household of individual i holds the asset class at the start of quarter t (i.e., at time $t-1$). $State_{i,t-1}$ is a set of binary variables indicating the state where individual i lived at the start of quarter t. $Demographics_i$ include time-invariant binary variables for gender, year of birth, country of birth, aboriginal, and asset quintile in 1999 for individual i.

To account for time-invariant unobserved heterogeneity, we also estimate an individual fixed effects model:

$$\boldsymbol{log\left(Asset_{i,t}/Asset_{i,t-1}\right)\times 100 = \beta_0 + \beta_{age}Age_{i,t} + \beta_{inc}Income\ Variables_{i,t-1} + \beta_{hst}Household\ status_{i,t-1} + \beta_{ti}Taper\ Indicators_{i,t-1} + \beta_{hsh}Household\ shocks_{i,t} + \beta_{ao}Asset\ class\ ownership_{i,t-1} + \beta_s State_{i,t-1} + \alpha_i + e_{i,t}} \quad (2)$$

where α_i is the individual fixed effect. However, we estimate this model for each gender to explore the different drawdown behaviour between males and females. Including individual fixed effects implies that the effects of ageing are estimated within each individual over time. (The Hausman test rejected a random effects specification.) As usual, we cannot separately estimate age, cohort and time effects, so following Colie and Milligan (2009), and given our short sample of quarterly observations, we assume that time effects are small relative to age and cohort effects.

[19] Bequests to the spouse would remain as household assets and hence will not result in changes in the assets assessed by asset tests.

[20] We also test the specification with proportion of assets allocated in each asset class instead of asset holding indicators. The results are very similar.

Single non-homeowners accumulate financial resources at slower rates than partnered homeowners, whose couple status offers household economies and insurance against housing shocks (Table 9, OLS).[21] Confirming the graphical analysis presented above, estimation results show younger and wealthier individuals on the asset taper decumulate, but this changes at older ages, where slow rates of accumulation are estimated. Labour income also significantly adds to assessable assets, whereas increases in Age Pension payments pre-empt declining assessable assets. The unexpected sign-on increases in Age Pension income could be due to slow adjustments as payments and assessable asset balances are harmonised.

Household structure and its interaction with home ownership has large and significant effects on decumulation. Long-term singles decumulate much faster than couples, and not owning a home adds to the rate. The decline in wealth associated with singleness also outweighs the increases in financial assets reported by divorced or widowed women. The positive impact of institutionalisation on financial assets for homeowners is almost exactly offset by the negative coefficient on the interaction term between institutionalisation and non-homeownership, suggesting that institutionalisation is related to further accumulation for those able to enter care without selling the family home, but has little net effect on those who don't own homes to begin with or who sell up to help fund care. The asset and income taper indicators have the expected negative signs and are statistically and economically significant.

While Islam et al (2013) report that immigrants are likely to save more than natives, we do not find this to be true for all foreign countries of birth. The coefficients for two of the countries well represented among those over 65 in the 2006 census (Italy 4% and Greece 2%) were statistically significant, but that for Italy was negative and that for Greece positive. The coefficient for those of aboriginal origin was marginally negative.[22]

[21] The single Age Pension was increased by 10% relative to couples in the 2009 federal budget. Commonwealth Budget Paper No 2. http://www.budget.gov.au/2009-10/content/bp2/download/bp2_Consolidated.pdf

[22] We do not report the estimates, but they are available on request

The model explains a relatively small proportion of the heterogeneity in experience. One important reason is that not all assets were assessable over the period and changes in holdings of non-assessable assets are probably not well estimated by the models. In particular, increases in assessable assets in later years could be related to seepage of house sale proceeds into reported asset balances.[23]

VII. Discussion and conclusions

Superannuation balances in Australia are preserved to a set age (55 to 60 years) but can be withdrawn as a lump sum without penalty and, while around half of balances are transferred to phased withdrawal accounts at retirement, very few Australians voluntarily annuitise to protect themselves against outliving their wealth. Interest in retirement income policy has intensified as the baby boomers have reached retirement at the same time that the Superannuation Guarantee has created sizable defined contribution account accumulations. But before any policy changes are proposed or enacted, the behaviour of current retirees needs to be carefully reviewed. Here we examine the income and assessable asset records of a 1% sample of age pensioners using a longitudinal dataset (LDS) supplied by Centrelink from 1999 to 2007. Since around 70% of Australians over the eligible age receive at least a part pension payment, the study of age pensioners covers a comprehensive range of household structures and wealth categories. The LDS records fortnightly pension payments and income from most sources, as well as a range of financial and other assets, but does not record the value of the family home or the receipt of bequests.

Despite the implicit income insurance available through the public Age Pension, our study of decumulation shows that age pensioners are cautious rather than spendthrift in managing their retirement wealth. At older ages in particular, pensioners preserve a buffer of financial savings in addition to the family home of around $50,000 per person. Wealthier Australian age pensioners, on average, spend down their financial assets early in retirement, but tend to accumulate at later ages

[23] The value of homes is on average two to three times higher than financial assets – based on the relevant wealth quintiles reported in Table 6 of ABS (2007).

as health and energy reduces. Lower wealth quintile pensioners accumulate from early on. A sum of $50,000 per person represents four to five years of consumption for the income quintiles to which it applies, which appears to be unnecessarily high. It is possible that products providing longevity, health and aged-care insurance could help to increase the welfare of retirees by reducing the need for precautionary saving. We find that as a consequence of holding buffers, pensioners on average pass away with almost as much wealth as they had at the beginning of the sample period. We also find considerable heterogeneity among households' decumulation experiences, with a significant minority of retirees spending (or losing) a big part of their assets, and others gaining significantly.

Continuing couple households maintain ownership of the family home, but selling the home is more common when couple households dissolve due to death or separation. Single households over the age of 80 show marked declines in home ownership, probably related to the demands of funding aged care. In general, dissolution of partnerships is associated with large changes in both financial and housing wealth.

The average rate of pension payment in the LDS sample was over 70%, and while the payment declined as wealth increased, 20% of households in the highest wealth quintile received the full Age Pension. Most households drew about one fifth of their income from financial savings in addition to pension payments, and much more so at the highest wealth quintile. Results from other studies indicate that younger pensioners are also more likely to be receiving bequests to add to their financial asset balances. Very few Age Pension households earn labour income and greater participation in the labour market would help diversify income among the retired.

On average, consumption stays at modest levels, even among wealthier pension households, and poorer pension households appear to consume even less than the full pension payment. Consumption appears to decline with age, not increasing much at advanced ages as would be consistent with increased health and care costs. Wealthier couple households spend slowly when compared with the ASFA "comfortable" budget standard. Overall, the data suggest that age

pensioners live well within their means. If we set aside precautionary and bequest motives, they would be able, on average, to spend more in retirement and still not exhaust their assets.

REFERENCES

Agnew, J. (2013), 'Australia's Retirement System: Strengths, Weaknesses and Reforms', Research Brief Number 13-5, Center for Retirement Research (CRR), Boston College.

Alessie, R., Lusardi, A. and Kapteyn, A. (1999), 'Saving After Retirement: Evidence from Three Different Surveys', *Labour Economics*, **6**(2), 277-310.

Ameriks, J., Caplin, A., Laufer, S. and Van Nieuwerburgh, S. (2011), 'The Joy of Giving or Assisted Living? Using Strategic Surveys to Separate Bequest and Precautionary Motives', *Journal of Finance*, **66**(2), 519-561.

ARC Centre of Excellence in Population Ageing Research (CEPAR) (2013), Population Ageing Fact Sheet. Available at: http://www.cepar.edu.au/fact-sheets.aspx

Association of Superannuation Funds of Australia (ASFA) (2014), ASFA Retirement Standard. Available at: http://www.superannuation.asn.au/resources/retirement-standard

Australian Bureau of Statistics (ABS) (2007), 6554.0 Household Wealth and Wealth Distribution. Australia, 2005-06.

Australian Government Actuary, 2009, *Australian Life Tables 2005-07*, Canberra.

Australian Prudential Regulation Authority (APRA) (2013), Statistics: Annual Superannuation Bulletin June 2013. Available at: http://www.apra.gov.au/super/publications/pages/annual-superannuation-publication.aspx

Barrett, G.F., Donald, S.G. and Bhattacharya, D. (2014), 'Consistent Nonparametric Tests for Lorenz Dominance', *Journal of Business & Economic Statistics,* **32***(*1), 1-13.

Baker, C. and Gilding, M. (2011), 'Inheritance in Australia: family and charitable distributions from personal estates.' *The Australian Journal of Social Issues*, **46**(3), 273-289.

Bershadker, A. and Smith, P.A. (2006), 'Cracking Open the Nest Egg: IRA Withdrawals and Retirement Finance', in *Proceedings of the 98th Annual Conference on Taxation.* Washington: National Tax Association.

Börsch-Supan, A. (1992), 'Saving and Consumption Patterns of the Elderly', *Journal of Population Economics*, **5**(4), 289-303.

Börsch-Supan, A. (2003), *Saving: A Cross-National Perspective*. Academic Press, San Diego.

Bryant, V.L., Holden, S. and Sabelhaus, J. (2011), 'Qualified Retirement Plans: Analysis of Distribution and Rollover Activity', Working Paper 2011-01, Pension Research Council, The Wharton School, University of Pennsylvania.

Chomik, R. and Piggott, J. (2012), 'Long-term Fiscal Projections and the Australian Retirement Income System', Working Paper Series 2012/15, ARC Centre of Excellence in Population Ageing Research (CEPAR).

Coile, C. and Milligan, K. (2009), 'How Household Portfolios Evolve After Retirement: The Effect of Aging and Health Shocks', *Review of Income and Wealth*, **55**(2), 226-248.

Davidson, R. (2009), 'Reliable Inference for the Gini Index', *Journal of Econometrics*, **150**(1), 30-40.

De Maio, F.G. (2007), 'Income Inequality Measures', *Journal of Epidemiology and Community Health*, **61**(10), 849-852.

French, E., De Nardi, M., Bailey, J., Baker, O. and Doctor, P. (2006), 'Right Before the End: Asset Decumulation at the End of Life', *Economic Perspectives – Federal Reserve Bank of Chicago,* **30**(3), 1-30.

Guiso, L., Haliassos, M. and Jappelli, T. (2002), *Household Portfolio*s. MIT Press, Cambridge, MA.

Hulley, H., McKibbin, R., Pedersen, A. and Thorp, S. (2013), 'Means-Tested Public Pensions, Portfolio Choice and Decumulation in Retirement', *Economic Record*, **89**(284), 31-51.

Hurd, M.D. (1990), 'Research on the Elderly: Economic Status, Retirement, and Consumption and Saving', *Journal of Economic Literature*, **28**, 565-637.

Ishkahov, F., Thorp, S. and Bateman, H., (2015) 'Optimal annuity purchases for Australian retirees', *Economic Record*, in press, accepted February 2015.

Islam, A., Parasnis, J. and Fausten, D. (2013), 'Do Immigrants Save Less than Natives? Immigrant and Native Saving Behaviour in Australia', *Economic Record*, **89**(284), 52-71.

Kardamanidis, K., Lim, K., Da Cunha, C., Taylor, L.K. and Jorm, L.R. (2007), 'Hospital Costs of Older People in New South Wales in the Last Year of Life', *Medical Journal of Australia*, **187**(7), 383.

Kelly, S. and Harding, A. (2006), 'Don't Rely on the Old Folks' Money: Inheritance Patterns in Australia'. *Elder Law Review*, **4**, Article 5

Lim-Applegate, H., McLean, P., Lindenmayer, P. and Wallace, B. (2006), 'New Age Pensioners – Trends in wealth', *Australian Social Policy*, **2006**, 1–26.

Love, D and Smith, P. (2007), 'Measuring Dissaving Out of Retirement Wealth', in *Proceedings of the 100th Annual Conference on Taxation,* National Tax Association: Washington, D.C., 102-113.

Milligan, K. (2005), 'Lifecycle Asset Accumulation and Allocation in Canada', *Canadian Journal of Economics* **38**(3), 1057-1106.

Ooijen, R., Alessie, R. and Kalwij, A. (2014), 'Saving Behavior and Portfolio Choice After Retirement', Panel Paper 42, Network for Studies on Pensions, Aging and Retirement (Netspar).

Poterba, J. (2014), 'Retirement Security in an Aging Population', *American Economic Review*, **104**(5), 1-30.

Poterba, J., Venti, S., and Wise, D. (2011a), 'The Composition and Drawdown of Wealth in Retirement', *Journal of Economic Perspectives*, *25*(4), 95-117.

Poterba, J., Venti, S., and Wise, D. (2011b), 'The Drawdown of Personal Retirement Assets', NBER Working Paper 16675, National Bureau of Economic Research.

Spicer, A., Stavrunova, O., and Thorp, S. (2013), 'How Portfolios Evolve After Retirement: Evidence from Australia', Working Paper 40/2013, Centre for Applied Macroeconomic Analysis, Australian National University.

Turrell, G., and Mathers, C. (2001), 'Socioeconomic Inequalities in All-cause and Specific-cause Mortality in Australia: 1985–1987 and 1995–1997', *International Journal of Epidemiology*, **30**(2), 231-239.

Appendix A: Assessable asset inequality

Panel A of Table A1 presents the estimates of the Gini index ($\hat{G}$) and its standard error ($\widehat{se}(\hat{G})$) for each year of our sample period, using the method in Davidson (2009). Results show that the estimated Gini index decreased from 0.5363 in 1999, reaching a low of 0.5146 in 2003, and then increased to 0.5337 in 2007. We test the year-to-year equality of the Gini index using bootstrapped standard errors (Davidson 2009) that account for dependence within individuals from year to year. The *p-values* for the test of the null hypothesis of equal Gini indexes for all pairs of years are reported in the first (shaded) row for each year i of Panel B of Table 8. The results show that despite a reduction in inequality between 1999 and 2003, there is no significant difference between the Gini coefficients of 1999 and 2007.

Two populations with the same Gini index can have very different shapes of income/wealth distribution, representing different kinds of inequality (De Maio, 2007). Lorenz dominance provides inequality-based ranking of distributions by performing a position test on Lorenz curves for these distributions, with the consideration given to the whole distribution. Specifically, if the Lorenz curve for distribution A lies nowhere below that for distribution B, the Lorenz curve for A is said to weakly dominate the Lorenz curve for B. Strong Lorenz dominance occurs further if the Lorenz curve for A lies at some point above that for B. Barrett et al. (2014) provides a consistent nonparametric test for Lorenz dominance. Using this method, we perform tests for Lorenz dominance for each year-against-year pair of our sample.

Table 8 reports the bootstrapped p-values of strong and weak Lorenz dominance for each year-against-year pair. The hypothesis that the Lorenz curves are equal is rejected in all but three cases. The Lorenz curve for year 2003 appears to strongly dominate the curve for year 1999, confirming that wealth was more equally distributed in 2003 than 1999. This reduction in inequality is possibly related to low or negative equity returns in 2002-03, lowering wealth in the upper quartiles of the distribution. However, further analysis shows that in 2007 both the bottom 50% and the top 5% of age pensioners own a greater share of total assets compared with 1999, but the rest of the upper quartile own a smaller share.

Table A1 Gini index and tests of Lorenz dominance

Year i	Year j									Null
	1999	2000	2001	2002	2003	2004	2005	2006	2007	Hypothesis
Panel A Gini index										
$\hat{G}$	0.5363	0.5289	0.5203	0.5167	0.5146	0.5169	0.5211	0.5277	0.5337	
$\widehat{se}(\hat{G})$	0.0027	0.0027	0.0027	0.0028	0.0028	0.0028	0.0028	0.0028	0.0027	
Panel B P-values										
1999		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.193	$H_0^{(G)}$
		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.082	$H_0^{(i)}$
		0.705	0.618	0.601	0.385	0.405	0.389	0.110	0.022	$H_0^{(j)}$
		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.037	$H_0^{(e)}$
2000			0.000	0.000	0.000	0.000	0.000	0.482	0.029	$H_0^{(G)}$
			0.000	0.000	0.000	0.000	0.000	0.100	0.344	$H_0^{(i)}$
			0.649	0.575	0.342	0.324	0.260	0.015	0.000	$H_0^{(j)}$
			0.000	0.000	0.000	0.000	0.000	0.032	0.000	$H_0^{(e)}$
2001				0.001	0.001	0.033	0.754	0.011	0.000	$H_0^{(G)}$
				0.000	0.000	0.016	0.738	0.836	0.890	$H_0^{(i)}$
				0.712	0.442	0.398	0.172	0.000	0.000	$H_0^{(j)}$
				0.000	0.000	0.041	0.308	0.000	0.000	$H_0^{(e)}$
2002					0.065	0.881	0.060	0.001	0.000	$H_0^{(G)}$
					0.067	0.573	0.737	0.828	0.887	$H_0^{(i)}$
					0.460	0.107	0.000	0.000	0.000	$H_0^{(j)}$
					0.151	0.208	0.000	0.000	0.000	$H_0^{(e)}$
2003						0.099	0.011	0.001	0.000	$H_0^{(G)}$
						0.799	0.751	0.924	0.959	$H_0^{(i)}$
						0.002	0.000	0.000	0.000	$H_0^{(j)}$
						0.005	0.000	0.000	0.000	$H_0^{(e)}$
2004							0.015	0.000	0.000	$H_0^{(G)}$
							0.808	0.935	0.980	$H_0^{(i)}$
							0.001	0.000	0.000	$H_0^{(j)}$
							0.001	0.000	0.000	$H_0^{(e)}$
2005								0.001	0.000	$H_0^{(G)}$
								0.906	0.986	$H_0^{(i)}$
								0.000	0.000	$H_0^{(j)}$
								0.000	0.000	$H_0^{(e)}$
2006									0.000	$H_0^{(G)}$
									0.908	$H_0^{(i)}$
									0.000	$H_0^{(j)}$
									0.000	$H_0^{(e)}$

$H_0^{(G)}$: $G_i = G_j$ tests equality of the Gini index against a two-sided alternative; $H_0^{(i)}$: $L_i(p) \geq L_j(p)$ for all $p \in [0,1]$, or L_i weakly Lorenz dominates L_j, $H_1^{(i)}$: $L_i(p) < L_j(p)$ for some $p \in [0,1]$; $H_0^{(j)}$: $L_j(p) \geq L_i(p)$ for all $p \in [0,1]$, or L_j weakly Lorenz dominates L_i, $H_1^{(j)}$: $L_j(p) < L_i(p)$ for some $p \in [0,1]$; $H_0^{(e)}$: $L_i(p) = L_j(p)$ for all $p \in [0,1]$, or L_i and $L_j$are equal, $H_1^{(e)}$: $L_i(p) \neq L_j(p)$ for some $p \in [0,1]$. The combination $\{H_0^{(i)}, H_1^{(j)}, H_1^{(e)}\}$ indicates L_i strongly Lorenz dominates L_j; $\{H_0^{(i)}, H_1^{(j)}, H_0^{(e)}\}$ indicates L_i weakly Lorenz dominates L_j; $\{H_0^{(i)}, H_0^{(j)}, H_0^{(e)}\}$ indicates L_i and L_j are equal; $\{H_1^{(i)}, H_1^{(j)}, H_1^{(e)}\}$ indicates neither of the above relationship is true.

Table 1 Summary statistics: demographics; assets, income and the Age Pension benefits (in '000 of $2007)

	Full sample									Institutionalised								
	Annual Unbalanced			Annual Balanced			Quarterly Balanced			Annual Unbalanced			Annual Balanced			Quarterly Balanced		
Variable	Av	SD	Med	Av	SD	Med	Av	SD	Med	Av	SD	Med	Av	SD	Med	Av	SD	Med
Age	73.51	7.52	72.00	74.49	6.66	74.00	74.49	6.59	74.00	84.39	7.81	85.00	83.98	7.57	85.00	83.91	7.60	84.00
Female	0.60	0.49		0.64	0.48		0.64	0.48		0.75	0.43		0.77	0.42		0.77	0.42	
Non-homeowner	0.27	0.44		0.25	0.44		0.25	0.43		0.66	0.47		0.69	0.46		0.69	0.46	
Divorced/separated	0.11	0.31		0.11	0.31		0.11	0.31		0.10	0.30		0.12	0.32		0.11	0.32	
Single	0.07	0.26		0.05	0.22		0.05	0.22		0.17	0.38		0.11	0.32		0.12	0.32	
Widowed	0.25	0.44		0.28	0.45		0.28	0.45		0.58	0.49		0.62	0.48		0.62	0.49	
Assessed assets	82.86	89.46	50.96	83.73	86.09	54.41	82.93	84.86	54.20	66.30	84.44	29.88	68.76	85.40	31.53	66.69	83.66	30.44
Labour income	0.62	3.49	0.00	0.36	2.57	0.00	0.06	0.51	0.00	0.01	0.24	0.00	0.01	0.11	0.00	0.00	0.08	0.00
Non-labour income	4.66	7.29	1.82	4.94	7.60	2.09	0.92	1.71	0.27	3.97	6.39	1.34	4.21	6.87	1.50	0.85	1.59	0.21
Age Pension benefits	13.37	5.06	12.28	15.73	4.76	13.89	3.02	1.91	3.07	10.33	2.65	10.71	11.94	2.28	12.28	2.41	1.23	2.97
Asian	0.05			0.04			0.04			0.02			0.02			0.02		
Australia	0.62			0.62			0.62			0.72			0.71			0.72		
East Europe	0.02			0.02			0.02			0.03			0.03			0.03		
New Zealand	0.01			0.01			0.01			0.01			0.01			0.01		
North West Europe	0.05			0.05			0.05			0.04			0.04			0.04		
Other	0.15			0.15			0.15			0.14			0.14			0.14		
South Europe	0.10			0.11			0.11			0.05			0.04			0.04		
Number of observations	158587			93150			336237			8673			3343			11658		

Table 2: Couple-to-single transitions, balanced panel

Reasons for changing from couple benefit to single benefit	Count	Per cent
Death of spouse	847	57
Divorced or separated	115	8
Moving to Aged care or Nursing homes	232	16
Missing	282	19
Total	1476	100

Table 3: Income sources, 2006-07

		Asset quintile in June 2007					
Income type	Household type	1	2	3	4	5	All
Panel A: Percentage of People Receiving Income Type							
Labour income	Single	1.6	2.4	1.0	1.5	1.2	1.6
	Couple	4.7	7.3	6.7	4.6	4.8	5.5
Non-labour income	Single	66.1	94.5	98.6	99.2	99.3	88.1
	Couple	61.0	88.2	97.3	99.8	99.4	93.5
Age Pension benefits	Single	100.0	100.0	100.0	100.0	100.0	100.0
	Couple	100.0	100.0	100.0	100.0	100.0	100.0
Panel B: Percentage of total income and mean total income value							
Labour income	Single	0.3	0.7	0.2	0.7	0.2	0.4
	Couple	1.4	1.7	2.1	1.0	1.2	1.4
Non-labour income	Single	11.8	14.4	20.2	30.0	50.3	22.5
	Couple	14.5	16.8	20.4	22.1	36.3	24.8
Age Pension benefits	Single	87.9	84.9	79.7	69.3	49.5	77.0
	Couple	84.1	81.5	77.5	76.9	62.5	73.8
		'000 of $2007					
Mean total income	Single	13.7	14.1	15.1	16.6	18.8	15.1
	Couple	23.4	24.0	25.1	25.4	27.7	25.6

Table 4: Age Pension benefit by age cohort and assessable asset quintile

Age in June 2007		Asset quintile in June 2007					
		1	2	3	4	5	All
	Panel A: Age Pension benefit as proportion of full payment						
60-69	Mean	0.99	0.97	0.95	0.95	0.84	0.93
	SD	*0.06*	*0.10*	*0.18*	*0.12*	*0.21*	*0.16*
70-79	Mean	0.97	0.96	0.96	0.95	0.81	0.93
	SD	*0.12*	*0.12*	*0.13*	*0.13*	*0.22*	*0.16*
80+	Mean	0.97	0.96	0.96	0.92	0.75	0.92
	SD	*0.12*	*0.12*	*0.12*	*0.16*	*0.23*	*0.17*
All	Mean	0.97	0.96	0.96	0.94	0.80	0.93
	SD	*0.12*	*0.12*	*0.13*	*0.14*	*0.22*	*0.16*
	Panel B: Percentage receiving full payment						
60-69		90	74	75	56	18	60
70-79		85	80	75	61	20	62
80+		86	80	76	41	8	62
All		85	80	75	54	16	62

Table 5: Home ownership rate and mean assessable asset balances and by age

Year	Age interval											
	60-69			70-79			80+			All age		
	Single	Couple	All	Single	Couple	All	Single	Couple	All	Single	Couple	All
	Panel A: Percentage of homeowners											
1999	63	87	80	63	85	76	64	76	67	63	86	77
2000	63	87	79	64	86	77	62	75	66	63	86	77
2001	63	86	79	64	86	77	60	77	66	63	86	76
2002	64	86	78	63	86	77	59	79	65	62	85	75
2003	62	86	77	63	86	77	58	80	65	62	85	75
2004	62	87	77	63	85	76	57	80	64	61	85	74
2005	61	87	77	63	85	76	57	82	65	61	85	73
2006	60	86	76	64	85	76	56	81	64	60	84	72
2007	58	81	72	63	85	76	56	83	65	60	85	72
	Panel B: Mean assessable asset balance											
1999	55.0	125.0	103.9	48.0	104.2	80.2	42.6	81.5	54.2	49.8	115.1	89.7
2000	53.5	121.0	100.1	49.4	104.9	81.9	43.6	83.3	55.7	49.6	111.6	86.7
2001	52.2	114.6	94.3	50.3	105.3	83.3	43.5	81.2	54.9	49.2	107.4	83.3
2002	50.9	116.8	94.4	52.1	105.9	84.4	45.1	83.7	57.0	50.0	107.6	82.8
2003	51.0	113.5	91.5	51.9	104.9	83.9	48.5	88.1	60.8	50.7	105.3	81.0
2004	50.0	115.1	90.8	54.3	107.0	86.1	50.3	92.7	63.7	52.4	106.5	81.6
2005	51.0	117.1	91.7	56.6	110.0	88.3	52.6	97.2	66.6	54.6	108.8	82.9
2006	50.3	113.1	88.9	57.6	111.1	88.8	54.3	100.2	69.2	55.8	109.0	82.7
2007	49.9	111.7	88.3	58.0	112.7	89.6	57.0	102.1	71.8	57.3	110.1	83.0
8-year change	-9%	-11%	-15%	21%	8%	12%	34%	25%	32%	15%	-4%	-7%

Mean asset balances are calculated at the first benefit payment dates in July from 1999 to 2006 and in June in 2007, in thousands of 2007 Australian dollars. 99.5% of the observations have a positive asset balance.

Note that the this table reflects the asset of the balanced panel, who remain in the sample over the eight years, and so the composition of each age bracket changes over the years as people age and potentially move into a higher age bracket.

Table 6: Asset Allocation, July 2003

Ages	60-69			70-79			80+			All Ages		
	Single	Couple		Single	Couple		Single	Couple		Single	Couple	
		Resp.	Spouse		Resp.	Spouse		Resp.	Spouse		Resp.	Spouse
	Percentage of pensioners with positive asset holdings by category											
Shares and managed investments (1)	22	34	5	22	30	30	14	21	52	19	30	26
Implied deposits(2)	96	92	91	97	94	94	99	97	96	97	94	93
Deemed assets (3)	96	98	98	98	98	98	99	99	99	98	98	98
Superannuation (4)	9	9	17	5	8	6	1	2	2	5	7	8
Real estate (5)	8	12	14	7	11	11	4	8	8	6	11	11
Other assets (6)	83	92	93	75	90	89	50	76	75	69	89	89
	Mean value (in '000 of $2007)											
Share and managed investments (1)	7	8	9	7	9	9	5	7	7	6	8	9
Implied deposits* (2)	22	20	19	28	23	23	32	24	24	28	23	22
Deemed assets** (3)	29	28	28	35	32	32	38	31	31	35	31	31
Superannuation (4)	7	7	15	3	6	4	0	1	1	3	5	6
Real estate (5)	5	6	7	4	5	6	3	4	4	4	5	6
Other assets (6)	11	11	13	10	11	11	7	8	8	9	11	11
Sum of (3) to (6)	51	52	63	53	54	52	49	45	44	51	53	54
Total assets under asset test***	51	114	110	52	105	103	48	88	86	51	105	103
Inconsistency****	-1	-2		-1	-2		-1	0		-1	-2	

* This is calculated by subtracting share and managed investments from deemed assets (3) – (1), assuming asset values of other risky financial assets are negligible.

** Under the deeming rule of the Age Pension, deemed assets include bonds, share investments, managed investments and other financial assets such as bank accounts.

*** This is the total amount of assets recorded in the data set that is assessed by asset test;

**** For singles: Inconsistency= Total assets under asset test – Sum of (3) to (6); For couples: Inconsistency= Total assets under asset test (Respondent)- Sum of (3) to (6) for respondent – Sum of (3) to (6) for spouse.

Table 7 Average household consumption (in '000 of $2007)

	Homeowners				Non-homeowners			
	Age cohort				Age cohort			
Asset quintile in July 1999	60-69	70-79	Over 80	All	60-69	70-79	over 80	All
Panel A: Single households								
1	11.9	13.1	12.7	12.8	12.5	12.0	11.5	11.9
2	13.2	14.1	13.7	13.8	11.4	12.2	10.3	11.4
3	16.5	16.7	15.3	16.2	14.4	13.2	12.0	12.9
4	22.1	19.9	21.0	20.5	20.8	16.8	15.4	16.8
5	32.4	29.1	27.5	29.4	32.9	24.2	22.6	24.1
All	18.6	17.8	15.9	17.3	13.6	13.1	12.2	12.9
Panel B: Couple households								
1	18.9	21.6	23.7	21.5	21.0	21.2	22.8	21.4
2	21.7	22.8	23.3	22.6	20.6	21.4	20.2	21.0
3	23.7	25.3	23.0	24.6	22.1	22.8	22.3	22.6
4	28.6	27.3	25.6	27.5	19.5	20.7	24.1	20.9
5	37.9	32.8	31.0	34.1	34.6	30.9	27.7	30.7
All	29.7	27.7	25.5	27.9	21.8	22.4	22.9	22.3

Table 8: Residual wealth at death

	Single households				Couple households			
	Age at death				Age at death			
Asset quintile in 1999	60-69	70-79	Over 80	All	60-69	70-79	Over 80	All
	Panel A: Mean (in '000 of $2007)							
1	6.3	6.0	11.7	9.3	13.1	12.8	16.0	13.7
2	31.4	28.9	27.4	28.1	30.9	28.2	23.3	27.7
3	69.7	62.2	45.6	51.3	74.7	63.8	38.2	58.7
4	126.3	110.6	80.4	88.3	135.5	119.5	73.1	106.8
5	219.6	196.7	166.3	172.4	245.3	244.1	201.8	228.3
All	47.7	49.5	58.6	55.5	98.0	94.9	84.2	92.3
	Panel B: Median of the ratios of wealth at death to real wealth in 1999							
1	0.92	0.87	0.84	0.87	0.94	0.91	0.91	0.91
2	0.94	0.91	0.91	0.91	0.92	0.91	0.97	0.91
3	0.97	0.89	0.89	0.91	0.95	0.89	0.91	0.91
4	0.92	0.91	0.91	0.91	0.94	0.89	0.89	0.90
5	0.91	0.84	0.90	0.90	0.87	0.87	0.91	0.90
All	0.93	0.89	0.89	0.89	0.93	0.90	0.91	0.91

5365 people died during the sample period. In comparison, the total number of age Pensioners in the unbalanced data set rises from over 15,938 in 1999 to 19,016 in 2007.

Table 9: Pooled OLS and fixed effects regression results

Dependent variable	Model 1: OLS	Model 2: Fixed effects	
Quarterly % change in assessable assets		Male	Female
Constant	4.841	2.755	0.342
	(0.00)	(0.77)	(0.11)
Age_t	-0.001	0.086*	0.139***
	(-0.04)	(1.89)	(3.82)
$Age\ Pension_{(t-1)}$	-0.084***	-0.090	-0.138**
	(-2.63)	(-1.61)	(-2.16)
$Labour\ Income_{(t-1)}$	0.417***	0.490**	0.681***
	(4.16)	(2.16)	(2.87)
$Non\ labour\ Income_{(t-1)}$	0.046*	-0.158	-0.144
	(1.66)	(-1.65)	(-0.70)
$Single_{(t-1)}$	-0.731***	-10.418*	-11.822*
	(-2.89)	(-1.68)	(-1.81)
$Div'd\ or\ Sep'd_{(t-1)}$	-0.508**	-0.600	1.681
	(-2.16)	(-0.29)	(0.73)
$Widowed_{(t-1)}$	-0.664***	0.069	2.244***
	(-4.47)	(0.06)	(3.42)
$Institutionalised_{(t-1)}$	2.282***	8.168***	3.836**
	(2.63)	(3.07)	(2.57)
$Non\text{-}homeowner_{(t-1)}$	-0.958***	1.837	0.253
	(-3.94)	(1.45)	(0.22)
$Single_{(t-1)}$* $Non\text{-}homeowner_{(t-1)}$	-0.257	-1.470	-0.393
	(-0.59)	(-0.34)	(-0.16)
$Div'd\ or\ Sep'd_{(t-1)}$* $Non\text{-}homeowner_{(t-1)}$	-0.370	2.111	-0.511
	(-0.96)	(0.72)	(-0.19)
$Widowed_{(t-1)}$ * $Non\text{-}homeowner_{(t-1)}$	0.012	1.170	-0.554
	(0.04)	(0.39)	(-0.40)
$Institutionalised_{(t-1)}$ * $Non\text{-}homeowner_{(t-1)}$	-3.325***	-8.537**	-4.486**
	(-3.27)	(-2.25)	(-2.28)
$Asset\ Taper_{(t-1)}$	-2.321***	-8.102***	-8.276***
	(-8.90)	(-8.10)	(-10.71)
$Income\ Taper_{(t-1)}$	0.130	-2.150***	-3.548***
	(0.83)	(-3.81)	(-6.47)
Other control variables			
Household structure shock	YES	YES	YES
Home ownership shock	YES	YES	YES
$Asset\ class\ ownership_{(t-1)}$	YES	YES	YES
$State\ of\ residence_{(t-1)}$	YES	YES	YES
Gender, cohort and country of birth	YES	By fixed effects	By fixed effects
Aboriginal	YES	By fixed effects	By fixed effects
Asset quintile in 1999	YES	By fixed effects	By fixed effects
N	326048	116096	209952
R-square	0.051	0.052	0.054

* p<0.10, ** p<0.05, *** p<0.01; t-stats calculated from cluster-robust standard errors in parentheses.

Figure 1: Changes in home ownership by age and household structure

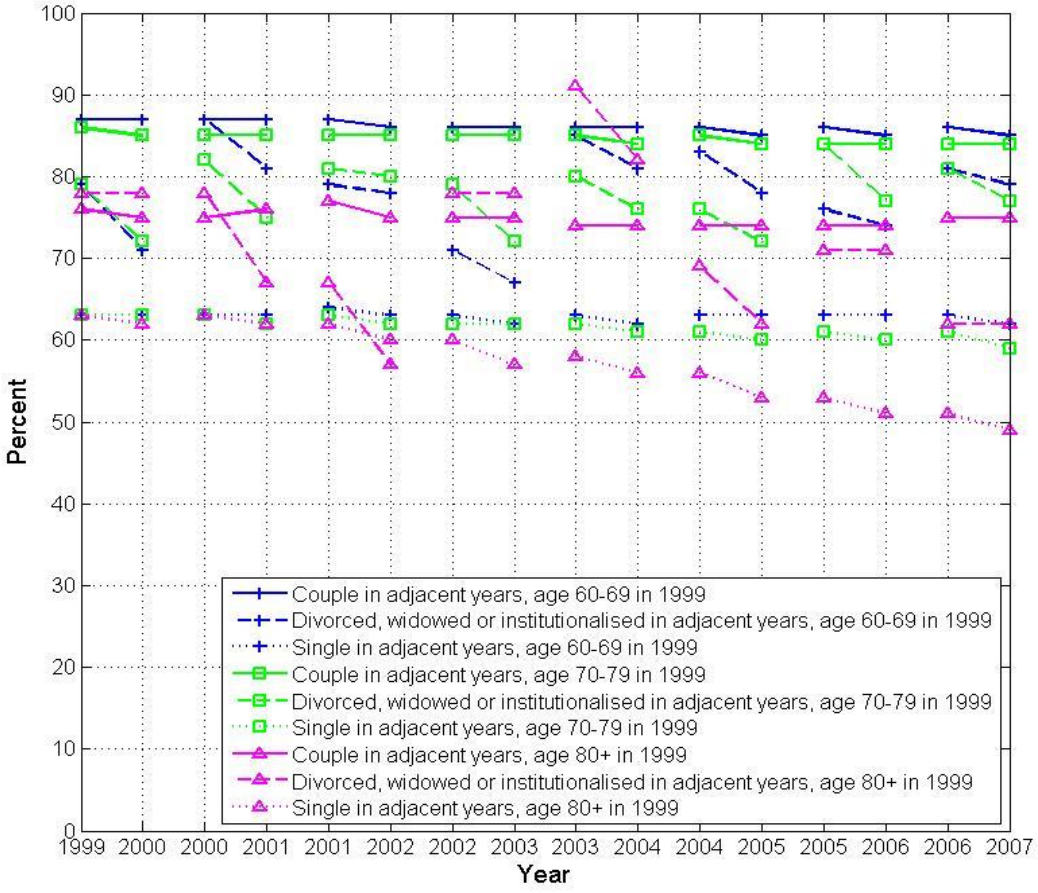


Figure 2: Changes in assessable asset balances by age and household structure

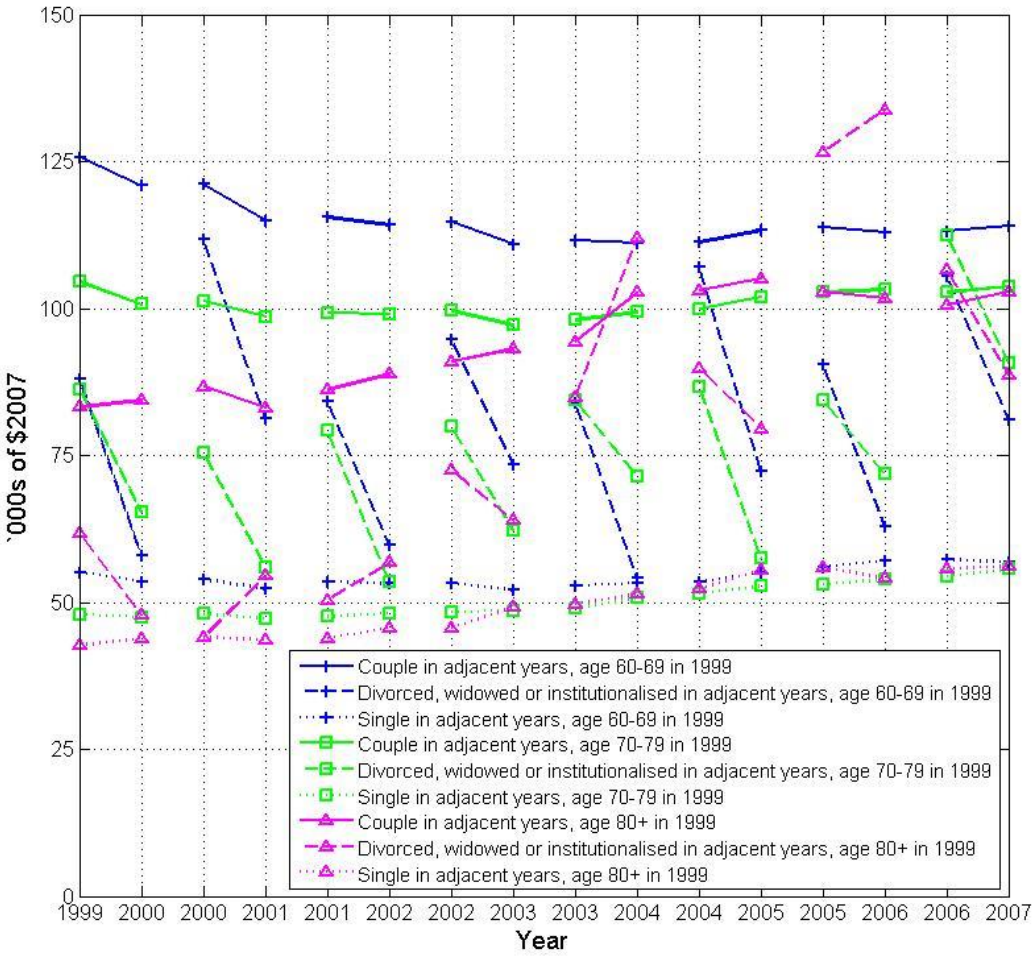


Figure 3. Mean balances of assets for selected cohorts by age and household type

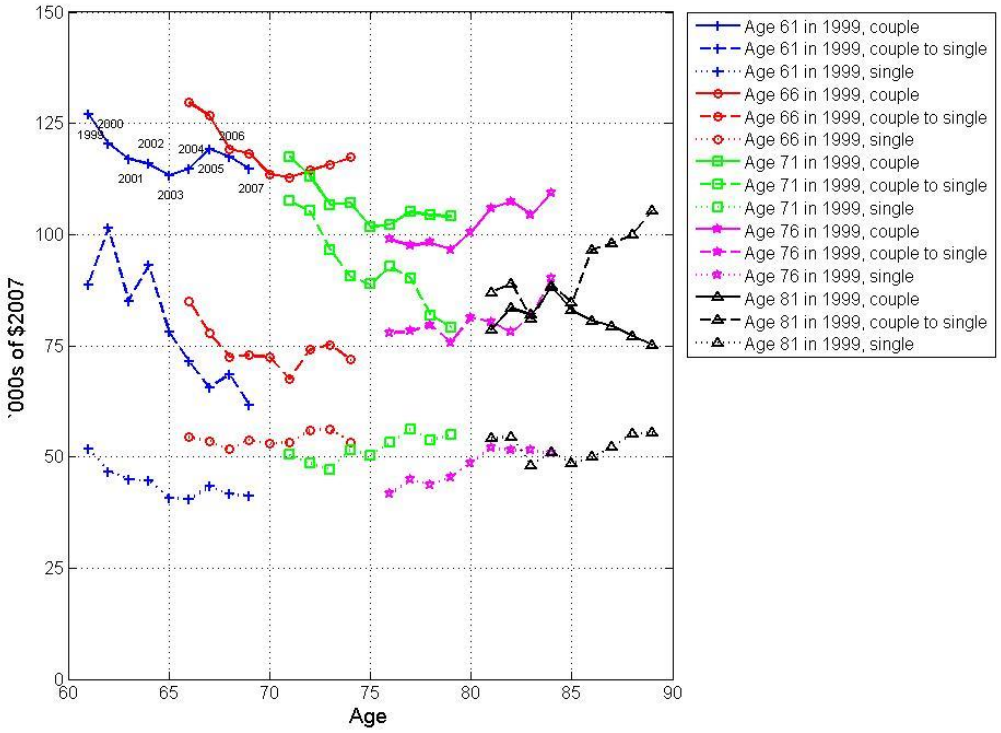


Figure 4: Assessable assets by wealth quintile: balanced panel.

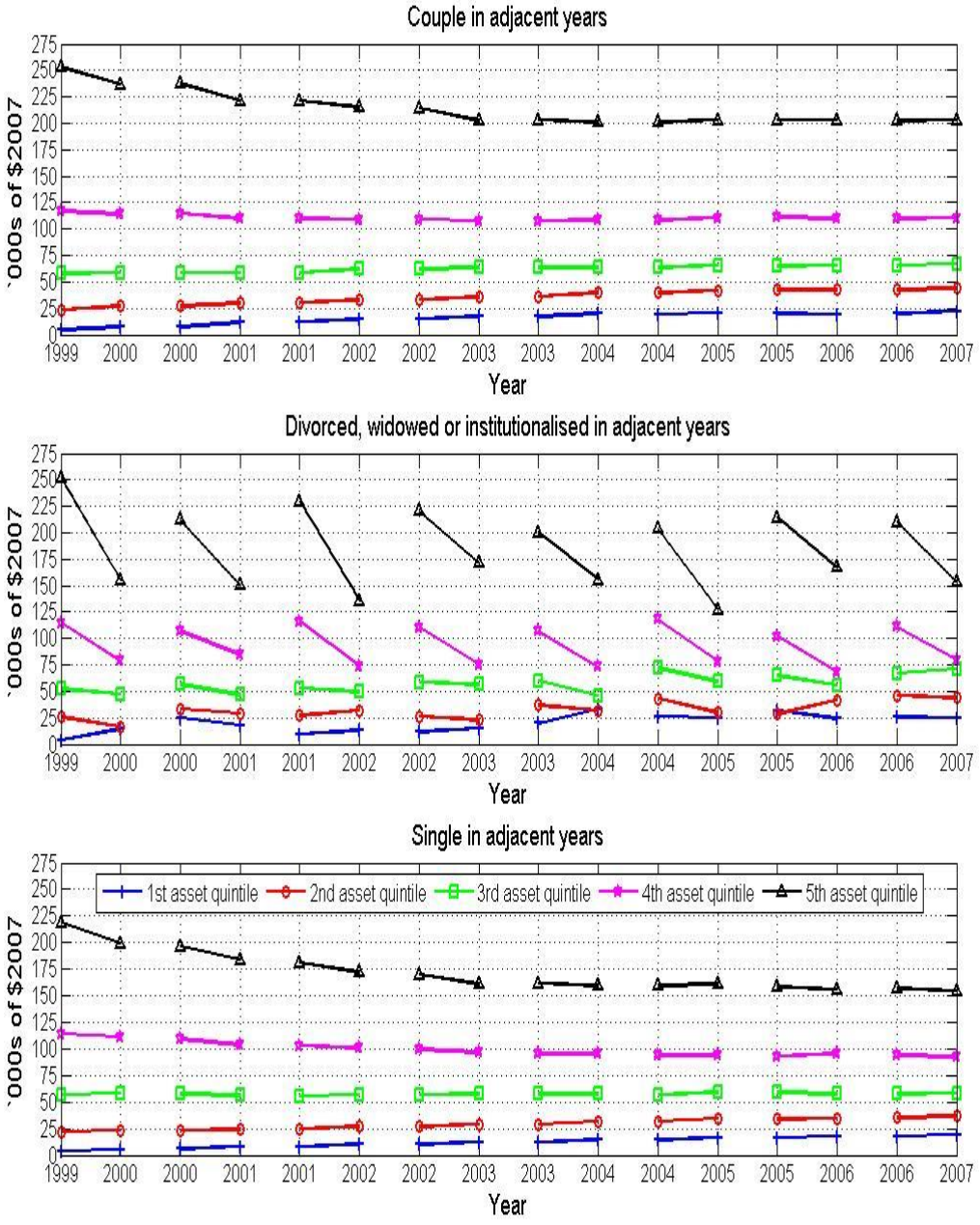
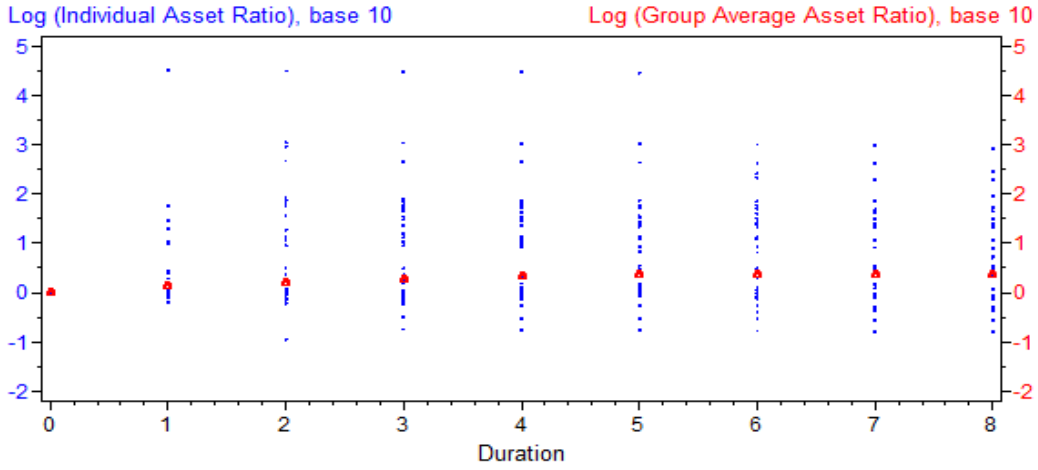
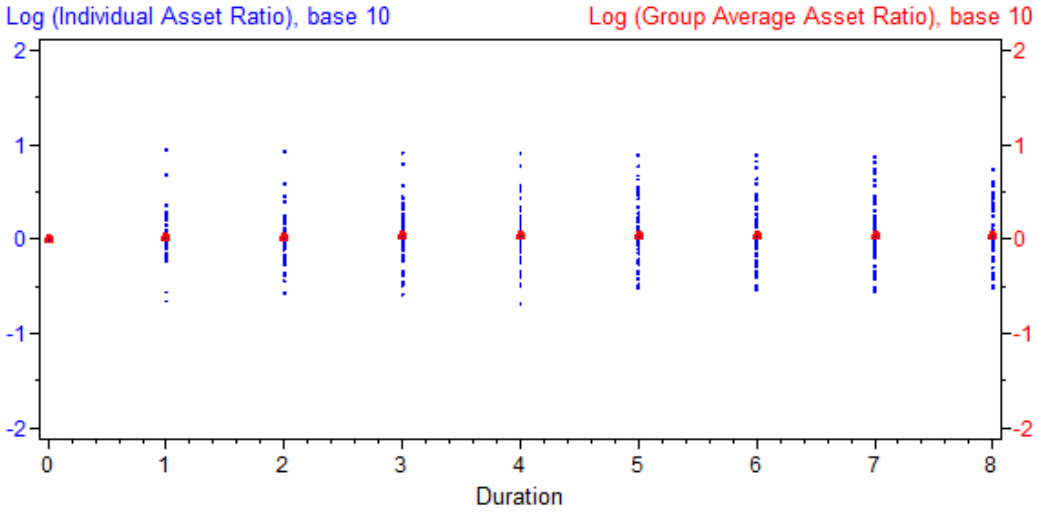


Figure 5 Asset ratio of couples by duration in a random sample

Bottom Quintile



Middle Quintile



Top Quintile