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Mortgage stress and precarious home ownership: implications for older Australians

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Acronyms and abbreviations used in this report

ABS	Australian Bureau of Statistics
AHURI	Australian Housing and Urban Research Institute Limited
BHPS	British Household Panel Survey
CGT	Capital Gains Tax
CPI	Consumer Price Index
CRA	Commonwealth Rent Assistance
FHOG	First Home Owners Grant
GFC	Global Financial Crisis
GST	Goods and Services Tax
HES	Household Expenditure Survey
HILDA	Household, Income and Labour Dynamics in Australia
ISP	Income support payment
LVR	Loan-to-value ratio
MDIR	Mortgage debt to income ratio
MPIR	Mortgage payment to income ratio
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary least squares
PSID	Panel Study of Income Dynamics
SIH	Survey of Income and Housing

Glossary

A list of definitions for terms commonly used by AHURI is available on the AHURI website www.ahuri.edu.au/research/glossary.

Executive summary

Key points

- Between 1987 and 2015, the real mortgage debt of older mortgagors aged 55+ blew out by 600 per cent. Real house price and income growth lagged behind, tripling and doubling respectively over the period.

- Older mortgagors' average mortgage debt to income ratio tripled from 71 per cent to 211 per cent between 1987 and 2015, reflecting a severe increase in repayment risk. In addition, repayment risk is correlated with mortgage payment difficulties.

- When older mortgagors face mortgage payment difficulties, males' SF-36 mental health scores are reduced by around 2 points and females' by 4 points. Late mortgage payments also raise males' K10 psychological distress scores by nearly 2 points.

- The budget share devoted to necessities increases as repayment risk rises. In the top MPIR quintile the budget share accounted for by necessities is around 3 per cent higher than in the bottom quintile, holding all other factors constant.

- Due to tenure and demographic change, the demand for Commonwealth Rent Assistance (CRA) is projected to rise by 60 per cent, from 414,000 in 2016 to 664,000 in 2031. The unmet demand for public housing from private renters aged 55+ is expected to rise by 78 per cent—from 200,000 to 440,000 households—between 2016 and 2031.

- The CRA budget cost is predicted to increase steeply, from $972 million in 2016, to $1.55 billion in 2031 (at constant 2016 prices).

- In the bottom two mortgage-payment-to-income ratio (MPIR) quintiles the odds of superannuation drawdowns are only around 60 per cent of the odds in the top quintile.

- Older retired mortgagors exhibit significant heterogeneity with respect to their wealth management strategies, as well as their consumption profiles.

Key findings

How significant are investment and repayment risks for older mortgagors?

Between 1987 and 2015, the growth in mortgage debt outstripped both house price and income growth among older mortgagors. Mortgage debt blew out by 600 per cent while house prices tripled. Income growth lagged even further behind, doubling over the same period. Investment risk increased for older mortgagors over the same period. The leverage multiplier rose from 1.15 to 1.4 between 1987 and 2015, indicating that a 10 per cent decline in house prices would wipe out 11.5 per cent of housing equity in 1987, but by 2015 that potential loss increases to 14 per cent. Investment risk is a serious concern for some older mortgagors. If house prices

suddenly fall by 10 per cent (based on 2015 data), the share of older mortgagors that would hold only a 40 per cent or less equity stake in their family home would rise from 13.7 per cent to 17.5 per cent. There has been an even more severe increase in repayment risk. Older mortgagors' average mortgage debt to income ratio (MDIR) tripled from 71 per cent to 211 per cent between 1987 and 2015.

Our research shows tentative evidence that repayment risk, rather than investment risk, is correlated with mortgage payment difficulties. Biographical disruption (such as divorce), single status and economic disadvantage also contribute to failure to meet mortgage payments on time. However, net financial wealth (other than housing) is a buffer that can help those at risk of default to continue making payments.

What impacts does the level of mortgage indebtedness have on older mortgagors' personal wellbeing?

Older mortgagors report lower mental health and higher psychological distress scores than older outright owners. However, exposure to investment and repayment risk alone does not appear to have a strong bearing on older mortgagors' wellbeing. A rising mortgage payment to income ratio does not adversely impact wellbeing. A rising leverage multiplier has a mildly adverse impact on mental health and psychological distress, but for men only. It is when older mortgagors experience difficulty in meeting mortgage payments, that wellbeing declines. When facing difficulty in meeting mortgage payments, the SF-36 mental health scores for older men are reduced by around 2 points and 4 points for women. Late mortgage payments also raise males' K10 psychological distress scores by nearly 2 points.

Gender differences are quite pronounced. Amongst older mortgagors, women generally have lower levels of mental health and higher levels of psychological distress than male mortgagors. The K10 distress score for older female mortgagors is 15.9, compared to the 14.6 score for older male mortgagors. The average SF-36 score for older female mortgagors is 73.5, compared to 77.1 for older male mortgagors. Older female mortgagors' SF-36 mental health is also more sensitive to personal circumstances than older male mortgagors'. Marital breakdown, ill health and poor labour market engagement all adversely affect women's SF-36 mental health scores more than men.

How do older Australians in mortgage stress manage their superannuation wealth and consumption expenditure?

Older retired mortgagors that draw down superannuation balances seem to be re-orienting their portfolios toward property. As their average superannuation balances tumbled from $471,000 to $271,000 (a 42% decline) between 2010 and 2014, average equity stakes in property rose from $621,000 to $667,000 (a 7% increase). Over the same period, the property wealth strategies of those accumulating savings in superannuation are the mirror image of those drawing down superannuation. Among this subgroup, average equity stakes in property dropped by 8 per cent.

There is some evidence suggesting that the chances of superannuation drawdown by older retired mortgagors may increase with repayment risk. In the bottom two mortgage payment to income ratio quintiles, the odds of superannuation drawdowns are only around 60 per cent of the odds in the top quintile. However, the links between superannuation wealth management and investment risk are more complex, reflecting two major wealth management strategies, driven by different investor preferences. Every $10,000 decline in home value increases the likelihood of superannuation drawdown by 4 per cent, suggesting that for some mortgagors, the threat of housing equity being slashed leads to a strategy of dipping into superannuation to preserve as much housing equity as possible. On the other hand, every $10,000 increase in home debt means an 18 per cent lower chance of superannuation drawdown. Hence, other

mortgagors may be more reluctant to draw down their superannuation in order to preserve as much non-housing wealth as possible.

In regard to consumption, the budget share devoted to necessities expands as repayment risk rises. A non-negligible segment of the mortgagor population is more prone to material deprivation than outright owners, despite the fact that the former also exhibit higher discretionary spending levels. Nearly 8 per cent of older mortgagors have been unable to pay their utility bills on time between 2006 and 2016, compared to around 3 per cent of outright owners.

The findings suggest that older mortgagors are a heterogeneous group in terms of wealth and consumption profiles, and they have varying preferences for asset and debt mix. Some are able to cope with mortgage burdens in later life, particularly those with higher educational qualifications. However, a separate subgroup must use most of their spending for necessities or suffer from material deprivation due to mortgage stress.

What are the implications of high levels of mortgage debt and falling home ownership rates for future national policy directions for retirement incomes and housing assistance in Australia?

Our modelling predicts an increasingly tenure polarised seniors population. Outright ownership status will be attained later in life and at lower real incomes. Mortgagors will have a relatively younger age profile and higher real incomes. Tenants will fall further behind in terms of employment, real incomes and health.

In 2031, we can expect that over 200,000 older Australians will be living in private rental housing and in need of assistance with one or more activities. This may in turn require the retrofit of family homes. Insecurity of tenure and lack of control over internal amenities could prevent a growing number of older tenants from meeting these needs.

The combination of tenure change and demographic change is expected to increase CRA eligibility among seniors aged 55 years and over; it is forecast to rise from 414,000 in 2016 to 664,000 in 2031, an increase of 60 per cent over the forecasting horizon. The population of seniors is expected to increase by a much lower 35 per cent, so a growing dependence on CRA is anticipated. The Australian Government CRA budget cost is predicted to increase steeply, from $972 million in 2016, to $1.55 billion in 2031 (at constant 2016 prices).

The unmet demand for public housing from private renters aged 55 years and over is expected to climb from roughly 200,000 households in 2016 to 440,000 households in 2031, a 78 per cent increase. Those 75 years and older are anticipated to push their share of unmet demand up from 27.5 per cent in 2016 to 34.2 per cent in 2031.

Our projections suggest that 1.88 million older Australians could be in before-housing poverty in 2031; but this count falls by 730,000 to 1.15 million on an after-housing cost basis. Outright ownership will remain an important but weaker pillar supporting living standards in old age.

Policy development options

The report's findings present significant challenges for policy makers planning for an ageing population amidst increasing precariousness in the home ownership sector in Australia. Five broad streams of policy development options likely to be pertinent for forward-looking policy planning are:

- long-term planning for financial security in retirement
- limiting exposure to mortgage debt via innovations and regulations

- systemic reform to the housing sector to address the twin challenges of population ageing and precarious home ownership

- budgeting for housing assistance for the growing population of elderly low-income renters

- understanding substitution between two key pillars of the retirement incomes system—the family home and superannuation.

Long-term planning for financial security in retirement

Long-term financial planning strategies: Long-term planning for a mortgage debt repayment strategy over the life course is crucial in mitigating an increase in repayment risk as a mortgagor ages. Such financial planning needs to take into account net financial wealth (other than housing). Non-housing financial assets can potentially act as a buffer, helping those at risk of default to continue making payments. This may prove especially valuable for those particularly vulnerable to biographical disruption, or with weak labour market engagement. Obviously, higher levels of non-housing debt can adversely affect older mortgagors' ability to meet their mortgage commitments. This is complicated by the increasing fluidity of housing wealth, as financial innovations enable home owners to draw down on the wealth stored in their family home without moving, by taking on higher levels of debt throughout their life course.

Financial literacy needs: The budget share devoted to necessities grows as repayment risk rises. A non-negligible segment of the mortgagor population is more prone to material deprivation than outright owners. Those with low education qualifications are particularly susceptible to limiting their consumption to necessities as their repayment risk rises. Educational qualifications usually mean increased financial sophistication, therefore financial literacy programs are needed to assist older mortgagors, especially those with lower lifetime incomes, to better manage their mortgage payments and consumption of other goods and services.

Hedging exposure to mortgage payment difficulties: Those who are actively involved in the labour market in later life are less likely to have mortgage payment difficulties. While older Australians may be increasingly willing to extend working lives to pay down their mortgages, unexpected life shocks such as unemployment, ill health or marital breakdown are more common in later life, and can plunge older mortgagors with over-optimistic expectations into severe mortgage stress. It is therefore important for policy makers to consider measures to assist older mortgagors to hedge exposure to mortgage payment difficulties. For instance, one could impose a mortgage insurance requirement on those whose mortgage debt burden relative to income remains above a specified level after they pass a certain age threshold.

Gender equity considerations: The negative associations between mortgage indebtedness and wellbeing levels also raise gender equity concerns. Older female mortgagors generally have lower levels of mental health and higher levels of psychological distress than older male mortgagors. The former's personal wellbeing (as measured by the SF-36 mental health score) is also more sensitive to their personal circumstances. In addition, women have longer life expectancies than men, are more likely to experience career interruptions, and are less inclined than men to re-marry following a marital breakdown. Hence, ageing female mortgagors face multiple challenges, which signals a need to carefully design policies and programs that provide adequate support for women at risk of housing insecurity and poverty in old age.

Limiting exposure to mortgage debt via innovation and regulation

Equity-oriented funding solutions for owner-occupation: The negative association between mortgage debt and wellbeing presents a need to design innovative financial solutions for funding owner-occupation that do not increase the debt burden. Studies such as Smith, Whitehead et al. (2013) and Wood, Smith et al. (2013) have proposed equity-based solutions for funding owner-occupation, for example equity finance, but it has rarely been tried and the

sector is small. Downsizing may also be an option for 'empty nesters' if it unlocks sufficient equity to reduce mortgage debt. However, downsizing is often hampered by barriers such as the lack of affordable and appropriate housing in the local area and the financial disincentive of stamp duties on the purchase of a new home.

Insurance instruments: While investment risk is not found to be a driver of mortgage payment defaults, it is nevertheless important because house price declines threaten the wealth holdings of older home owners. Those who have rebalanced wealth portfolios by substituting property wealth for superannuation are particularly challenged. Fears of a housing market-led recession are accentuated by the absence of insurance instruments that could enable mortgagors to hedge house price declines (Smith and Searle 2010). When house prices are ticking along nicely, the lack of such insurance products is rarely noticed. In the less secure housing market emerging, policy makers should consider whether product innovation along these lines is worth encouraging. If property owners could enter insurance contracts that hedge house price declines, better financial planning would be facilitated.

Monetary policy and prudential regulations: In terms of overall economic health, the findings are concerning. High levels of mortgage debt are likely to reduce consumption spending, particularly when house prices fall, and especially the spending of older mortgagors as they have fewer years of earnings ahead. Our findings confirm Ong, Wood et al.'s (2017) report on the links between housing and the economy, which show that the take-up of further debt by highly leveraged households exposes them and the macroeconomy to significant investment and repayment risks. Hence, though monetary policy levers are not directly housing related, they have significant influence on housing wealth-related consumption effects. Overall, policy makers need to carefully monitor the growth of household indebtedness and ensure robust prudential regulations that limit the exposure of the economy to unacceptably high levels of debt-driven consumption.

Systemic reform to the housing sector to address the twin challenges of population ageing and precarious home ownership

Housing design and planning systems: Demographic projections show an impending rise in the number of elderly Australians, many of whom will likely need various types of housing assistance. Mobility issues will generate a growing need for housing designs and planning systems that support retrofits that aid mobility in existing homes, as well as incorporate such amenities into new builds.

Barriers to downsizing: Because growth in the number of small households, and especially lone person households, is expected to accelerate, a stronger demand for smaller dwellings could emerge, and the kind of modifications to planning requirements suggested above might be better targeted to smaller houses and units. However, the stronger demand for smaller dwellings might not eventuate if impediments to downsizing are not addressed. Stamp duties, pension income and asset means tests that penalise downsizers, and a lack of suitable smaller dwellings in the neighbourhoods of older empty nesters and lone persons households, are all potentially important.

Private rental sector regulations: Over 200,000 older private rental housing tenants will need assistance with one or more activities by 2031. The presence of a growing number of elderly, and possibly frail, persons in private rental housing raises a different set of issues, especially if private landlords are unwilling to permit modifications that aid mobility around the home. The insecurity associated with private rental housing tenancies is also a concern because housing stability assists arrangement of support services. If social housing remains a small residual tenure, as assumed in the forecasts in this report, there will be growing pressure on governments to review tenancy regulations that impede tenant rights to install amenities to help infirm and immobile elderly people conduct daily activities.

Budgeting for housing assistance to cater for the growing population of elderly low-income renters

Commonwealth Rent Assistance (CRA): Housing assistance for older Australians will add to the fiscal pressures on government budgets even if there is no net increase in public housing, as has been assumed in this report. There is an important policy ramification. There will be rapid growth in real government outlays on CRA payments to older private renters. This is due to a combination of population ageing, a modest fall in projected home ownership rates and continued rationing of the public housing stock.

Public housing: Eligibility for public housing is expected to increase from 247,000 to 440,000 seniors over the period 2016–2031. Though not all eligible older Australians will join waiting lists, it is conceivable that many will. This will in turn put state housing authorities as well as community housing organisations under extreme pressure.

Understanding substitution between two key pillars of the retirement incomes system—the family home and superannuation

Retirement incomes adequacy: Older mortgagors seem prepared to run down their superannuation to bolster wealth stored in home equity when repayment risks are present. These findings are worrying from a retirement incomes adequacy perspective. If superannuation balances are being run down to pay off mortgage debt rather than to sustain spending in retirement, pressure on the age pension system will increase as growing numbers of baby boomers retire with mortgage debt owed against the family home. Another concern is that resulting wealth portfolios are dominated by property, and therefore more exposed to investment risks posed by falling house prices.

Asset substitution—preferences and strategies: The links between the value of the family home, mortgage debt and superannuation are complex. They suggest at least two major types of wealth management strategies by older mortgagors, reflecting different investor preferences, and varying degrees of asset substitution between superannuation and housing wealth. For one subgroup of older retired mortgagors, the threat of housing equity being slashed may prompt a strategy of dipping into superannuation balances to meet spending needs in order to preserve as much housing equity as possible. However the prospect of rising mortgage debt (or falling housing equity) deters 'raids' on superannuation funds by another subgroup, as these mortgagors seek to preserve their non-housing wealth buffers. Policy makers need to understand this heterogeneity, which will drive wealth management decisions by older Australians in regard to their two key assets in retirement.

The role of superannuation in housing decisions: There is a growing sense that an alternative housing solution is needed as a safety net to meet the housing needs of low-income seniors living in private rental housing. Given that the superannuation system will have matured by 2031, the accumulated superannuation wealth of future retired tenants could open up new housing opportunities, especially if governments assist with innovative programs such as shared ownership. These programs could permit seniors to use part or all of their accumulated superannuation balances to buy a share of their dwelling, and rent the remainder. A key criticism of such a measure is that it undermines a major aim of the Superannuation Guarantee, which is to promote financial independence in old age. However, this objection may carry less weight for a program targeted to seniors rather than younger people. The other more valid criticism is that it could undermine another Superannuation Guarantee aim, to curb growth in the budget cost of age pensions.

The study

This study is motivated by concerns regarding growing numbers of middle-aged Australians who are carrying mortgage debt into retirement and paying off higher levels of debt relative to house values and income. These trends have significant consequences for older Australians' wellbeing and affect the ways in which older home owners manage their wealth portfolios and labour market transitions. Mortgage indebtedness later in life also presents significant ramifications for retirement incomes policy and housing assistance programs. Home ownership has often been dubbed the fourth pillar of the retirement incomes system. However, this pillar may be crumbling due to rising mortgage indebtedness and threats to home ownership's status as Australia's majority tenure. While policy challenges abound, the international literature offers few studies that address the circumstances of older mortgagors.

These policy concerns and knowledge gaps motivated the following research questions in this study, which focuses on mortgagors 55 years and over:

1 How significant are investment and repayment risks for older Australian mortgagors?

2 What impacts does the level of mortgage indebtedness have on older mortgagors' personal wellbeing?

3 How do older Australians in mortgage stress manage their superannuation wealth and consumption expenditure?

4 What are the implications of high levels of mortgage debt and falling home ownership rates for future national policy directions in relation to retirement incomes and housing assistance in Australia?

This study therefore promotes forward-looking policy development and budget planning in an era of an ageing population and growing housing market volatility. It presents a comprehensive evidence base that examines whether home ownership offers less reliable support for retirement incomes policy, with post-retirement circumstances becoming more precarious as superannuation balances are drained to repay mortgages. It also provides a forecast assessment of the impacts of rising mortgage stress on future demand for housing assistance. Overall, it will inform efforts by policy makers and practitioners to sustain the elderly's wellbeing amidst more insecure home ownership. The findings of this report are highly relevant to a range of policies and programs that affect both home owners and renters, as well as ageing Australians in general.

We draw on three nationally representative microdata sources to undertake empirical analyses: the Survey of Income and Housing (SIH); the Household, Income and Labour Dynamics Surveys (HILDA); and ABS population projections. The SIH and HILDA Survey contain critical housing, wealth and income data that will enable us to draw population-wide conclusions. Both are staple Australian data sources that offer a comprehensive set of household and individual data covering a vast array of themes. The ABS population projections are crucial for projecting demographic change so as to generate forecast estimates that are especially helpful for government budget planning.

We apply a combination of econometric modelling, microsimulation modelling and projection techniques to generate a comprehensive evidence base pertaining to support the report's conclusions. Via econometric modelling we are able to isolate the independent effect that a mortgage stress predictor might have on an outcome of interest while controlling for other potentially confounding predictors. Microsimulation modelling is employed to estimate the demand for CRA and public housing by older Australians. This is combined with forecasting techniques developed in Wood, Cigdem-Bayram et al. (2017) to project forward the impacts of demographic change, mortgage indebtedness and falling home ownership rates on retirement incomes, and the demand for housing assistance.

1 Background and key aims

- The research presented in this report is motivated by the growing numbers of middle-aged and older Australians carrying mortgage debt into retirement, and fears for their wellbeing in later life.

- The report investigates a range of mortgage stress indicators and associated risks for older Australians' financial and mental wellbeing.

- The key findings support forward-looking policy development and budget planning by assessing the consequences of mortgage indebtedness on housing assistance and retirement income policies.

- The analyses draw on a range of quantitative methods, including econometric modelling, microsimulation modelling, and demographic and housing tenure projections.

1.1 Why this research was conducted

Growing numbers of middle-aged Australians are carrying mortgage debt into retirement. Recent AHURI research by the team (Wood, Ong et al. 2015) showed that these mortgagors are paying off higher levels of debt relative to house values and income. These trends have significant consequences for older Australians' wellbeing, as well as housing assistance and welfare systems.

Over the period 1982–2013 the share of mortgagors has increased in all age groups. The steepest increases are amongst middle-aged Australians approaching retirement. Mortgage indebtedness was uncommon among the 55–64 cohort as recently as the 1990s. However, between 1996 and 2013 the proportion still paying off their mortgage climbed from under 20 per cent to 45 per cent. Among 45–54-year-olds, the share of mortgagors exceeds 70 per cent, nearly 30 percentage points higher than three decades ago. Loan-to-value ratios (LVRs) have also risen, but the escalation in mortgage debt to income ratios (MDIRs) is especially 'eye-catching'; among mortgagors aged 45–54 years, the mean MDIR has nearly doubled from 85 per cent to 160 per cent (Wood and Ong 2017). Hence, exposure to repayment and investment risks has increased.

These trends reflect three underlying phenomena. Firstly, house prices are rising faster than incomes, so households have to borrow more to purchase housing. Secondly, more owners are using flexible mortgages to dip into their housing equity without moving (Ong, Haffner et al. 2013a). Thirdly, the maturing Superannuation Guarantee and longer working lives means that for many home owners, paying off mortgages before pension age no longer seems necessary for a financially secure retirement (Cigdem-Bayram, Ong et al. 2017).

Mortgage indebtedness can compromise personal wellbeing (Wood, Smith et al. 2013), and affect the ways in which older home owners manage their wealth portfolios and labour market transitions (Cigdem-Bayram, Ong et al. 2017). Mortgage indebtedness later in life also has important implications for retirement incomes policies. Home ownership has been described as the fourth pillar supporting Australia's retirement incomes policy because it reduces after-housing cost poverty in old age (Yates and Bradbury 2010; Chomik and Piggott 2012). But this pillar may crumble due to rising mortgage indebtedness and threats to home ownership's status as Australia's majority tenure (Wood and Ong 2017). Tentative evidence in Ong,

Haffner et al. (2013a) suggests some may be paying off mortgage debt using lump sum superannuation payouts, hence increasing pressure on the age pension system.

An increasingly important cause of declining home ownership rates is growing numbers of middle-aged and older individuals who are falling out of home ownership, with mortgage stress being a primary driver (Wood, Colic-Peisker et al. 2010). A significant number become eligible for housing assistance (Wood, Cigdem-Bayram et al. 2017), causing an increase in government outlays. Loss of home ownership is especially important for single women, because they accumulate lower superannuation balances, and rely more on the family home as their main retirement asset.

These policy concerns motivate the following research questions in this report:

1   How significant are investment and repayment risks for older Australian mortgagors?

2   What impacts does the level of mortgage indebtedness have on older mortgagors' personal wellbeing?

3   How do older Australians in mortgage stress manage their superannuation wealth and consumption expenditure?

4   What are the implications of high levels of mortgage debt and falling home ownership rates for future national policy directions in relation to retirement incomes and housing assistance in Australia?

1.2   Policy context

This report promotes forward-looking policy development and budget planning in an era of an ageing population and growing housing market volatility, presenting a comprehensive evidence base that examines whether home ownership offers less reliable support for retirement incomes policy, with retirees' financial circumstances becoming more precarious as superannuation balances are drained to repay mortgages. It also provides a projected assessment of the impacts of rising mortgage stress on future demand for housing assistance. Overall, it will inform efforts by policy makers and practitioners to sustain the elderly's wellbeing amidst a more precarious home ownership status. The findings of this report are highly relevant to a range of policies and programs that affect both home owners and renters, as well as ageing Australians in general.

1.2.1   Housing policy

Australians have traditionally received housing subsidies from the government to help cope with housing cost burdens. For home owners, these include an extensive range of assistance measures including stamp duty concessions, non-taxation of imputed rent, Goods and Services Tax (GST) exemptions on the sale and purchase of existing properties, as well as the family home's exemption from land tax, capital gains tax (CGT) and income support payment (ISP) assets test. First home buyers can also access First Home Owners Grants (FHOGs). Property investors also receive a range of subsidies including CGT discounts and negative gearing benefits. In comparison, renters' subsidies are smaller in size and number with the main assistance being in the form of CRA for private rental tenants and rebated rents for public housing tenants. Wood, Cigdem-Bayram et al. (2017) estimated that in 2011, the CRA budget cost was $2.8 billion, compared to a budget cost of $5.8 billion attributable to the ISP asset test concession on the family home, and a further $15.3 billion of tax subsidies for home owners.

However, the preferential treatment of housing assets has resulted in an evidently inequitable distribution of housing subsidies across the income distribution, as well as adverse impacts on the allocation of resources in land and housing markets, such as over-investment in property

assets at the expense of other productive assets in the economy (Wood and Ong 2012). Home owners who are typically older and on higher incomes benefit from the bulk of housing subsidies available to housing consumers, while renters, and younger, lower income mortgagors receive a lower amount of housing assistance through subsidies (Yates 2009; Wood, Colic-Peisker et al. 2010; Eccleston, Verdouw et al. 2018).

However, despite the fact that housing subsidies to renters comprise a disproportionately low share of total housing subsidies to housing consumers, existing trends and evidence point to an impending surge in demand for rental housing assistance. On the one hand, house prices have spiralled to increasingly higher levels, putting home ownership out of reach for young renters, many of whom are facing the prospect of long-term or even lifetime renting (Ong 2017). On the other hand, the confluence of growing indebtedness in home ownership and ageing population leaves an increasing number of older Australian home buyers prone to loss of home ownership. Other demographic factors are at play, including historically high divorce rates and lower marriage rates (Beer and Faulkner 2011); and the mounting number of single-person households that typically find it more difficult to access and sustain home ownership than couple households, due to lower household incomes and wealth (Hendershott, Ong et al. 2009).

As growing numbers of home owners are approaching retirement carrying mortgage debt, the chances of falling out of home ownership in later stages of their life course are now higher (Wood, Smith et al. 2013). In fact, during the first decade of the new millennium, nearly half a million Australians aged 50 years and over terminated their home ownership and moved into the rental sector (Wood and Ong 2012). Ong, Wood et al. (2015) found that a sizeable share—over 25 per cent—of ex-home owners aged 45 years and over in 2002 had moved onto housing assistance by 2006. Moreover, the same study found strong indications of welfare path dependency; a housing assistance recipient aged 45 years or over at time *t* has a 54 percentage point higher probability of receiving housing assistance four years later compared to one who was not reliant on housing assistance at time *t*.

Australia has two key forms of housing assistance—CRA for low-income private renters and public housing subsidies for those eligible to rent from state housing authorities. Public housing offers significant tenure security for low-income households, but comprises under 5 per cent of the total housing stock and is tightly rationed. According to the Productivity Commission's 2018 report on government services, over 149,000 households were on public housing wait lists in June 2017. The scale of public housing capital expansion that would be required to address this shortage in the sector is unlikely to be accommodated within currently tight government budget constraints. While the private rental sector is much larger than the public housing sector, making up around one-quarter of the housing stock, the Australian private rental market is lightly regulated and offers insecure housing to most occupants, which is a concern for some occupants, especially the elderly. Hence, there is growing interest in public-private partnerships that might widen and enhance the range of housing assistance solutions for low-income renters, such as secure leases that incentivise private landlords to offer long-term rental arrangements to eligible renters (Cigdem-Bayram, Ong et al. 2017).

1.2.2   Retirement incomes policy

Home ownership has traditionally been dubbed the fourth pillar of the retirement incomes policy, with the other three being the publicly funded means-tested age pension, superannuation savings and voluntary savings (Yates and Bradbury 2010; Yates, Ong et al. 2016). Hence, growing precariousness in the home ownership sector has significant ramifications for the retirement incomes system. For decades, all Australian governments have promoted and protected the home ownership sector via an extensive range of direct and indirect subsidies to home owners (described above). According to Kelly, Hunter et al. (2013), tax and other government expenditure on home owners amounted to about $36 billion in 2013.

The preferential treatment of the family home has been justified by the perceived benefits of home ownership, including the provision of a sense of physical and emotional security, safety, independence and belonging (Yates, Ong et al. 2016). If retirement savings run dry, the family home provides a retirement safety net that benefits both retirees and the community (Kelly, Hunter et al. 2013). When comparing various OECD countries, Yates and Bradbury (2010) show that Australia has one of the highest before-housing poverty rates but one of the lowest after-housing poverty rates among the elderly. The social policy role of home ownership has allowed Australian governments to set the age pension at relatively low levels (Wood and Ong 2012) on the assumption that elderly retirees will typically have no mortgage payments to meet, and therefore can survive on smaller pensions (Castles 1998). However, the growing trend towards renting, as significant numbers exit home ownership later in life, has called into question the adequacy of the age pension for elderly Australians bearing rental housing costs in their retirement years.

1.3 Existing research

The international literature features a significant pool of studies that examine the drivers and implications of mortgage stress. However, few studies have focused on older mortgagors, as we do in this report. We summarise below four strands of literature that are relevant to the four key research questions. More detailed reviews can be found within separate chapters of this report.

1.3.1 Investment and repayment risks for mortgagors

A range of studies have examined investment and repayment risks for mortgagors using data sources from different countries, including Australia (Read, Stewart et al. 2014), the UK (Bowie-Cairns and Pryce 2005) and the US (Dushi, Friedberg et al. 2010; Stafford, Hurst et al. 2012).

Studies that have examined investment and repayment risks typically found that both were important factors associated with difficulty meeting mortgage repayments. Read, Stewart et al. (2014) and Bajari, Chu et al. (2008) found that the probability of mortgage payment difficulties increases as investment risk rises. Read, Stewart et al. (2014) also found that the probability of missing a mortgage payment is particularly high for households with relatively high repayment risk.

However socio-demographic and economic characteristics of mortgagors also mediate the relationship between investment risks and the likelihood of mortgage payment difficulties; factors such as disability (Stafford, Hurst et al. 2012), divorce and separation (Berry et al. 2010), number of children (Bowie-Cairns and Pryce 2005), labour market inactivity or self-employment (Read, Stewart et al. 2014), unemployment (Stafford, Hurst et al. 2012) and low incomes (Quercia, Pennington-Cross et al. 2012) have all been documented as significant influences.

Few studies have focused on older mortgagors, though Dushi, Friedberg et al. (2010) in the US and Temple (2008) in Australia are exceptions. Temple (2008) found that compared with older outright home owners, purchasers were 3.5 times more likely to experience housing affordability stress while public and private renters have a 2.5 and 2.8‑fold greater risk, respectively.

1.3.2 Mortgage stress and wellbeing

There is a vast international literature that has examined the impact of housing tenure, housing wealth and debt on wellbeing. Existing studies have found that home owners in regions with high rates of mortgage-backed home ownership are generally in better health than renters (Filakti and Fox 1995; Easterlow, Smith et al. 2000). This has been attributed to a range of factors including inter-tenure differences in the quality of housing stock (Lloyd, McCormack et al. 2008), a housing wealth effect (Fichera and Gathergood 2013), differences in non-housing

tenure related characteristics between home owner and renters (Baker, Bentley et al. 2013) and health selectivity effects (Smith 1990).

A smaller number of studies have conducted in-depth investigations into the effect of mortgage indebtedness on personal wellbeing. These studies have generally found evidence of a link between mortgage indebtedness and psychological distress, including Cannuscio, Alley et al. (2012) and Yilmazer, Babiarz et al. (2015) in the US, Cairney and Boyle (2004) in Canada, Nettleton and Burrows (1998; 2000) in the UK, and Smith, Cigdem et al. (2017) for Australia and the UK. However, most studies do not focus on older mortgagors. This may reflect traditional notions of housing pathways, where home owners are expected to pay off their mortgage during their working lives so that they have very low to zero housing costs by the time they retire (Wood and Ong 2012). However, housing pathways are increasingly precarious and older mortgagors in Australia are therefore more prone to carry mortgage debt later in life (Ong, Haffner et al. 2013a). Hence, this report fills an important gap in the literature by empirically measuring the effect of mortgage indebtedness on mental health and psychological distress among older home owners.

1.3.3   Mortgage stress, wealth and consumption

The existing pool of studies modelling the influence of mortgage debt burdens on wealth and consumption management is small. In the US, Bridges and Stafford (2012) discover that those experiencing mortgage distress were less likely to make pension contributions, and more likely to draw down pension balances. Bray (2013) found that the incidence of mortgage debt among persons aged 50–64 years is negatively associated with the level of superannuation balances. Ong, Haffner et al. (2013a) and the Productivity Commission (2015) have presented descriptive findings signalling some association between superannuation lump sum withdrawals and the reduction of mortgage debt.

A handful of studies have examined the links between mortgage stress and consumption. Atalay, Whelan et al. (2017) found that that during the Global Financial Crisis (GFC), house price increases were associated with larger increases in consumption for home owners with a higher LVR. However this pattern no longer holds post GFC, with findings suggesting that consumption behaviour is not associated with house prices and LVRs. The study concludes that since the GFC, households with high LVRs have become more financially conservative and therefore reluctant to borrow more in order to increase consumption, despite rising house prices. In the US, Mian and Sufi (2011) suggest that a large portion of home-equity based borrowing might be used for consumption or home improvement. While these studies have examined the impact of consumption on the decision to increase mortgage debt, they have not looked at the impact of mortgage stress on consumption (which is the focus of our project).

1.3.4   Projections of falling home ownership rates and population ageing

The interaction between ageing and home ownership issues have been canvassed in the literature, primarily focusing on the housing implications of an ageing population. Hugo (2005) found that older single person household numbers were increasing rapidly due to more common occurrences of divorce and lower marriage rates. Wood, Chamberlain et al. (2008) further showed that the loss of a partner through marital breakdown can have devastating consequences for one's future home ownership prospects. The study estimated that in the two years following divorce or separation, home ownership rates fell from 69 per cent to 50 per cent for those who had lost a partner.

Yates, Kendig et al. (2008) was the first Australian to model the housing system consequences of projected changes to Australia's demography, as well as falling rates of home ownership. The study projected a real increase in CRA expenditure of 170 per cent, concluding that the current Australian system of rental housing assistance is unsustainable. Yates (2015) re-affirmed this

by showing that even without changes in home ownership rates, the number of older private renters will double over the next 40 years due to the population ageing and a stagnant public housing stock.

Drawing on Yates, Kendig et al.'s (2008) tenure profile projection methodology, Wood, Cigdem-Bayram et al. (2017) projected a rise in the number of CRA recipients from 952,000 in 2011 to 1.5 million in 2031, equivalent to a 61 per cent increase over the timeframe. At the same time, the real CRA budget is projected to rise from $2.8 billion in 2011 to $4.5 billion—a 62 per cent rise on 2011 levels. Wood, Cigdem-Bayram et al. (2017) also estimated the budget cost of ISP asset test concessions on the family home. The study projected that this cost will rise, in real terms, from $5.8 billion in 2011 to $8 billion (a 38% increase on 2011 levels) on the conservative assumption that real house prices will stay fixed over the period. However, the projected growth in the real value of housing tax subsidies will be smaller, from $15.3 billion in 2011 to $18.8 billion in 2031. This is due to falling rates of home ownership in middle age groups, as well as historically high LVRs and low interest rates that are assumed to continue into the future.

1.4 Research methods

1.4.1 Data

We will draw on three nationally representative microdata sources to undertake empirical analyses: the Survey of Income and Housing (SIH); the Household, Income and Labour Dynamics Surveys (HILDA); and ABS population projections.

The SIH and HILDA Survey contain critical housing, wealth and income data that enable us to draw population-wide conclusions. Both are staple Australian data sources that offer a comprehensive set of household and individual data covering a vast array of themes. Of particular importance to this report is information relating to individuals' and households' housing circumstances (e.g. housing wealth, mortgage debt, housing tenure). These surveys allowed us to design and measure a range of mortgage stress indicators, which are central to the analyses conducted throughout the report. Other critical data found in the two surveys include information on wellbeing outcomes, consumption patterns and non-housing asset and debt variables.

The SIH is a repeated cross-sectional data set that spans decades, so we can track the changing mortgage profiles of older Australians from as early as 1990 through to the latest 2015–16 data. The HILDA Survey is a high-quality longitudinal data source that has tracked households annually since its inception in 2001. It will be used to profile changing housing and mortgage circumstances as Australians age. Both surveys have healthy sample sizes— 14,000 households in the latest SIH, and over 17,000 households in the latest HILDA Survey.

ABS population projections are crucial for projecting demographic change. We employ the ABS's *Household and Family Projections, 2011 to 2036* (2015) as the baseline projections that account for demographic change. This particular projection series provides not only a projected count of persons for each year from 2011 to 2036 by state and territory, it also breaks down the projection estimates by age group and living arrangements. The age and living arrangement profiles of Australians are expected to change significantly as a result of population ageing and these trends are taken into account in our estimates.

1.4.2 Econometric modelling

Econometric modelling techniques are typically used for estimating relationships between an outcome (e.g. an individual's personal wellbeing) and a series of predictors (e.g. mortgage stress, wealth, age, education). While the techniques vary considerably across studies and

disciplines, econometric modelling is usually a reliable and useful method of estimating the magnitude and direction of the link between a predictor and an outcome, while holding other predictors constant. Hence, via econometric modelling we are able to isolate the independent effect that a 'mortgage stress' predictor has on an outcome of interest while controlling for other potentially confounding predictors.

We apply a range of econometric modelling techniques to quantify the following statistical associations:

- The impact of investment and repayment risks on the ability of an older mortgagor to make mortgage repayments on time;

- The effect of mortgage stress on older mortgagors' mental health and psychological distress scores;

- The effect of mortgage stress on older mortgagors' consumption patterns, differentiating between essential and discretionary items;

- The effect of mortgage stress on older mortgagors' propensity to draw down their superannuation balance in lump sums.

1.4.3 Microsimulation modelling

Microsimulation modelling has been employed to estimate the CRA entitlements of older Australians. The HILDA Survey contains an extensive set of information on individuals' ISPs, including pension, allowance and family tax benefit payments, which act as passports to CRA for those whose rent payments also exceed the minimum rent threshold applicable to their household type. However, the HILDA Survey does not report CRA for individuals and households. Using the relevant ISP and rent data available in the HILDA Survey, we simulated the amount of CRA each eligible private renter is entitled to receive.[1] Because we also forecast changes in tenure profile as a result of falling home ownership rates, we also measured the CRA entitlements of older Australians who are projected to fall out of home ownership and become private renters in the future.

The detailed state housing authority's income eligibility rules program in the microsimulation model, AHURI-3M, were employed to estimate the unmet demand for public housing, with particular reference to the demand emerging from older Australians. AHURI-3M is a microsimulation model that is capable of predicting policy outcomes under different scenarios. The model contains several inter-related modules, including a tax-transfer module, an investor's module, and a public housing module that contains the detailed eligibility rules to identify those persons who would be eligible for public housing in each state and territory.

1.4.4 Projection techniques

We updated forecasting techniques developed in Wood, Cigdem-Bayram et al. (2017) to project forward the impacts of demographic change, mortgage indebtedness and falling home ownership rates on retirement incomes, and the demand for housing assistance. To undertake the demographic forecasting exercise, we utilised the ABS's population projections series described above to 'age' the 2016 HILDA data and thereby derive population forecasts for the

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[1] There a minor limitation to our methodology for calculating CRA entitlements. First, CRA entitlements are typically estimated on an income unit basis. However, we calculate CRA entitlement on a household basis due to data limitations. By doing so, we may not accurately represent the CRA entitlements received by multi-income unit households. The limitation of using a household approach for imputing CRA entitlements applies to only a small proportion of households however, as most households with members aged 55+ one-income unit households.

years 2016 (period t), 2021 (period t+5), and 2031 (t+15). The forecasting exercise therefore predicted a series of inter-related profiles of older Australians as follows:

- home ownership rates, by extrapolating forward age-specific home ownership rates based on historical long-run trends in the SIH

- mortgage debt profiles of home owners that can be expected given ABS demographic projections, holding all other factors constant

- poverty rate profiles

- CRA demand from older Australians, given ABS projected demographic change and SIH projected home ownership rates

- public housing demand by older Australians, given ABS projected demographic change and SIH projected home ownership rates.

2 Investment and repayment risks among older mortgagors: trends and drivers

- Between 1987 and 2015, the growth in mortgage debt has outstripped both house price and income growth among older mortgagors. Mortgage debt blew out by 600 per cent, while house prices tripled. Income growth lagged even further behind, doubling over the same period.

- Investment risk has increased for older mortgagors over the period 1987–2015. The leverage multiplier rose from 1.15 to 1.4 between 1987 and 2015, indicating that a 10 per cent decline in house prices would wipe out 11.5 per cent of housing equity in 1987, and 14 per cent of housing equity by 2015.

- Investment risk is a serious concern for some older mortgagors. If house prices suddenly fall by 10 per cent (based on 2015 data), the share of older mortgagors that would hold only a 40 per cent or less equity stake in their family home rises from 13.7 per cent to 17.5 per cent.

- There has been a severe increase in repayment risk. Older mortgagors' average mortgage debt to income ratio tripled from 71 per cent 1987 to 211 per cent in 2015.

- Biographical disruption and single status, economic disadvantage and repayment risk (as measured by the mortgage payment to income ratio) are key drivers of failure to meet mortgage payments on time.

- Modelling estimates offer tentative evidence that it is repayment risk, rather than investment risk, that is correlated with mortgage payment difficulties. However, repayment risk impacts are modest relative to biographical disruption and single status and economic disadvantage.

- Net financial wealth (other than housing) is a buffer that can help those at risk of default to continue making payments.

This chapter addresses the report's first key research question:

How significant are investment and repayment risks for older Australian mortgagors?

As discussed in the first chapter, growing numbers of Australians are carrying mortgage debt into retirement. Moreover, these mortgagors are paying off higher levels of debt relative to house values and income. These trends have potentially significant consequences for older Australians' wellbeing, as well as housing assistance and welfare systems. In this chapter we document these concerns by profiling the mortgage debt profile of older mortgagors over a period of nearly three decades. Moreover, we extend our previous research by computing a range of mortgage stress indicators that reflect general measures of mortgage indebtedness, as well as associated investment and repayment risks.

We begin by expanding on the earlier (Section 1.3.1) literature review summary in Section 2.1, and highlight key studies from Australia and overseas which have attempted to model the factors driving mortgage stress, including investment and repayment risks. The literature review

uncovers some gaps of policy importance that are addressed by our analysis. In Section 2.2, we profile long-run trends in mortgage stress indicators among mortgagors aged 55 years and over. This is followed by a more in-depth analysis of investment risk versus repayment risk as key indicators of mortgage stress in Section 2.3. In Section 2.4, we report key findings from modelling exercises that compare the effect of investment risk and repayment risk on mortgage payment difficulties.

2.1 Existing research

There are a series of studies that have examined investment and repayment risks for mortgagors using both household-level and loan-level data sources. For instance, Read, Stewart et al. (2014) used the household-level HILDA Survey to analyse factors associated with housing loan arrears. In the UK, Bowie-Cairns and Pryce (2005) used the British Household Panel Survey (BHPS) to chart trends in mortgage payment difficulties. In the US, Dushi, Friedberg et al. (2010) and Stafford, Hurst et al. (2012) used the household-level Panel Survey of Income Dynamics (PSID) to model the factors driving mortgage stress.

Loan-level data from two Australian banks on residential mortgages are utilised by Read, Stewart et al. (2014) to model the probability of entering arrears. A US study reported in Bajari, Chu et al. (2008) used loan performance data to identify key drivers of mortgage defaults by subprime borrowers, while Quercia, Pennington-Cross et al. (2012) employed loan data from a database containing community reinvestment home purchase loans to estimate the probability of very low-income households defaulting on a mortgage.

Studies that have examined investment and repayment risks typically found that both were important factors causing mortgage repayment difficulties. Read, Stewart et al. (2014) discovered that the probability of entering arrears increases with investment risk as measured by the loan-to-value ratio (LVR) at origination. In the US, Bajari, Chu et al. (2008) found that declines in home values have substantial effect on subprime defaults, with estimates suggesting that a 20 per cent decline in home values increases the likelihood of default by 15 per cent. Read, Stewart et al. (2014) also found that the probability of missing a mortgage payment is particularly high for households with relatively high repayment risk as measured by debt-servicing ratios.

However, equally important are the socio-demographic and economic characteristics of mortgagors. There is evidence indicating that the following demographic factors increase the probability of mortgage repayment problems—presence of a disability (Stafford, Hurst et al. 2012), divorce and separation (Bowie-Cairns and Pryce 2005; Berry et al. 2010), and number of children (Bowie-Cairns and Pryce 2005). Key economic factors correlated with difficulty meeting mortgage repayments include inactive labour market status and low incomes. Difficulty meeting mortgage repayments was more likely for those out of the labour force (Read, Stewart et al. 2014), or unemployed (Stafford, Hurst et al. 2012),while those in professional and managerial roles have less risk of facing mortgage difficulties (Bowie-Cairns and Pryce 2005). The self-employed, a group prone to income insecurity, are more likely to have mortgage repayment difficulties (Read, Stewart et al. 2014). Unsurprisingly, low incomes also result in difficulty with meeting mortgage repayments (Stafford, Hurst et al. 2012; Quercia, Pennington-Cross et al. 2012).

Few studies have focused on older mortgagors, an exception being the US study published in Dushi, Friedberg et al. (2010). Temple's (2008) Australian study used the 2002 ABS General Social Survey (GSS) to identify which demographic, economic and housing factors were correlated with older Australians exposed to housing affordability stress. The study found that compared with home owners, purchasers were 3.5 times more likely to experience housing affordability stress, while public and private renters have a 2.5 and 2.8-times higher risk,

respectively. However, this study is now outdated and does not distinguish between investment and repayment risks. Our report fills a critical gap in the literature on mortgage stress by distinguishing between different types of mortgage-related financial risks for older mortgagors in Australia.

2.2   Mortgage stress indicators: Long-run trends

In this section, we profile long-run trends in mortgage stress indicators for mortgagors aged 55 years and over using the ABS SIH for the period 1987 to 2015. The long-run analysis allows us to observe the mortgage profiles of older mortgagors, and associated investment and repayment risks, over an extended time period during fluctuating housing market conditions, and major changes in government fiscal policies (e.g. capital gains tax reform in 1999 and the introduction of GST in 2002) and public policies (e.g. introduction of first home owners grant in 2000).

Significantly, the period spanned a momentous housing market boom that saw many property owners reap windfall gains during the late 1990s to the mid-2000s, an upswing ending in an alarming global financial crisis (GFC) during the late 2000s, which originated in housing markets. The length of the study timeframe also allows us to observe the post-GFC years when housing markets started to recover, but did not regain the strength characteristic of the pre-GFC years. It was also a period during which Australians experienced similar highs and lows in labour market conditions.

The late 1980s and early 1990s presented difficult labour market conditions. The unemployment rate was 9 per cent as the 1980s drew to a close, and spiked at more than 10 per cent during the recession of the early 1990s. The subsequent housing market boom coincided with a period of strengthening labour market conditions, with the unemployment rate falling to a historical low of 4.3 per cent just before the GFC hit in 2008, before rising again to around 6.5 per cent in 2015.[2]

The period 1987–2015 also saw the introduction of some major policy reforms that addressed issues linked to population ageing and helped shape the financial strategies chosen by older Australians. The first was the Superannuation Guarantee introduced in 1992; which obliged employers to contribute to the superannuation savings of employees, which employees could not access before they reached the compulsory superannuation preservation age (Ong, Haffner et al. 2013a). This was a form of 'forced' savings which might have incentivised home owners to 'bring forward' their superannuation savings by taking out higher mortgage debt burdens then they would otherwise have chosen; and then draw down superannuation balances to pay off mortgage debt still outstanding on retirement. Indeed, Ong, Haffner et al. (2013a) provide preliminary evidence to suggest there is a statistical association between the drawdown of superannuation lump sums and reduction in mortgage debt once mortgagors reach superannuation preservation age. Later in this report, we explicitly test this hypothesis using more sophisticated econometric modelling approaches.

The period was also marked by deregulation of financial markets, which loosened credit lending controls. For instance, banks were allowed to increase the share of property lending in their assets, and interest rate controls on all new housing loans were abolished by 1986 (Debelle

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[2] The unemployment rate time series is drawn from ABS (2017b).

2010). Standard home loan interest rates fell from a high of 15 per cent in 1987 to a historical low of under 6 per cent by 2015.[3]

Table 1 charts the mean mortgage, home value and income profiles of older mortgagors for the period 1987 to 2015.[4] Financial variables were converted to 2015 values using the ABS Consumer Price Index (CPI).[5] Quarterly CPIs were averaged to derive annual CPI values in the selected years. Our unit of analysis is the individual while the unit of measurement is the income unit. To illustrate, consider the hypothetical example of a couple, Tom and Kate. As the unit of analysis is the individual, both Tom and Kate are counted in the sample used to produce the calculations. However, the unit of measurement is the income unit, which means that mortgages, home values, income estimates, as well as the derived investment and repayment risk indicators, are all calculated on an income unit basis to reflect the fact that Tom and Kate would likely be sharing their resources and liabilities as a couple, much as a community has access to a public good such as parks, or national defence. So if the couple live in a house valued at $700,000 against which a debt of $300,000 is owed, the full house value of $700,000 and full debt value of $300,000 would be assigned to both Tom and Kate, instead of being split between them.

The table shows a sharp increase in the incidence of mortgage indebtedness—a doubling from 14 per cent to nearly 28 per cent—between 1987 and 2015. In the previous millennium (1997), just under one in ten older home owners held a mortgage, while the remaining 90 per cent owned their homes outright. However, as house prices soared into the new millennium, older home owners began taking on higher mortgage debts. By 2008, one in five older home owners were indebted and by 2015 one in four older home owners still had a mortgage to pay off. These trends reflect the pace at which house prices have outstripped incomes, so that home buyers have to take on higher mortgage debt burdens to purchase housing. Moreover, as house prices have soared, it appears that home owners are increasingly drawing down on their housing wealth to fund spending needs (Ong, Haffner et al. 2013a). The accumulation of superannuation savings under the Superannuation Guarantee system introduced in 1992, and longer working lives, may also encourage owners to carry larger mortgages later in life (Cigdem-Bayram, Ong et al. 2017).

The rest of the table sheds light on the mortgage debt profile of older mortgagors relative to their income and home values. It is clear that real mortgage debt burdens have skyrocketed over the period of analysis. Back in 1987, the real mortgage debt carried by older mortgagors was only $27,000. By 2015, this had blown out by nearly 600 per cent to over $185,000, while house prices more than tripled between 1987 and 2015. Back in 1987, older mortgagors average mortgage debt burdens were 13 per cent of average home values. This climbed to over 30 per cent as the property boom took off in the late 1990s, and has remained at that level ever since, even as global housing markets experienced a significant downturn during the GFC, and remained weaker in the post-GFC recovery period. Over the same period, the required average annual mortgage repayments more than tripled from $5,000 to $17,000. The rise in annual mortgage repayments is accompanied by a similarly hefty tripling in house values (from $210,000 to $710,000). It is notable that while the late 1990s featured sharp spikes in house prices and mortgage debts, disposable incomes trailed behind house price growth; and though

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[3] The home loan interest rate time series is drawn from the Reserve Bank of Australia's statistical tables on indicator lending rates at http://www.rba.gov.au/statistics/tables/#interest-rates

[4] Median trends in mortgage stress indicators are presented in Appendix A1. These display the same trends as the means though the median values are in general lower than the means.

[5] The CPI time series is drawn from ABS (2017a).

real annual disposable income doubled from $38,000 to $88,000 between 1987 and 2015, this growth fell well short of the increase in real house prices over the same period.

Table 1: Mean trends in mortgage, home value and income for mortgagors aged 55+, 1987–2015

	All home owners	Mortgage debt, income and home values for mortgagors (real $ in 2015 values)			
Year	Incidence of mortgage indebtedness (%)*	Mortgage debt	Annual mortgage payment	Disposable income	Home value
1987	14.0	27,206.7	5,116.2	38,346.4	215,258.9
1990	9.8	32,858.3	6,955.8	39,115.3	292,228.2
1997	9.5	93,996.1	15,894.8	48,022.3	297,847.0
2003	12.9	115,530.8	14,419.3	65,151.4	446,104.0
2008	20.4	159,055.4	19,555.2	82,830.9	647,128.6
2012	25.2	166,875.9	17,710.4	82,146.6	657,937.1
2015	27.5	185,757.6	17,273.8	87,908.9	716,492.0

Notes: Estimates are weighted using cross-sectional population weights provided in the SIH dataset. *Outright owners included in sample to calculate incidence of mortgage indebtedness.

Source: Authors' own calculations using the SIH 1987, 1990, 1997, 2003, 2008, 2012, 2015.

2.3   Investment and repayment risks

Table 2 presents a series of measures that allow us to gauge how vulnerable older mortgagors are to the financial risks associated with carrying high mortgage debt burdens. The table presents four investment risk measures, all of which are based on the level of mortgage debt relative to home value:

- loan-to-value ratio (LVR)—Home mortgage debt expressed as a percentage of home value

- leverage multiplier—the percentage of housing equity that would be wiped out if house prices were to decline by 1 per cent, and expressed as a ratio calculated from $1/(1 - LVR)$ (Mian and Sufi 2014)

- incidence of limited equity—the proportion of older mortgagors whose LVR exceeds 60 per cent, and therefore possess equity of less than 40 per cent of the home value (Ong, Jefferson et al. 2013b)

- incidence of negative equity—the proportion of older mortgagors with LVRs that exceed 100 per cent of their home value.

The table also presents two measures of repayment risk, which is the ability of older mortgagors to repay their mortgage debt burdens given their income levels:

- mortgage debt to income ratio (MDIR)—home mortgage debt expressed as a percentage of annual disposable income

- mortgage payment to income ratio (MPIR)—annual mortgage payment expressed as a percentage of annual disposable income.

Table 2: Mean investment and repayment risk indicators for mortgagors by age group, 1987–2015

Year	LVR * (%)	Leverage multiplier** (ratio)	Incidence of limited equity (%)	Incidence of negative equity (%)	MDIR (%)^	MPIR (%)#
		Investment risk			**Repayment risk**	
55+ years						
1987	13.3	1.154	3.1	0.0	70.9	13.3
1990	13.2	1.152	3.1	0.0	84.0	17.8
1997	30.8	1.444	20.0	2.3	195.7	33.1
2003	29.6	1.421	12.5	2.3	177.3	22.1
2008	28.0	1.388	10.3	2.4	192.0	23.6
2012	28.4	1.396	12.5	0.8	203.1	21.6
2015	29.7	1.423	13.7	1.5	211.3	19.6
<55 years						
1987	35.4	1.548	17.3	0.5	105.1	18.4
1990	30.3	1.435	12.0	0.6	115.8	25.1
1997	48.3	1.935	34.6	3.2	165.4	24.9
2003	45.1	1.821	28.5	2.1	216.3	22.5
2008	47.0	1.886	30.8	2.0	217.0	24.8
2012	50.8	2.031	38.4	2.6	233.9	22.2
2015	52.1	2.088	40.3	2.7	268.4	21.4

*Notes: Estimates are weighted using cross-sectional population weights provided in the SIH dataset. *Averages are estimated using the sample mean of individual mortgage debt/ individual home value; **Leverage multiplier estimated using 1/(1-Overall Mean LVR); ^Averages are estimated by taking the ratio of Overall Mean Mortgage Debt in Year X/Overall Mean Disposable Income in Year X; # Averages are estimated by taking the ratio of Overall Mean Mortgage Repayment in Year X/Overall Mean Disposable Income in Year X.*

Source: Authors' own calculations using the SIH 1987, 1990, 1997, 2003, 2008, 2012, 2015.

It is clear from Table 2 that investment risk has risen for older mortgagors over the period 1987–2015. Prior to the property boom of the late 1990s, the leverage multiplier sat at around 1.15. This means that a 1 per cent decline in house prices would drive housing equity down by 1.15 per cent, or alternatively, a 10 per cent decline in house prices would have reduced housing equity by 11.5 per cent back then. This does not appear to represent a significant investment risk. However, it is notable that older mortgagors have become more exposed to investment risk in recent years with the leverage multiplier stretching out to around 1.4 during the late 1990s and new millennium. Hence, in 2015, a 10 per cent decline in house prices would reduce older mortgagors' housing equity by 14 per cent. The incidence of negative equity is reassuringly low and has gradually rather than steeply climbed by 1–2 percentage points since 1987; though back then negative equity was entirely absent among older mortgagors.

Furthermore, while the share of older mortgagors with limited equity was only 3 per cent in 1987, this has grown to 14 per cent.

These indicators suggest that while older mortgagors are carrying more mortgage debt than before, most have remained in positive equity territory, and the number that are trapped 'under water' is negligible. However, the number of older mortgagors who are moving close to the precarious edges of ownership is increasing. This is because house prices soared, but mortgage debts grew at an even faster rate.

Mortgagors close to the edge are vulnerable to sharp changes in house prices. As shown in Table 3, if house prices were to suddenly fall by 5, 10 or 20 per cent in 2015, the incidence of negative equity would increase from 1.5 per cent to 1.9, 2.9 and 4.4 per cent of mortgagors respectively. At the same time, the incidence of limited equity would rise from 13.7 per cent to 15.3 per cent, 17.5 per cent and 22.4 per cent respectively. While a sharp plunge of 20 per cent in house prices might seem unlikely, the recent downward trend in property prices is continuing. If the gradual price declines of the last year or so are sustained another 12 months, declines of around 20 per cent from their previous peak are probable in our larger cities. It is notable that monthly property value indices from CoreLogic show property prices in Sydney plunged by nearly 9 per cent between the start and end of 2018, while property prices across the five major capital cities tumbled by 6.4 per cent over the same period.[6]

Table 3: Count and incidence of mortgagors aged 55+ facing negative and limited equity under actual and hypothetical house prices in 1987 and 2015

	Actual		House prices decline by:					
			5%		10%		20%	
	N	%	N	%	N	%	N	%
In negative equity								
1987	0	0	0	0	0	0	4,128	1.4
2015	16,962	1.5	21,921	1.9	34,436	2.9	51,743	4.4
In limited equity								
1987	0	0	0	0	0	0	4,128	1.4
2015	160,603	13.7	178,334	15.3	204,545	17.5	261,970	22.4

Source: Authors' own calculations using the SIH 1987 and 2015.

The MDIR indicators are more worrying, and suggest that repayment risk is relatively severe compared to investment risk. Older mortgagors' average MDIR tripled from 71 per cent to 211 per cent between 1987 and 2015. Hence, while mortgage debt burdens were lower than annual disposable incomes in the late 1980s and early 1990s, they soared to nearly 200 per cent of income in the late 1990s and have remained stubbornly high at over 200 per cent since then. Back in 1987 these levels of indebtedness would be alarming, but mitigating such concern are lower interest rates in the 2000s.

As a result the MPIR trend does not parallel the steep upward movements in the MDIR. While average MPIRs rose from 13 per cent to 33 per cent between 1987 and 1997, they declined to a

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[6] The property value monthly indices are accessible on the CoreLogic website at https://www.corelogic.com.au/research/monthly-indices.

more comfortable 19.6 per cent in 2015 due to relaxation of monetary policy following the GFC, causing home loan interest rates to fall to historically low levels during the 2000s. However, the average MPIR hides a sizeable cohort of older mortgagors who may be experiencing a degree of mortgage stress. At a home loan interest rate of approximately 6 per cent in 2015, we find that around 27 per cent of older mortgagors had MPIRs greater than 30 per cent, that is, more than one in four older mortgagors were making mortgage repayment that exceeded 30 per cent of their disposable income. As shown in Table 4, if interest rates were to rise by 0.5 percentage points, the share of older mortgagors with MPIRs greater than 30 per cent would rise to 29 per cent. If interest rates jumped even higher by 1 or 1.5 percentage points, the share of older mortgagors are carrying a MPIR burden of greater than 30 per cent would rise to 31.5 and 33.5 per cent respectively. This share is significant as it represents one-third of all older mortgagors.

Comparing the over and under 55s in Table 2, the estimates reveal generally higher investment and repayment risk among under 55s. The leverage multiplier shows that back in 1987, a 10 per cent decline in house prices would typically wipe out 15 per cent of a younger mortgagor's housing equity; by 2015 this had increased to 21 per cent (compared to a smaller rise from a lower base for older mortgagors). Despite relatively high incomes compared with older mortgagors, younger mortgagors' MDIRs and MPIRs also reflect higher repayment risk as they have to repay higher levels of mortgage debt than older mortgagors, many of whom took out mortgages before the sustained house price boom that caused younger generations to fall further behind in terms of fulfilling the 'great Australian dream' of owning a home. However, it is noteworthy that the difference between older and younger mortgagors is one of degree, with the former exposed to levels of risk that are surprisingly high given their stage in the life cycle. Serious ill health is a more common occurrence later in the life cycle, and if made redundant older individuals can also find it more difficult to regain employment. In later life those in mortgage stress are more likely to experience crisis due to these hazards. It is then important to identify the characteristics of those older mortgagors that are prone to mortgage stress, a task we address in the next section.

Table 4: Count and incidence of mortgagors aged 55+ facing MPIRs of greater than 30 per cent under actual and hypothetical interest rates in 1987 and 2015

			Interest rates rise by:					
	Actual		**0.5 percentage point**		**1 percentage point**		**1.5 percentage point**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Paying MPIR>30%								
1987	38,474	13.1	40,448	13.8	42,296	14.4	42,296	14.4
2015	316,185	27.0	339,065	29.0	368,074	31.5	391,544	33.5

Source: Authors' own calculations using the SIH 1987 and 2015.

2.4   Model and variables

2.4.1   Model

In this section, we estimate the effects that different financial measures of mortgage stress have on the odds that older mortgagors would not be able to pay their mortgage on time. We restrict our sample to mortgagors aged 55 years or over. We estimate an econometric model where the outcome variable is a binary indicator that shows whether an older mortgagor has faced difficulty meeting mortgage payments, and 0 otherwise. The logit model specification is

estimated by maximum likelihood methods, so we are able to predict the odds of mortgage payment difficulty as a function of mortgage stress and other explanatory variables.

We estimate a logit specification as follows:

$$\Pr(D_{it}) = f(M_{it}, X_{it}, \varepsilon_{it})$$

where i indexes individuals, t indexes time, D indicates whether one has experienced difficulty meeting mortgage payments, M represents a mortgage stress indicator, X represents a vector of controls and ε_{it} it is a random error term.

While the latest wave of the HILDA Survey was for the year 2016, we pool together the three most recent waves—2014, 2015 and 2016—so as to include non-housing wealth variables from the latest (2014) wealth module in our econometric model. Because we are pooling together multiple waves of the HILDA Survey, we calculate a Hausman test statistic to determine whether a pooled model is appropriate (as would typically be the case in a cross-section dataset), or whether a random effects model would be more appropriate (as is typically the case in a panel dataset). The results of the Hausman test ruled out any systematic differences in coefficients between a pooled and random effects logit model.

2.4.2 Outcome and predictor variables

The outcome variable in the model is a binary indicator drawn from the HILDA Survey's self-completion module. The indicator equals 1 if an older mortgagor has reported being unable to pay their mortgage on time during the calendar year due to financial difficulties, and 0 otherwise. The outcome variable is regressed against measures of mortgage stress, and a range of other explanatory variables that capture socio-demographic and human capital characteristics, geographical areas, as well as levels of wealth from sources other than the family home. (See Table 5 for a list of the variables and their definitions).

Our key predictors of interest are mortgage stress indicators. Following Read, Stewart et al. (2014), we differentiate between investment and repayment risks as measures of mortgage stress. We hypothesise that the presence of investment risk is qualitatively different from repayment risk, and may therefore have a different impact on mortgage payment problems.[7] Hence, we experiment with the range of mortgage stress indicators reflecting the investment risk and repayment risk measures described in the previous sections.

The leverage multiplier and MPIRs were chosen to represent investment risk and repayment risk in the model as the correlation coefficient between the two measures is extremely low (–0.01), as well as being statistically insignificant, and so concerns around collinearity are allayed. The leverage multiplier and MPIR are first entered into the model as continuous variables (Model 1). To account for potential non-linearity in the association between investment risk and difficulty paying one's mortgage on time, a second separate model (Model 2) is also estimated; it differs from the first model because we categorise the leverage multiplier into five separate binary indicators, with each representing a quintile of the leverage multiplier distribution. Hence, the first quintile of the leverage multiplier identifies mortgagors in the bottom 20 per cent of the leverage multiplier distribution, the second quintile identifies those in the 20th–40th percentile of the multiplier distribution and so on for the higher three quintiles. In a third model (Model 3) we take the same quintile approach to categorise the MPIR variable to

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[7] An owner with little equity at stake may be more likely to default because there is less to lose in the event of foreclosure. Those with higher repayments relative to income are more likely to default because other necessities such as food expenses must be met, and the owner may have to prioritise those other necessities when spending needs are acute.

account for potential non-linearity in the association between repayment risk and difficulty paying the mortgage on time (Model 3).

Key socio-demographic variables are captured by binary indicators representing different marital states, sex, region of birth, and the presence of dependent children. Human capital characteristics are represented by reported labour force status and highest educational qualification, which may in turn reflect financial sophistication in the management of assets and debt. However, income is excluded from the model due to its collinearity with the MPIR, which is a component of this measure. Age is also excluded due to collinearity with not in the labour force status. Geographical areas are represented by capital city and rest of state variables, as housing markets may exhibit different trends in different geographical areas. We also capture the influence of net wealth stored in other property (e.g. investment properties, holiday homes) as well as wealth that is not stored in housing (either family home or other property) assets. By including these variables, we control for the potential influence of the elderly's investment in other forms of wealth that can be drawn down to meet mortgage commitments tied to the family home.

Table 5: Variables in model of the odds of facing difficulty paying mortgage on time

Variable category	Variable definition	Binary or continuous
Difficulty making mortgage payments on time	Unable to pay mortgage on time during the calendar year due to financial difficulties	Binary
Marital status	Legally married	Binary
	De facto	Binary
	Separated	Binary
	Divorced	Binary
	Widowed	Binary
	Single never married	Binary
Sex	Female	Binary
Region of birth	Australian-born	Binary
	Born in overseas English-speaking countries, defined as United Kingdom, New Zealand, Canada, USA, Ireland and South Africa	Binary
	Born in overseas non-English speaking countries	Binary
Children	Has dependent children	Binary
Labour force status	Employed	Binary
	Underemployed	Binary
	Unemployed	Binary
	Not in the labour force	Binary
Highest qualification	Bachelor degree or higher	Binary
	Advanced diploma and diploma	Binary
	Certificates	Binary
	Year 12	Binary

Variable category	Variable definition	Binary or continuous
	Year 11 or lower	Binary
Geographical area	Sydney	Binary
	Balance of NSW	Binary
	Melbourne	Binary
	Balance of Victoria	Binary
	Brisbane	Binary
	Balance of Queensland	Binary
	Perth	Binary
	Rest of Australia, defined as Adelaide, Balance of South Australia, Balance of Western Australia, Tasmania and the territories	Binary
Wealth other than the family home	Real other property net wealth in $'0,000 from 2014, expressed in 2015 prices, calculated as total other property asset values less total other property debt	Continuous
	Real non-housing net wealth in $'0,000 from 2014, expressed in 2015 prices, calculated as total non-housing asset values less total non-housing debt	Continuous
Investment risk	Leverage multiplier	Continuous
	Leverage multiplier quintile 1, denoting bottom 20% of the leverage multiplier distribution	Binary
	Leverage multiplier quintile 2	Binary
	Leverage multiplier quintile 3	Binary
	Leverage multiplier quintile 4	Binary
	Leverage multiplier quintile 5, denoting top 20% of the leverage multiplier distribution	Binary
Repayment risk	MPIR	Continuous
	MPIR quintile 1, denoting bottom 20% of the MPIR distribution	Binary
	MPIR quintile 2	Binary
	MPIR quintile 3	Binary
	MPIR quintile 4	Binary
	MPIR quintile 5, denoting top 20% of the MPIR distribution	Binary

Source: Authors.

2.5 The links between investment and repayment risks and difficulty paying mortgage on time

Table 6 compares the mean characteristics of older mortgagors who had difficulty paying their mortgage on time, versus those free of those difficulties, as measured over the analysis timeframe. The data has been pooled together from waves 14, 15 and 16 of the HILDA Survey to form a person-year dataset. Hence, if an older mortgagor responded to all three waves, then

the older mortgagor appears in the data three times. The table provides prima facie evidence of a strong statistical link between repayment (as represented by the MPIR) and difficulty paying mortgages on time. Older mortgagors with mortgage payment difficulties are over-represented in the higher MPIR quintiles. For instance, 31 per cent of older mortgagors with difficulty meeting their mortgage payments have MPIRs in the top 20 per cent of the MPIR distribution, but less than one-fifth have MPIRs in the bottom quintile of the MPIR distribution. The link between investment risk and mortgage payment difficulties is less clear. While older mortgagors with payment problems are over-represented in the highest leverage multiplier quintile, they are also over-represented in the lowest quintile. On the other hand, older mortgagors that have been making their mortgage payments on time are more or less equally spread across the MPIR and leverage multiplier quintiles.

Biographical disruption and economic disadvantage appear to be associated with failure to meet mortgage payments on time. Older mortgagors who report difficulty making their mortgage payments on time are more likely have suffered a marital breakdown through divorce, separation or widowhood than those free of payment problems. The former are also more likely to have dependent children, perhaps pointing to greater spending needs as a result of the presence of dependents within the family.

Over one-fifth of those with payment difficulties are underemployed. Unemployment and being out of the labour force are also correlated with difficulty in paying mortgages on time. On the other hand, those with bachelor qualifications or higher are more likely to manage their mortgage payments in a timely manner than those with lower qualifications.

There are some geographic differences, though the pattern is unclear. Those reporting difficulty paying their mortgage on time appear to be over-represented in Brisbane and the rest of Queensland. Despite housing markets typically being tighter in larger cities like Sydney and Melbourne, they appear to be under-represented among those prone to mortgage payment problems.

There are some strong correlations between levels of wealth stored outside the family home and ability to meet mortgage payments. Those meeting mortgage payments on time have accumulated almost three times the net wealth in other property compared to those with payment difficulties ($218,000 for the former compared to $80,000 for the latter). Similarly, they possess nearly 2.5 times the net non-housing wealth held by those with payment problems. This may reflect the fact that those with higher net wealth are generally more comfortable financially, and can therefore cope better with their mortgage payments. It may also reflect the correlation between lower net wealth and greater debt repayment obligations tied to assets other than the family home, e.g. mortgage debt on the investment property, credit card debt, HECS debt. The need to meet multiple debt obligations can put pressure on a household's ability to cope with primary home mortgage payments.

Table 6: Mean characteristics of mortgagors aged 55+, according to whether they had difficult paying mortgage on time

Characteristics	Difficulty paying mortgage on time	
	No	Yes
Marital status		
Legally married	0.727	0.645
De facto	0.084	0.053
Separated	0.033	0.035

Characteristics	Difficulty paying mortgage on time	
	No	Yes
Divorced	0.086	0.148
Widowed	0.039	0.081
Single never married	0.030	0.039
Country of birth		
Australian-born	0.660	0.604
Overseas English-speaking	0.136	0.066
Overseas non-English speaking	0.204	0.330
Presence of children		
Has dependent children	0.211	0.342
Labour force status		
Employed	0.652	0.572
Underemployed	0.043	0.207
Unemployed	0.010	0.012
Not in the labour force	0.338	0.417
Highest educational qualification		
Postgraduate	0.057	0.029
Graduate diploma	0.084	0.035
Bachelor or Honours	0.137	0.057
Advanced diploma and diploma	0.126	0.059
Certificates	0.249	0.332
Year 12	0.094	0.213
Year 11 or lower	0.252	0.275
Geographical location		
Sydney	0.178	0.074
Balance of NSW	0.119	0.102
Melbourne	0.196	0.148
Balance of Victoria	0.067	0.078
Brisbane	0.106	0.243
Balance of Queensland	0.084	0.176
Perth	0.083	0.042
Balance of WA	0.020	0.020
Adelaide	0.067	0.038

Characteristics	Difficulty paying mortgage on time	
	No	Yes
Balance of SA	0.019	0.020
Tasmania	0.023	0.024
Northern Territory	0.009	0.035
Australian Capital Territory	0.030	0.000
Net wealth		
Real other property net wealth in $'0,000 in 2014	21.878	8.001
Real non-housing net wealth in $'0,000 in 2014	59.997	24.719
Investment risk		
Leverage multiplier quintile 1	0.206	0.223
Leverage multiplier quintile 2	0.199	0.217
Leverage multiplier quintile 3	0.198	0.175
Leverage multiplier quintile 4	0.195	0.150
Leverage multiplier quintile 5	0.201	0.235
Repayment risk		
MPIR quintile 1	0.218	0.157
MPIR quintile 2	0.199	0.107
MPIR quintile 3	0.201	0.209
MPIR quintile 4	0.197	0.217
MPIR quintile 5	0.185	0.310

Notes: The reference categories are married, employed, bachelor degree or higher, rest of Australia (balance of Western Australia, South Australia, Tasmania and the territories), leverage multiplier quintile 1 and MPIR quintile 1.

Source: Authors' own calculations based on the 2014–2016 HILDA Survey.

Table 7 presents estimates from the logit model. Here, we are able to isolate the link between investment risk and repayment risk and the difficulty in making mortgage payments on time. Potentially confounding influences from socio-demographic, human capital, geographical and wealth variables are accounted for via control variables that capture these characteristics. A predictor can be binary (taking a value of either 0 or 1) or continuous in nature. For a binary predictor (e.g. 1 if divorced, 0 if not divorced), the odds ratio is the odds of finding difficulty making mortgage payments on time for the group defined when the predictor takes on a value of 1 as a ratio to the odds for the group defined when the predictor takes on a value of 0. As for a continuous predictor (e.g. other property net wealth), the odds ratio is the percentage change

in the odds of difficulty meeting mortgage payments on time when the predictor changes by one unit.[8]

We present three models that reflect different approaches to measuring the leverage multiplier and MPIR. In Model 1, the two measures are entered in their continuous form. In Model 2, we focus on the impact of investment risk and also account for potential non-linearity by entering the leverage multiplier in categorical form as determined by presence in quintiles. The MPIR is excluded from this model. Finally, in Model 3, we turn our focus to the impact of repayment risk and also account for potential non-linearity by entering the MPIR in categorical form, again arranged into quintile groupings. This time we exclude the leverage multiplier.

The model estimates confirm the importance of biographical disruption (and single status), economic disadvantage and repayment risk (MPIR) as key drivers of difficulty in making mortgage payments on time. Across all three models, the odds of experiencing mortgage payment difficulties are twice as high for those who are divorced as it is for those who are legally married (the reference category in the model). The odds are even higher among the single never married at around 2.5 times those of the legally married. The absence of full-time employment is again correlated with higher odds of mortgage payment difficulties. An interesting finding is the role of net financial wealth (other than housing) which seems to act as a reserve allowing those at risk of default to continue making payments.

Turning to our key variables of interest—the leverage multiplier and MPIR—we find a mildly positive correlation between the MPIR and the odds of mortgage payment difficulties in Model 1. The odds of mortgage payment difficulties rises by 1.2 percentage points with every 1 percentage point increase in the MPIR. On the other hand, there is no statistically significant link between the leverage multiplier and mortgage payment difficulties. Model 3 again confirms a positive link between a rising MPIR and mortgage payment difficulties. The odds rise from less than 1 to more than 1 at higher MPIR quintiles, though only quintile 5 is statistically significant at the 10 per cent level. Hence, our econometric modelling estimates suggest that repayment risk, rather than investment risk, is correlated with payment difficulties. However, repayment risk impacts are modest; it seems likely that biographical disruption, weak attachment to the labour force and relatively low levels of education and training (that are likely correlated with volatile income streams) precipitate mortgage payment difficulties for those with high mortgage repayment burdens.

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[8] For further technical details on the interpretation of odds ratio, please refer to Singer and Willett (2003), Wood and Ong (2009) and Wood et al. (2013).

Table 7: Logit model of the odds of facing mortgage payment difficulties, mortgagors aged 55+, 2014–2016

Explanatory variables	Model 1: Continuous LM and MPIR	Model 2: LM quintiles only	Model 3: MPIR quintiles only
	Odds ratio (std. error)	Odds ratio (std. error)	Odds ratio (std. error)
Female	1.121	1.142	1.140
	(0.210)	(0.214)	(0.210)
De facto	1.134	1.108	1.133
	(0.358)	(0.350)	(0.359)
Separated	1.367	1.405	1.554
	(0.618)	(0.634)	(0.655)
Divorced	2.077***	2.127***	2.014***
	(0.546)	(0.555)	(0.522)
Widowed	1.712	1.763	1.635
	(0.670)	(0.685)	(0.637)
Single never married	2.334**	2.592**	2.368**
	(0.920)	(1.014)	(0.930)
Born in overseas English-speaking countries	0.531**	0.549*	0.553**
	(0.165)	(0.171)	(0.166)
Born in overseas non-English-speaking countries	0.588*	0.610*	0.608*
	(0.175)	(0.180)	(0.175)
Has dependent children	1.700**	1.587**	1.671**
	(0.400)	(0.371)	(0.386)
Underemployed	1.843*	1.901*	1.917*
	(0.632)	(0.650)	(0.638)
Unemployed	2.827*	2.818*	2.691*
	(1.597)	(1.592)	(1.519)
Not in the labour force	1.813***	1.831***	1.801***
	(0.369)	(0.377)	(0.364)
Advanced diploma and diploma	1.023	1.035	1.197
	(0.376)	(0.381)	(0.420)
Certificate	2.153***	2.188***	2.213***
	(0.570)	(0.581)	(0.586)

Year 12	2.059**	2.063**	2.098**
	(0.692)	(0.693)	(0.709)
Year 11 or lower	1.147	1.137	1.235
	(0.335)	(0.334)	(0.359)
Sydney	0.635	0.677	0.711
	(0.232)	(0.247)	(0.254)
Balance of NSW	1.204	1.230	1.231
	(0.379)	(0.386)	(0.382)
Melbourne	0.988	0.991	1.005
	(0.314)	(0.315)	(0.319)
Balance of Victoria	1.445	1.463	1.562
	(0.471)	(0.476)	(0.502)
Brisbane	0.927	0.940	0.910
	(0.328)	(0.333)	(0.322)
Balance of Queensland	1.387	1.371	1.465
	(0.447)	(0.444)	(0.462)
Perth	0.697	0.655	0.617
	(0.330)	(0.311)	(0.292)
Real other property net wealth in $0,000 in 2014	0.999	0.999	0.999
	(0.003)	(0.003)	(0.003)
Real non-housing net wealth in $0,000 in 2014	0.992***	0.993***	0.992***
	(0.003)	(0.003)	(0.003)
Leverage multiplier	0.939		
	(0.0481)		
MPIR	1.012*		
	(0.00615)		
Leverage multiplier quintile 2		1.779*	
		(0.524)	
Leverage multiplier quintile 3		1.749*	
		(0.533)	
Leverage multiplier quintile 4		1.403	
		(0.448)	
Leverage multiplier quintile 5		1.483	
		(0.456)	
MPIR quintile 2			0.805

			(0.261)
MPIR quintile 3			1.531
			(0.436)
MPIR quintile 4			1.343
			(0.389)
MPIR quintile 5			1.650*
			(0.469)
Constant	0.027***	0.020***	0.023***
	(0.011)	(0.009)	(0.010)
Observations	2,814	2,814	2,928

Notes: *** p<0.01, ** p<0.05, * p<0.1. The reference categories are married, born in Australia, employed, bachelor degree or higher, rest of Australia (balance of Western Australia, South Australia, Tasmania and the territories), leverage multiplier quintile 1 and MPIR quintile 1.

Source: Authors' own calculations from the 2014–2016 HILDA Survey.

2.6   Policy development implications

This chapter presents several key findings that have important policy development implications. The growth in mortgage debt has outstripped both house price and income growth among older mortgagors over several decades, raising legitimate public concerns around investment risk, repayment risk and mortgage payment difficulties among older mortgagors.

Our findings suggest that investment risk affects a growing albeit minority share of older mortgagors. If house prices were to suddenly fall by 10 per cent (based on 2015 data), the share of older mortgagors who would then hold less than a 40 per cent equity stake in their family home would rise from 13.7 per cent to 17.5 per cent. The findings also point to a significant repayment risk when carrying a mortgage debt into retirement. Older mortgagors' average MDIR tripled from 71 per cent to 211 per cent between 1987 and 2015.

Overall, the findings raise questions around the continued assumption that home ownership is the fourth pillar of the retirement incomes system. The assumption that home ownership will shield the elderly from housing affordability stress and alleviate after-housing cost poverty may be increasingly untenable. We explore this in further detail in Chapter 5. Because a growing number of older Australians are carrying higher mortgage debt obligations into retirement, and are therefore more exposed to investment and repayment risks in later life, the age pension may not provide a minimum standard of income adequate for those still making mortgage repayments in retirement. Older mortgagors may need to resort to lump sum drawdowns from their superannuation balances to pay down their mortgage debt in retirement. Ong, Haffner et al. (2013a) present tentative evidence suggesting this might be the case, but we explore this scenario using more robust modelling techniques in Chapter 4.

Our modelling estimates tentatively indicate that repayment risk, rather than investment risk, raises the chances of mortgage payment difficulties among older mortgagors. Long-term planning for a mortgage debt repayment strategy over the life course will be crucial in mitigating a rise in repayment risk as a mortgagor ages. Such planning will need to take into account net financial wealth (other than housing) that can potentially act as a buffer, helping those at risk of default to continue making payments. This may be especially valuable for those prone to biographical disruption, or with weak attachment to the labour force (see below). At the same time, this means that higher levels of non-housing debt can adversely affect older mortgagors'

ability to meet their mortgage commitments. It is also complicated by the increasing fluidity of housing wealth, as financial innovations enable home owners to drawn down on the wealth stored in their family home without moving, albeit by taking on higher levels of debt throughout the life course (Ong, Haffner et al. 2013a).

Our findings also suggest that those who are actively involved in the labour market in later life are more likely to be shielded from mortgage payment difficulties. This is important in the context of Cigdem-Bayram, Ong et al.'s (2017) findings that a growing number of older Australians appear to be willing to extend working lives to pay down their mortgages. While this appears to be a positive outcome for retirement incomes policy and economic productivity in an ageing population, there is a caveat. Unexpected life shocks such as unemployment or marital breakdown are more common in the later stages of the life cycle, and can plunge older mortgagors with over-optimistic expectations into severe mortgage stress. Policy makers need to consider measures to assist older mortgagors to hedge exposure to mortgage payment difficulties. An example would be the requirement that mortgagors take out mortgage insurance if their mortgage debt burden relative to income remains above a specified level after they pass a certain age threshold.

3   Mortgage stress and wellbeing in later life

- The evidence points to higher stress burdens for mortgagors in later life; older mortgagors report lower mental health and higher psychological distress scores than older outright owners.

- When older mortgagors experience difficulty in meeting mortgage payments, male SF-36 mental health scores are reduced by 2 points, and female scores by 3.7 points. Late mortgage payments also raise males' K10 psychological distress scores by nearly 2 points.

- Exposure to investment and repayment risk alone does not appear to strongly affect older mortgagors' wellbeing—a rising mortgage payment to income ratio does not adversely impact wellbeing, and a rising leverage multiplier has a mildly adverse impact on mental health and psychological distress, but for men only.

- Among older mortgagors, women generally have lower levels of mental health and higher levels of psychological distress than male mortgagors. The average SF-36 score for older female mortgagors is 73.5, compared to 77.1 for older male mortgagors. As well, the K10 distress score for older female mortgagors is 15.9, compared to 14.6 for older male mortgagors.

- Older female mortgagors' SF-36 mental health is more sensitive to personal circumstances than older male mortgagors. Marital breakdown, ill health and poor labour market engagement all adversely affect women's SF-36 mental health scores more than men's.

- Men and women's K10 psychological distress levels are influenced by different factors. Widowhood plunges men but not women into psychological distress, while unemployment and ill health raises distress levels for women but not men. Men's distress levels are also likely to be mitigated somewhat by volunteering activities, but this is not so for women.

This chapter addresses the report's second key research question:

What impacts does the level of mortgage indebtedness have on older mortgagors' personal wellbeing?

The GFC has undoubtedly raised some important questions around the effects that economic instability and financial stress have on health outcomes (Stuckler, Basu et al. 2009; Karanikolos, Mladovsky et al. 2013). Credit and debt, in particular, have emerged as potentially important influences on households' personal wellbeing (Bridges and Disney 2010; Keese and Schmitz 2014). Concerns are increasing around the influence of mortgage debt, which dominates the debt portfolios of most households (Mason, Baker et al. 2013).

Financial innovations following mortgage market deregulation have spawned a new breed of flexible financial products. These products allow home owners to borrow against their housing equity by increasing the mortgage debt secured against their housing assets in a relatively cheap manner, and without the need to move (Ong, Parkinson et al. 2013c). While this *in situ* equity borrowing can unlock a much needed income flow to meet spending needs (Benito

2007), it may also extend mortgage debt burdens into later stages of the life course and contribute to financial stress (Ong, Haffner et al. 2013a). As the population ages and growing numbers of Australian households carry mortgage debt burdens into retirement, the wellbeing consequences among older home owners are worthy of scrutiny.

In Section 3.1, we review the existing literature on the links between mortgage indebtedness and personal wellbeing. Section 3.2 presents some descriptive statistics on the links between mortgage stress and wellbeing. We compare the wellbeing outcomes of older mortgagors and older outright owners here. In Section 3.3 we describe our econometric model specification and key variables of interest. Section 3.4 reports the key model findings on the key variables influencing the wellbeing outcomes of older mortgagors, and Section 3.5 presents policy development implications of the findings.

3.1   Existing research

The analysis in this chapter is embedded in an international literature that has examined the impact of housing wealth and debt on wellbeing. Existing studies have found that home owners in regions with high rates of mortgage-backed home ownership are generally in better health than renters (Filakti and Fox 1995; Easterlow, Smith et al. 2000). This has been attributed to a range of factors. For instance, studies have found that inter-tenure differences in the quality of housing stock can affect occupants' health (Lloyd, McCormack et al. 2008). Owning housing wealth has been correlated with better health outcomes (Fichera and Gathergood 2013), and home owners and renters may possess systematically different characteristics not specifically related to housing tenure, but which nonetheless give rise to different health outcomes (Baker, Bentley et al. 2013; Mason, Baker et al. 2013). There may also be selection effects, where those with superior underlying health status select into home ownership (Smith 1990; Smith and Easterlow 2005).

Within this vast literature, there are studies that have focused specifically on the links between mortgage indebtedness and wellbeing. Cairney and Boyle (2004) found that mortgagors (and renters) in Canada are more likely to be psychologically distressed than outright owners. This finding holds even after controlling for demographic, financial and health characteristics. Focusing on UK mortgagors, Nettleton and Burrows (1998; 2000) detected a link between psycho-social stress and unsustainable debt, as represented by mortgage arrears and the risk of repossession. In the US, Cannuscio, Alley et al. (2012) found a negative correlation between health and foreclosures, as did Yilmazer, Babiarz et al. (2015) and Pevalin (2009). Hence, the health outcomes of home ownership range widely, from positive outcomes linked to ontological security to psychological distress linked with foreclosures (Rohe and Lindblad 2013). Using the HILDA Survey and the BHPS, Smith, Cigdem et al. (2017) detected a positive 'outright ownership' effect in both Australia and the UK, but mortgage equity borrowing by mortgagors decreases wellbeing.

The bulk of the literature has not considered older mortgagors. This may be because of traditional notions of housing pathways, where home owners are expected to pay off their mortgage so they would have very low to zero housing costs by the time they retire (Wood and Ong 2012). However, there is a growing trend towards higher rates and levels of mortgage indebtedness in later stages of the life course (Ong, Haffner et al. 2013a), as well as an increase in the number of older mortgagors that can be attributed to population ageing.

Older mortgagors have fewer years of labour market participation ahead of them, so their health and wellbeing may be more vulnerable when mortgage stress occurs. Hence, this chapter fills an important gap in the literature by empirically measuring the effect of mortgage indebtedness on the mental health and psychological distress of older home owners.

3.2 The association links between mortgage stress and personal wellbeing: older mortgagors and older outright owners

We begin analysing the links between mortgage stress and personal wellbeing by first comparing the wellbeing scores of mortgagors aged 55 years or older with a benchmark group of similarly aged outright owners. The sample size used for the analysis of the SF-36 mental health scores is 50,878 person years. In around one-fifth of person-years there is an outstanding mortgage, but in a majority (80.2%) of person-years mortgages have already been paid off, or the owner has never had a mortgage.

Table 8 shows that on a person-year basis, older mortgagors have lower wellbeing scores than older outright owners. The table presents a more detailed breakdown on a year-by-year basis and shows that both groups have levels of mental health that edge upwards over the study timeframe—mortgagors from 74.7 in wave 1 to 75.7 in wave 16, and outright owners from 76.8 in wave 1 to 77.6 in wave 16. However, these are small increases and could reflect ageing effects—older people are typically happier. Mortgagors' wellbeing deficit narrows slightly from 2.1 percentage points to 1.7 percentage points, or from 2.8 per cent to 2.5 per cent.

The Kessler Psychological Distress Scale measure suggests that mortgagors' average psychological distress level is higher than that of outright owners. Mortgagors distress score also edges up from 14.6 in wave 7 to 15.2 in wave 15 (a 4.1% increase), while outright owners' scores are stable at 14.3 in wave 7 and 14.4 in wave 15. A 2.1 per cent mortgagor stress overload stretches out to 5.6 per cent by wave 15.

Table 8: Mean mental health (SF-36) and psychological distress (K10) scores of home owners aged 55+, by mortgagor status and year, 2001–2016

Year	Mental health (SF-36)		Psychological distress (K10)	
	Mortgagors	Outright owners	Mortgagors	Outright owners
2001	74.7	76.8**		
2002	75.1	77.3**		
2003	76.2	77.2		
2004	75.8	77.0		
2005	75.4	77.6**		
2006	75.9	77.5*		
2007	76.2	77.5	14.6	14.2**
2008	76.0	77.9**		
2009	75.4	78.1***	14.8	14.4**
2010	76.7	77.1		
2011	75.9	77.7***	14.9	14.2***
2012	75.8	77.9***		
2013	76.7	78.1**	14.7	14.4***
2014	75.5	77.8***		
2015	75.1	77.6***	15.2	14.3***
2016	75.7	77.6***		14.2**

	Mental health (SF-36)		Psychological distress (K10)	
Year	**Mortgagors**	**Outright owners**	**Mortgagors**	**Outright owners**
Person-year basis	75.8	77.6***	14.9	

Notes: The SF-36 score is measured on a scale of 0–100 and the K10 score is measured on a scale of 10–50. T-tests were performed to compare the statistical significance of differences in mental health between mortgagors and outright owners; *** denotes significant at 1%, ** denotes significance at 5% and * denotes significance at 10%.

Source: Authors' own calculations from the 2001–2016 HILDA Survey in the case of the SF-36 score and every alternative year starting in 2007 and ending in 2015 in the case of the K10 score.

Table 9 provides further insights into the mortgagor excess stress burden, by comparing the wellbeing of older mortgagors across different levels of investment risk, as represented by leverage multiplier quintiles. The quintiles divide older mortgagors into five equal groups, ranging from the bottom 20% of the leverage multiplier distribution in quintile 1 to the top 20% in quintile 5. The trends across different levels of investment risk are mixed. Among men the SF-36 measure of wellbeing invariably declines as higher leverage multiplier quintiles are reached, but among females there is no systematic pattern across leverage multiplier quintiles. Among men, the K10 score is relatively stable across different levels of investment risk, but it does decline among females suggesting declining psychological distress as investment risk increases.

Table 9: Mean mental health (SF-36) and psychological distress (K10) scores of mortgagors aged 55+, by sex and by leverage multiplier quintiles, pooled 2001–2006 data

Leverage multiplier quintile	Male	Female	All
Mental health (SF-36)			
1 (lowest)	78.5	72.9	75.6
2	76.1	73.0	74.6
3	76.5	74.5	75.6
4	77.7	73.1	75.5
5 (highest)	76.5	74.2	75.4
Psychological distress (K10)			
1 (lowest)	14.7	16.2	15.5
2	14.4	16.2	15.3
3	14.9	15.7	15.3
4	14.3	15.8	15.0
5 (highest)	14.6	15.4	15.0

Notes: The SF-36 score is measured on a scale of 0–100 and the K10 score is measured on a scale of 10–50.

Source: Authors' own calculations from the 2001–2016 HILDA Survey in the case of the SF-36 score and every alternative year starting in 2007 and ending in 2015 in the case of the K10 score.

Table 10 compares the wellbeing of older mortgagors across different levels of repayment risk, as represented by MPIR quintiles. Among men, the SF-36 measure of wellbeing once again declines as higher MPIR quintiles are reached. It is more difficult to discern any pattern in the

case of women. The K10 score for both men and women is lowest in the lowest MPIR, suggesting that psychological distress is higher at higher levels of MPIR for both sexes.

Table 10: Mean mental health (SF-36) and psychological distress (K10) scores of mortgagors aged 55+, by sex by MPIR quintiles, pooled 2001–2006 data

MPIR quintile	Male	Female	All
Mental health (SF-36)			
1 (lowest)	78.5	73.5	76.1
2	77.1	74.1	75.7
3	76.8	74.3	75.5
4	77.0	71.9	74.6
5 (highest)	76.1	74.5	75.3
Psychological distress (K10)			
1 (lowest)	14.1	15.5	14.7
2	14.9	16.1	15.5
3	14.7	15.7	15.2
4	14.6	15.8	15.2
5 (highest)	14.6	16.0	15.3

Notes: The SF-36 score is measured on a scale of 0–100 and the K10 score is measured on a scale of 10–50.

Source: Authors' own calculations from the 2001–2016 HILDA Survey in the case of the SF-36 score and every alternative year starting in 2007 and ending in 2015 in the case of the K10 score.

In Table 11, we compare the mean mental health and psychological scores of older male and female mortgagors. Gender differences are apparent. In general, older female mortgagors have lower levels of mental health and higher levels of psychological distress than older male mortgagors. The average SF-36 score for older female mortgagors is 73.5 compared to 77.1 for older male mortgagors. At the same time, the K10 score for older female mortgagors is 15.9, compared to 14.6 for older male mortgagors.

Both the SF-36 and K10 scores show some consistent differences that are correlated with personal characteristics. Those who are married or in a de facto relationship have much higher levels of wellbeing and lower levels of distress in their lives than single persons. Employment generally raises mental health and lowers distress, but less schooling correlates with lower levels of wellbeing, and more distress. Volunteering boosts wellbeing. On the other hand, poor health is especially bad for wellbeing. For men, the SF-36 score rises over time but for females there is a curious spike in wellbeing during the GFC before dropping again to pre-GFC levels in the post-GFC recovery period.

Table 11: Mean mental health (SF-36) and psychological distress (K10) scores of mortgagors aged 55+, by sex and personal characteristics, pooled 2001–2016 data

	Mental health (SF-36)			Psychological distress (K10)		
	Male	Female	All	Male	Female	All
Overall	77.1	73.5	75.3	14.6	15.9	15.2
Marital status						
Married	77.2	75.5	76.5	14.4	14.7	14.6
De facto	78.8	76.0	77.6	14.0	14.9	14.3
Separated	71.9	70.8	71.2	17.5	17.8	17.7
Divorced	73.8	71.9	72.5	15.5	16.1	15.9
Widowed	71.8	74.4	73.9	16.5	15.8	16.0
Single never married	69.8	71.2	70.7	18.0	16.0	16.7
Health						
Long-term health condition	70.0	68.2	69.2	16.7	17.8	17.2
Presence of children						
Has dependent children	77.2	73.8	76.2	14.2	15.3	14.5
Labour force status						
Employed	79.1	77.0	78.2	13.9	14.3	14.1
Unemployed	72.9	68.7	71.3	15.7	18.4	16.9
Underemployed	74.9	72.5	73.5	15.1	15.3	15.2
Not in the labour force	71.1	70.8	70.9	16.7	16.6	16.6
Highest educational qualification						
Postgraduate	79.1	78.1	78.8	14.3	13.8	14.1
Graduate diploma	81.4	75.2	78.0	12.6	14.8	13.8
Bachelor	76.8	75.6	76.2	14.8	15.0	14.9
Advanced diploma/diploma	78.7	75.8	77.6	14.5	14.7	14.6
Certificate	75.5	74.6	75.2	14.8	15.2	15.0
Year 12	76.2	73.9	75.1	14.9	15.5	15.2
Year 11 or lower	75.7	73.6	74.5	15.0	15.5	15.3
Volunteering status						
Volunteer	79.7	78.4	79.0	12.6	13.7	13.2
Geographical location						
Sydney	78.6	73.6	76.2	14.2	15.5	14.9
Balance of NSW	76.7	75.7	76.2	14.4	15.1	14.7
Melbourne	75.8	73.2	74.5	14.9	15.8	15.4
Balance of Victoria	79.1	74.9	77.0	14.0	14.9	14.4
Brisbane	77.5	78.8	78.1	14.3	14.1	14.2

	Mental health (SF-36)			Psychological distress (K10)		
	Male	**Female**	**All**	**Male**	**Female**	**All**
Balance of Queensland	73.9	74.3	74.0	15.9	15.4	15.7
Perth	76.0	71.5	73.9	14.6	15.7	15.1
Economic cycle						
Pre-GFC	76.2	74.8	75.6	n/a	n/a	n/a
GFC	76.6	75.5	76.1	n/a	n/a	n/a
Post-GFC	77.1	74.4	75.8	n/a	n/a	n/a

Notes: The SF-36 score is measured on a scale of 0–100 and the K10 score is measured on a scale of 10–50.

Source: Authors' own calculations from the 2001–2016 HILDA Survey in the case of the SF-36 score and every alternative year starting in 2007 and ending in 2015 in the case of the K10 score.

3.3 Model and variables

3.3.1 Model

In this section, we estimate the effects that different measures of mortgage stress have on the wellbeing of mortgagors aged 55 years or over. We exploit all existing waves of the HILDA Survey at the time of analysis, pooling together cases from all 16 waves of the HILDA Survey covering the time period 2001–2016. The sample design is restricted to person-waves (years) where individuals still have an outstanding mortgage and are aged 55 years or over. This then results in a person-year dataset of older mortgagors. So for instance, consider a person who was aged 50 years old in 2001, when the survey began, and that person became a mortgagor in 2003 but subsequently fell out of home ownership in 2010, before rebounding back into home ownership as a mortgagor again in 2014. Only the years in which the person is observed to be a mortgagor aged 55 years or over are included in the pooled dataset. These years are 2006, 2007, 2008, 2009, 2014, 2015 and 2016.

Given the length of the panel used in the modelling, we apply panel data modelling techniques to estimate the effect of mortgage stress (and other factors) on wellbeing. Various recent studies linking housing to wellbeing have also deployed panel data modelling techniques, including Baker, Bentley et al. (2013), Wood, Smith et al. (2013) and Smith, Cigdem et al. (2017). Following these studies we conduct fixed effects linear regression using the following model specification:

$W_{it} = f(M_{it}, X_{it}, \partial_i, \varepsilon_{it})$

Where i indexes individuals, t indexes time, W represents a continuous wellbeing score, M represents a mortgage stress indicator, X represents a vector of controls, ∂_i refers to person-specific fixed effects such as personality traits and ε_{it} represents a random error term. Unobserved heterogeneity can be correlated with the subjective wellbeing score (W) and with the predictors (M and X), and therefore produce biased estimates. A fixed effects model minimises this potential bias to the extent that unobservables such as personality type are fixed over time. The choice of fixed effects estimation is supported by a Hausman test, which indicates that a fixed effects model would produce more consistent estimates than a standard pooled ordinary least squares (OLS), or random effects model.

We test various hypotheses, which further guide our choice of modelling strategy. Firstly, we hypothesise that investment risk and repayment risk have different effects on wellbeing. Hence,

as per the previous chapter, we once again differentiate between the two types of financial risks.

Secondly, objective measures of financial risk may not impact on personal wellbeing until they adversely impact an older mortgagor's ability to make mortgage payments. To test this hypothesis, we model the effect of difficulty meeting mortgage payments on the personal wellbeing of older mortgagors.

Thirdly, the effect of mortgage stress on personal wellbeing may differ between older men and women so we estimate separate models for men and women. There exists a reliable and extensive evidence base that shows clear differences in wellbeing levels between older men and women. These differences are larger than the differences in subject wellbeing between younger men and women. Pinquart and Sörensen (2001) synthesised findings from 300 empirical studies on gender differences in life satisfaction, happiness, self-esteem, loneliness, health, and age in late adulthood. They found significantly lower levels of subjective wellbeing among older women than older men on all wellbeing measures. The study attributed this difference to older women's higher risk of widowhood, health issues and caring responsibilities. On the other hand, the study found that older women's wellbeing may be boosted by greater access to sources of subjective wellbeing, such as relationships with adult children. The strategy of modelling separately for men and women has been implemented numerous times in the published international economics and wellbeing literature to account for differences in behaviour and characteristics of men and women. Examples include Ong and Shah (2012), Austen, Jefferson et al. (2014) and Ong, Nguyen et al. (2018).

Fourthly, anxiety about mortgage indebtedness could vary depending on age among older mortgagors, so we stratify our models by age group (55–64 years and 65+ years).

3.3.2   Outcome variables

We focus on two measures of personal wellbeing reported in the HILDA Survey as our key outcome variables. The first is a measure of mental health from the SF-36 Survey—a short-form survey featuring 36 questions on health and wellbeing. The values for each measure are transformed into a 0–100 score; the higher the score, the better the mental health (Ware, Kosinski et al. 2000). The SF-36 mental health score is available in all waves of the HILDA Survey.

The K10 is a score of non-specific psychological distress. It is based on a ten-item questionnaire about negative emotional states experienced in the past 30 days, including tiredness, nervousness, restlessness and depression. The Kessler measure uses a five-point score, ranging from 1 (minimum score indicating a symptom is never experienced) to 5 (maximum score indicating a symptom is experienced all of the time). Thus, the minimum possible score is 10 when a respondent answers 1 for each of the ten questions, denoting the absence of psychological distress. On the other hand, the maximum possible score is 50 when a respondent answers 5 for each question, denoting very high distress (ABS 2001). The Kessler K10 score is only available in waves 7, 9, 11, 13 and 15 of the HILDA Survey, so analysis of these scores is restricted to the waves in which they are available.

Both the SF-36 and K10 measures are derived from questions asked of respondents in relation to the four weeks leading up to the interview.

3.3.3   Predictors

The model predictors are listed and defined in Table 12. Our key predictors of interest relate to mortgage stress. In order to test both our first and second hypotheses, we differentiate between the two objective measures of financial risk—investment risk and repayment risk—as well as difficulty paying the mortgage on time. As per the previous chapter, investment risk is represented by the leverage multiplier, while repayment risk is represented by the MPIR.

Key socio-demographic variables are captured in binary indicators representing different marital states, health, region of birth, and the presence of dependent children. Human capital characteristics are represented by reported labour force status and highest educational qualification, which may in turn affect wellbeing. Income is excluded from the model due to its collinearity with the MPIR, given the presence of income in the denominator of MPIR. Age is also excluded due to collinearity with not in the labour force. Geographical areas are represented by capital city and rest of state variables. In the model, we also capture the influence of net wealth stored in other property (e.g. investment properties, holiday homes), as well as wealth that is stored in non-housing (either family home or other property) assets. We also introduce an additional variable that is likely to affect personal wellbeing outcomes. A volunteering variable is used to represent community participation, as greater community participation has been shown to improve personal wellbeing. The variable is measured as hours per week spent doing volunteering or charity work. Since the panel data spans a rather lengthy timeframe over which general economic conditions have fluctuated, we introduce binary indicators that reflect three distinctive economic periods—pre-GFC (a2001–2007), GFC (2008–2009) and post-GFC (2010–2016).

Table 12: Variables in model of wellbeing

Variable category	Variable definition	Binary or continuous
SF-36 mental health score	Score on a scale of 0 to 100, with higher scores indicating higher levels of mental wellbeing	Continuous
K10 psychological distress score	Score on a scale of 10 to 50, with 10 denoting the absence of psychological distress and 50 denoting very high distress	Continuous
Marital status	Legally married	Binary
	De facto	Binary
	Separated	Binary
	Divorced	Binary
	Widowed	Binary
	Single never married	Binary
Long-term health condition	Has a disability or long-term health condition for six months or more	Binary
Children	Has dependent children	Binary
Labour force status	Employed	Binary
	Underemployed	Binary
	Unemployed	Binary
	Not in the labour force	Binary
Highest qualification	Bachelor degree or higher	Binary
	Advanced diploma and diploma	Binary
	Certificates	Binary
	Year 12	Binary
	Year 11 or lower	Binary

Variable category	Variable definition	Binary or continuous
Volunteering	Hours per week spent doing volunteering or charity work	Continuous
Geographical area	Sydney	Binary
	Balance of NSW	Binary
	Melbourne	Binary
	Balance of Victoria	Binary
	Brisbane	Binary
	Balance of Queensland	Binary
	Perth	Binary
	Rest of Australia, defined as Adelaide, Balance of South Australia, Balance of Western Australia, Tasmania and the territories	Binary
Pre-GFC	2001–2007	Binary
GFC	2008–2009	Binary
Post-GFC	2010–2016	Binary
Net Wealth other than the family home	Real other property net wealth in $'0,000 from 2014, expressed in 2015 prices, calculated as total other property asset values less total other property debt	Continuous
	Real non-housing net wealth in $'0,000 from 2014, expressed in 2015 prices, calculated as total non-housing asset values less total non-housing debt	Continuous
Investment risk	Leverage multiplier	Continuous
Repayment risk	MPIR	Continuous
Difficulty paying mortgage on time	Faced difficulty paying mortgage on time during the calendar year due to financial difficulties	Binary

Source: Authors.

3.4 The impact of mortgage stress on older mortgagors' personal wellbeing

We estimate models of personal wellbeing as a function of mortgage stress and other explanatory variables as described in Section 3.3. To recap, we hypothesise that: (1) investment risk and repayment risk have different effects on wellbeing; (2) objective measures of financial risk may not impact on personal wellbeing until they adversely impact on older mortgagors' ability to make mortgage payments; (3) the effect of mortgage stress on personal wellbeing differ between older men and women. To test these combined hypotheses, we estimate six model variants. In Model 1, the mortgage stress indicators are represented by investment and repayment risk measures. In Model 2, the mortgage stress indicator is simply difficulty meeting mortgage repayments. Models 1 and 2 are estimated separately for men, women and for the full sample, resulting in six sets of estimates for each outcome variable. In Table 13 the outcome variable is the SF-36 mental health score while Table 14 reports estimates for the K10 psychological distress score. Recall that we also hypothesise that anxiety about mortgage indebtedness could vary depending on age. We stratified our models by age

group (45–54 years, 55–64 years and 65+ years) but these models perform poorly so we do not report findings by age group.

We refer first to Table 13 where the outcome variable is the SF-36 mental health score. Our hypotheses are largely confirmed. In Model 1, we hypothesise that investment risk and repayment risk have different effects on wellbeing. We find that high mortgage payment burdens *per se* do not matter, though investment risk does have a negative effect in the full sample estimates. When broken down by gender the effect is only significant in the male equation, but is small in size; exposure to a one point increase in the leverage multiplier reduces the mental health score of older male mortgagors by 0.3 points (equivalent to less than 0.5% of men's average mental health score).

In Model 2, the late repayment variable depresses the SF-36 scores of men by 2 points and those of women by 3.7 points, the latter estimate being strongly significant; while not as large an effect as those obtained for biographical disruption, it is nevertheless more important than the effect of the objective financial risk variables. It is important that when respondents are asked about the experience of difficulty paying their mortgage on time, they are asked to consider their experience since January of the calendar year in which they are interviewed. However, the wellbeing outcome variables are restricted to the timeframe of four weeks previous to the interview. This reduces the risk of reverse causality, that is, the finding is more likely to reflect the impact of late repayment difficulties on wellbeing than the other way around.

In general, we find that older female mortgagors' mental health is more sensitive to their personal circumstances than older male mortgagors. Marital status is very important, but it seems for women and not men, the former's wellbeing levels being more adversely affected. Relative to married females, females that are divorced, separated and widowed have SF-36 scores that are (after controls) around 6 points, 9 points and 7 points lower respectively. Employment improves mental health, but this is only significant for women. On the other hand, poor health is bad for the wellbeing of males and females, but again more so for women (–2.4 points) than men (–1.3 points). Women's mental health levels improved during the post-GFC period, while men's mental health did not change in a statistical sense across the economic cycles.

Table 13: Fixed effects linear model of mental health (SF-36) among mortgagors aged 55+, 2001–2016

	Model 1			Model 2		
Explanatory variables	**Men**	**Women**	**All**	**Men**	**Women**	**All**
De facto	-2.959	2.776	-0.826	-2.535	3.247	-0.378
	(1.799)	(2.518)	(1.473)	(1.904)	(2.692)	(1.573)
Separated	0.910	-8.852***	-3.955**	0.168	-7.968***	-3.925**
	(2.302)	(2.683)	(1.748)	(2.458)	(2.840)	(1.859)
Divorced	-1.434	-5.591**	-3.270*	-1.219	-5.518**	-3.499**
	(2.415)	(2.490)	(1.686)	(2.528)	(2.633)	(1.779)
Widowed	-3.397	-6.970***	-5.345***	-7.332**	-7.268***	-6.777***
	(2.904)	(2.385)	(1.759)	(3.322)	(2.540)	(1.911)
Single never married	-3.067	6.621	1.195	-3.177	7.233	1.739
	(8.690)	(9.886)	(6.559)	(9.391)	(10.14)	(6.892)

Explanatory variables	Model 1			Model 2		
	Men	Women	All	Men	Women	All
Has long-term health condition	-1.307**	-2.379***	-1.799***	-1.361**	-2.424***	-1.847***
	(0.518)	(0.610)	(0.397)	(0.543)	(0.653)	(0.421)
Has dependent children	0.438	-0.135	0.130	0.375	-0.642	-0.0279
	(0.837)	(1.226)	(0.704)	(0.877)	(1.286)	(0.740)
Unemployed	-2.139	-4.446**	-2.976***	-2.193	-3.807*	-2.731**
	(1.379)	(1.932)	(1.142)	(1.485)	(2.001)	(1.212)
Underemployed	-1.576	-3.175***	-2.395***	-1.598	-2.634**	-2.157***
	(1.056)	(1.074)	(0.751)	(1.108)	(1.162)	(0.800)
Not in the labour force	-1.138	-2.629***	-2.003***	-0.868	-1.683*	-1.420**
	(0.722)	(0.826)	(0.546)	(0.763)	(0.878)	(0.578)
Advanced diploma, diploma	-4.476	4.437	-0.668	-6.567	5.394	-0.232
	(9.040)	(7.298)	(5.157)	(9.477)	(7.767)	(5.515)
Certificate	-2.083	6.025	2.017	-6.691	6.906	1.840
	(9.048)	(5.993)	(4.576)	(9.524)	(6.159)	(4.797)
Year 12	-6.659	7.381	-0.471	-10.13*	5.877	-2.519
	(4.858)	(6.857)	(3.971)	(5.466)	(7.135)	(4.312)
Year 11 or lower	2.338	6.136	2.411	2.425	5.292	1.760
	(9.797)	(6.579)	(4.929)	(10.34)	(6.789)	(5.181)
Volunteering hours	-0.0889	0.101	0.000964	-0.0509	0.149*	0.0449
	(0.0630)	(0.0748)	(0.0483)	(0.0688)	(0.0795)	(0.0520)
Sydney	-3.901	3.581	1.163	-9.692*	-4.192	-3.911
	(5.146)	(5.379)	(3.574)	(5.656)	(5.788)	(3.858)
Balance of NSW	-8.367*	8.175*	0.174	-12.42**	0.888	-3.624
	(4.536)	(4.547)	(3.056)	(4.860)	(4.730)	(3.199)
Melbourne	0.962	-2.913	-2.635	-3.219	-8.253*	-6.376*
	(5.729)	(4.504)	(3.409)	(6.034)	(4.661)	(3.521)
Balance of Victoria	-4.121	-6.033	-5.364*	-7.358	-10.44***	-8.348***
	(4.798)	(3.821)	(2.895)	(4.952)	(3.923)	(2.963)
Brisbane	-5.110	-0.166	-4.222	-9.090	-7.168	-9.050**
	(6.151)	(6.144)	(4.275)	(6.320)	(6.348)	(4.414)
Balance of Queensland	0.214	5.811	1.779	-3.631	-4.842	-4.842*
	(4.296)	(4.214)	(2.919)	(4.159)	(4.196)	(2.870)

Explanatory variables	Model 1			Model 2		
	Men	Women	All	Men	Women	All
Perth	-1.080	-2.322	-1.843	-2.852	-2.561	-3.152
	(4.106)	(3.834)	(2.758)	(4.441)	(4.338)	(3.058)
GFC	0.703	0.740	0.743	0.562	0.917	0.740
	(0.631)	(0.777)	(0.494)	(0.644)	(0.804)	(0.508)
Post-GFC	0.764	1.463**	1.093**	0.642	1.332*	0.913*
	(0.588)	(0.701)	(0.452)	(0.617)	(0.755)	(0.480)
Real other property net wealth in $'000 in 2014	0.0568	0.0920	0.0665	0.0411	-0.0224	0.001
	(0.0949)	(0.0994)	(0.0686)	(0.0995)	(0.107)	(0.0728)
Real non-housing net wealth in $'000 in 2014	0.0272	-0.0519	-0.0109	0.0182	-0.0143	0.0110
	(0.0421)	(0.0465)	(0.0312)	(0.0436)	(0.0680)	(0.0377)
Leverage multiplier	-0.324***	-0.129	-0.233**			
	(0.121)	(0.152)	(0.0958)			
MPIR	-0.00589	0.0101	0.00260			
	(0.0161)	(0.0189)	(0.0123)			
Difficulty meeting mortgage payments				-2.046*	-3.698***	-2.891***
				(1.090)	(1.129)	(0.782)
Constant	81.98***	71.15***	77.34***	86.68***	76.23***	80.82***
	(6.638)	(5.365)	(3.758)	(6.979)	(5.537)	(3.929)
Number of person-periods	3,961	3,647	7,608	3,719	3,388	7,107
R-squared	0.014	0.031	0.015	0.015	0.033	0.017
Number of persons	1,138	1,088	2,226	1,142	1,066	2,208

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The reference categories are married, employed, bachelor degree or higher, rest of Australia (balance of Western Australia, South Australia, Tasmania and the territories), and pre-GFC period.

Source: Authors' own calculations from the 2001-2016 HILDA Survey.

Table 14 reports the outcomes of the psychological distress model, as measured by the K10 outcome variable. The K10 variable is only available in selected waves of the HILDA Survey and hence it is unsurprising that the model is weaker, and throws up fewer significant variables. Nonetheless, there are some interesting and important findings.

Model 1 once again confirms that it is investment risk, and not repayment risk, that affects wellbeing. The effect is only significant in the case of men, though only weakly significant and the magnitude in question is again small. Exposure to a one point increase in the leverage multiplier raises the psychological distress level of older male mortgagors by 0.1 points (less

than 1 per cent of men's average psychological distress score). In Model 2, the late repayment variable is strongly significant in the case of males and raises K10 scores by nearly 2 points for older male mortgagors. There is also a roughly 1 point increase in older females' K10 scores, but the estimate is insignificant.

Men and women's psychological distress levels are influenced by different control variables. Widowhood plunges men but not women into psychological distress, while unemployment and ill health raise distress levels for women but not men. Men's distress levels are also likely to be mitigated somewhat by volunteering activities, but this is not so for women.

Table 14: Fixed effects model of psychological distress (K10) among mortgagors aged 55+, pooled 2005, 2007, 2009, 2011, 2013 and 2015

	Model 1			Model 2		
Explanatory variables	**Men**	**Women**	**All**	**Men**	**Women**	**All**
De facto	0.536	-2.008	-0.648	0.575	-1.942	-0.686
	(1.304)	(1.572)	(0.982)	(1.262)	(1.530)	(0.961)
Separated	-0.365	-0.0426	-0.220	-0.605	-0.337	-0.398
	(1.770)	(1.746)	(1.218)	(1.766)	(1.798)	(1.238)
Divorced	0.0511	-0.951	-0.524	0.213	-0.957	-0.456
	(1.830)	(1.691)	(1.180)	(1.809)	(1.718)	(1.186)
Widowed	4.827**	1.596	2.655**	4.510**	1.704	2.654**
	(1.987)	(1.534)	(1.125)	(1.989)	(1.573)	(1.142)
Single never married	2.390	-2.151	-0.00207	3.194	-2.247	0.150
	(4.234)	(5.214)	(3.317)	(4.206)	(5.364)	(3.370)
Has dependent children	-0.871	0.111	-0.492	-0.710	0.128	-0.385
	(0.608)	(0.876)	(0.513)	(0.599)	(0.891)	(0.516)
Unemployed	0.427	3.121**	1.335*	0.460	2.683*	1.129
	(0.897)	(1.402)	(0.779)	(0.872)	(1.466)	(0.785)
Underemployed	0.589	-0.0596	0.198	0.212	0.0658	0.106
	(0.554)	(0.736)	(0.451)	(0.559)	(0.747)	(0.458)
Not in the labour force	0.624	0.823	0.663*	0.694	0.337	0.447
	(0.456)	(0.529)	(0.345)	(0.456)	(0.537)	(0.349)
Advanced diploma, diploma	-4.338	-0.186	-2.692	-3.629	-0.0843	-2.842
	(4.213)	(6.626)	(4.621)	(4.237)	(6.859)	(4.720)
Certificate	2.156	-3.096	-2.217	2.966	-3.622	-2.665
	(2.403)	(7.632)	(5.249)	(2.434)	(7.893)	(5.362)
Year 12	0.869	3.300	1.588	0.456	3.316	1.416
	(2.656)	(4.970)	(2.461)	(2.653)	(5.146)	(2.511)

Explanatory variables	Model 1			Model 2		
	Men	Women	All	Men	Women	All
Year 11 or lower		-5.397	-4.845		-5.791	-5.394
		(7.647)	(5.336)		(7.917)	(5.458)
Has long-term health condition	0.496	0.756*	0.681**	0.364	1.021**	0.746***
	(0.332)	(0.424)	(0.264)	(0.329)	(0.440)	(0.269)
Volunteer	-0.126***	-0.0236	-0.0648**	-0.134***	-0.0201	-0.0701**
	(0.0427)	(0.0496)	(0.0324)	(0.0426)	(0.0515)	(0.0330)
Sydney	-1.801	-4.351	-2.763	-1.946	3.491	1.715
	(4.000)	(6.423)	(4.575)	(4.009)	(6.542)	(4.640)
Balance of NSW		-0.536	0.0337		7.132*	4.528
		(4.082)	(3.317)		(4.050)	(3.338)
Melbourne	-1.542	1.516	0.458	-1.503	4.825	2.913
	(3.609)	(3.479)	(2.457)	(3.618)	(3.566)	(2.492)
Balance of Victoria	-0.0300	1.968	1.455	-0.00890	3.823*	2.963*
	(2.678)	(2.125)	(1.601)	(2.684)	(2.151)	(1.617)
Brisbane	-0.359	-3.541	-1.702	-0.380	2.818	2.112
	(3.373)	(3.937)	(2.545)	(3.382)	(3.963)	(2.555)
Balance of Queensland	0.935	-0.559	0.249	1.028	7.231***	4.827***
	(2.189)	(2.530)	(1.640)	(2.193)	(2.315)	(1.564)
Perth	1.500	-0.561	0.423	1.517	-0.390	0.514
	(2.616)	(3.048)	(2.002)	(2.621)	(3.154)	(2.046)
Real other property net wealth in $'000 in 2014	0.000318	0.00241	0.00149	0.00185	0.00824	0.00563
	(0.00516)	(0.00638)	(0.00402)	(0.00511)	(0.00652)	(0.00406)
Real non-housing net wealth in $'000 in 2014	-0.00198	-0.00288	-0.00220	-0.00121	-0.00356	-0.00247
	(0.00336)	(0.00564)	(0.00299)	(0.00313)	(0.00580)	(0.00291)
2009	-0.116	-0.180	-0.167	-0.102	-0.124	-0.125
	(0.331)	(0.432)	(0.267)	(0.326)	(0.440)	(0.269)
2011	-0.103	-0.00782	-0.101	-0.110	0.0346	-0.0730
	(0.329)	(0.440)	(0.268)	(0.325)	(0.450)	(0.271)
2013	-0.660*	-0.541	-0.634**	-0.551	-0.421	-0.520*
	(0.354)	(0.468)	(0.287)	(0.348)	(0.481)	(0.289)
2015	-0.597	0.388	-0.150	-0.468	0.303	-0.116

Explanatory variables	Model 1			Model 2		
	Men	Women	All	Men	Women	All
	(0.390)	(0.510)	(0.314)	(0.381)	(0.524)	(0.316)
Leverage multiplier	0.114*	0.0620	0.0939*			
	(0.0620)	(0.0942)	(0.0534)			
MPIR	-0.0105	0.00159	-0.00441			
	(0.00949)	(0.0128)	(0.00777)			
Difficulty meeting mortgage payments				1.772**	1.060	1.234**
				(0.714)	(0.735)	(0.507)
Constant	15.08***	17.91***	17.26***	14.58***	13.97**	14.89***
	(1.752)	(5.457)	(3.655)	(1.732)	(5.590)	(3.711)
Number of person-periods	1,409	1,310	2,719	1,436	1,330	2,766
R-squared	0.049	0.048	0.031	0.048	0.061	0.039
Number of persons	685	654	1,339	696	661	1,357

Notes: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. The reference categories are married, employed, bachelor degree or higher, rest of Australia (balance of Western Australia, South Australia, Tasmania and the territories).

Source: Authors' own calculations from every alternate year beginning in 2007 and ending in 2015.

3.5 Policy development implications

Wellbeing has become an increasingly important and accepted measure of the costs and benefits of policy interventions and programs that provide goods and services such as housing (DEFRA 2005; Smith, Cigdem et al. 2017).

The findings in this chapter raise major concerns for jurisdictions that have embraced mortgage-backed home ownership as its dominant tenure in an era of population ageing. In countries such as Australia, home ownership has long been lauded for its apparent promotion of occupants' wellbeing, including the provision of a sense of physical and emotional security, safety, independence and belonging (Yates, Ong et al. 2016). Yet these perceived benefits have been predicated on the assumption of a more or less seamless transition from mortgage-backed to outright ownership over the life course (Wood and Ong 2012).

The evidence presented in this chapter clearly shows an additional stress burden in later life for mortgagors, with older mortgagors reporting lower mental health and higher psychological distress scores than older outright owners. When older mortgagors experience difficulty in meeting mortgage payments, their SF-36 mental health scores are reduced by 2 points for men and 3.7 points for women. Late mortgage payments also raise males' K10 psychological distress scores by nearly 2 points. These effects are comparable to those resulting from long-term health conditions. Hence, the rising trend in mortgage indebtedness in Australia will have negative impacts on the wellbeing of an increasing percentage of the population, as growing numbers of older Australians carry mortgages into retirement. Recent studies such as Smith,

Whitehead et al. (2013) and Wood, Ong et al. (2013) have proposed equity (rather than debt) solutions for funding owner occupation. An example is equity finance, but it has rarely been tried and the sector is small.

There is a demographic dimension to the phenomenon of growing mortgage indebtedness that is particularly noteworthy. Older female mortgagors generally have lower levels of mental health and higher levels of psychological distress than older male mortgagors. The average SF-36 score for older female mortgagors is 73.5 compared to 77.1 for older male mortgagors. At the same time, the K10 score for older female mortgagors is 15.9, compared to 14.6 for older male mortgagors. Furthermore, it would appear that older female mortgagors' personal wellbeing (as measured by the SF-36 mental health score) is more sensitive to their personal circumstances than older male mortgagors. In particular, marital breakdown adversely affects women's SF-36 mental health scores more than men, and poor labour market engagement and ill health reduce the SF-36 mental health score, and raise the K10 distress score of older female mortgagors more than their male counterparts. Women have longer life expectancies than men, are more likely to experience career interruptions, and are less inclined than men to re-marry following a marital breakdown. Policy makers need to note the interaction of these factors, which result in female mortgagors being more vulnerable to mortgage indebtedness problems as they age, and will likely have implications for the kinds of housing and financial support that older women will need.

4 Mortgage stress, superannuation and consumption

- Older retired mortgagors that draw down superannuation balances seem to be re-orienting their portfolios toward property. As average superannuation balances tumbled from $471,000 to $271,000 (a 42% decline) between 2010 and 2014, average equity stakes in property rose from $621,000 to $667,000 (a 7% increase).

- Over the same period, the property wealth strategies of those accumulating savings in superannuation contrasted with those drawing down superannuation balances. Among this subgroup of older retired mortgagors average equity stakes in property dropped by 8 per cent.

- In the bottom two mortgage payment to income ratio quintiles, the odds of superannuation drawdowns are only around 60 per cent of the odds in the top quintile.

- Mortgage repayments are the single largest expenditure item within older mortgagors' budgets (one-third share).

- A sizeable segment of the mortgagor population is more prone to material deprivation than outright owners. Nearly 8 per cent of older mortgagors were unable to pay their utility bills on time between 2006 and 2016, compared to around 3 per cent of outright owners.

- As in the case of superannuation drawdown, repayment risk matters; the budget share devoted to necessities increases as repayment risk rises. In the top MPIR quintile the budget share accounted for by necessities is around 3 per cent higher than in the bottom quintile, holding all other factors constant.

This chapter addresses the report's third key research question:

How do older Australians in mortgage stress manage their superannuation wealth and consumption expenditure?

We will analyse the correlation between mortgage debt burdens and management strategies toward superannuation wealth and consumer expenditure. The aim here is to verify whether older mortgagors' spending and saving decisions are influenced by their mortgage debt burden. The analysis will shed light on whether older mortgagors cope with mortgage burdens by trimming savings in superannuation wealth and cutting back expenditures on necessities. Prior studies have explored the impacts of mortgage debt on labour force participation (e.g. Cigdem-Bayram, Ong et al. 2017; Atalay, Barrett et al. 2015). However, this chapter focuses on exploring the tactics employed by individuals when managing wealth, debt and expenditure at different stages of the life course.

We begin by reviewing the limited literature on this topic in Section 4.1. In Sections 4.2 and 4.3, we examine the statistical links between mortgage stress and superannuation drawdowns and consumption expenditures respectively. Section 4.4 draws out some policy implications.

4.1 Existing research

The existing pool of studies that have empirically examined the impact of mortgage stress on either wealth management or consumption is very small.

In the US, Bridges and Stafford (2012) used the PSID to estimate a logistic model of the likelihood of making pension withdrawals and/or reducing pension contributions. The study found that families with higher levels of wealth and income were more likely to make pension contributions, while those experiencing mortgage distress were less likely to make pension contributions and more inclined to draw down on pension savings balances. The withdrawals were also larger during the GFC compared to the pre-crisis years. The study attributed their findings on pension withdrawals to housing market difficulties. In Australia, Bray used the HILDA Survey to model the relationship between changes in superannuation balances and changes in housing tenure and mortgagor status as well as mortgage indebtedness. The study discovered that the incidence of mortgage debt among those aged 50–64 years is negatively associated with savings accumulated in superannuation balances. Ong, Haffner et al. (2013a) and the Productivity Commission (2015) conducted descriptive analyses which uncovered tentative evidence of an association between superannuation lump sum withdrawals and paying off outstanding mortgage debt. However, overall the link between superannuation drawdowns and mortgage debt reduction remains inconclusive in Australia.

A handful of studies have examined the links between mortgage stress and consumption. Atalay, Whelan et al. (2017) found that that during the GFC, house price increases were associated with larger increases in consumption for home owners with higher LVRs. However, this pattern did not persist post-GFC. The study concludes that since the GFC, households with high LVRs have become more financially conservative and therefore reluctant to leverage borrowing secured to rising house values in order to increase consumption. In the US, Mian and Sufi (2011) report evidence suggesting that significant amounts of borrowing against housing equity are used to fund consumption or home improvement. The study also found that home owners with poor credit histories and high credit card utilisation rates have the strongest tendency to borrow against an increase in housing equity. These findings suggest that equity borrowing is strongest in the presence of binding credit constraints, though these patterns may also be consistent with self-control problems.

4.2 Data and variables

4.2.1 Assets and debt

The HILDA Survey contains detailed wealth modules on the different asset and debt holdings of respondents. These modules are repeated once every four years—2002, 2006, 2010 and 2014. The detailed wealth variables allow us to profile the asset and debt holdings of older mortgagors, and the panel nature of the wealth modules—albeit every four years—permit observation of four-yearly changes in the asset and debt profiles of older mortgagors as they age.

In this report, we are particularly interested in documenting whether any asset substitution takes place between superannuation and housing wealth when older mortgagors retire. This would happen, for instance, if older mortgagors drew down on their superannuation wealth to pay down outstanding mortgage debt, a tactic that becomes feasible on passing the compulsory superannuation preservation age. A second factor is the Superannuation Guarantee that mandates employer contributions that employees cannot access before retirement, so there is no longer the same urgency to pay down mortgages during working lives than there was a couple of decades ago.

The HILDA wealth modules allow us to identify whether asset substitution is taking place as hypothesised above. We use all the asset and debt variables in the detailed wealth modules to paint a full profile of the asset and debt holdings of older mortgagors, so we are able to detect shifts in wealth portfolios that go beyond just property and superannuation. These other asset and debt variables include:

- Asset: primary home value, other property value, superannuation, business assets, bank balance, financial instruments (e.g. shares, trust, insurance), other assets (e.g. cars, collectibles)

- Debt: primary home debt, other property debt, business debt, credit card debt, HECS, other debt (e.g. personal loans).

Following the same empirical methods as previously, our unit of analysis is the person, while the unit of measurement is the income unit, as wealth is typically shared among the members of an income unit. To illustrate, consider the hypothetical example of a couple, John and Sally. As the unit of analysis is the individual, both John and Sally are counted in the sample used to produce the calculations. However, the unit of measurement is the income unit, which means that asset and debt estimates are all calculated on an income unit basis to reflect the fact that John and Sally would likely be sharing their resources and liabilities as a couple. So if the couple live in a house valued at $700,000 against which a debt of $300,000 is owed, the full house value of $700,000 and full debt value of $300,000 would be assigned to both John and Sally instead of being split between them.

There is a slight complication in that most asset and debt data are reported on a household basis in the HILDA Survey, so that in the case of multi-income unit households there is an added step is necessary in order to divide the household wealth amongst the income units. We execute an algorithm that has been successfully implemented in Wood, Colic-Peisker et al. (2010) to transform the HILDA household wealth variables into income unit variables.

In the case of other property (e.g. investment property, second homes, holiday homes) we are able to directly identify the legal owners and can therefore correctly assign the asset and debt value of property to the legal owners. Business asset and debt is divided equally among those within the household who identify as business owners.

Apart from housing asset and debt, we are particularly interested in superannuation wealth and this is reported on an individual basis. Superannuation wealth on an income unit basis is obtained by simply adding up the individual superannuation balances of each member of the income unit.

Other asset and debt values that are only reported on a household basis (e.g. equity investments, trust funds) are simply divided equally among household members, then summed for members of each income unit to derive income unit wealth. This is a limitation but of course, in single-income unit households, household wealth is equivalent to income unit wealth, and most households comprise only one income unit.

Financial variables were converted to 2016 values using the ABS CPI.[9]

4.2.2   Consumption

There are currently no known Australian data sources that offer nationally representative information on household consumption at a fine-grained level. However, two data sources do offer extensive detail on household expenditure. One such data source is the ABS Household Expenditure Survey (HES), a cross-section data set that is repeated once every six years with

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[9] The CPI time series is drawn from ABS (2017a).

the latest being for the financial year 2015–2016. The other is the HILDA Survey, which collects reported expenditures by detailed itemised categories in every year from 2006 to 2016.

We opted for the HILDA Survey, as it provides annual data and is consistent with the data source used in the rest of this report. The Survey contains detailed expenditure estimates across a range of items including mortgage repayments, groceries, meals eaten out, alcohol and tobacco, electricity and gas bills, telephone and internet charges, public transportation, vehicle fuel, vehicle repairs and maintenance, home repairs and maintenance, education fees, clothing, insurance for health and home, and health practitioners and medicines. As in the case of asset and debt values in preceding sections, expenditure dollar magnitudes are measured at constant 2016 prices using the ABS CPI index. We also categorise expenditure items into either necessity or discretionary expenditures, then express these relative to total expenditure to derive estimates of the budget shares accounted for by these categories of spending.

The empirical investigation reports estimates of material deprivation among older mortgagors; these estimates are based on variables in HILDA's self-completion questionnaire where survey respondents report whether they have had to go without meals, heating or other necessities, decisions that reflect acute financial hardship. The other necessities that might be sacrificed are signalled by whether survey respondents report that they: couldn't pay utility bills on time, pawned or sold something, asked for help from friends, or asked for help from welfare or community organisations.

4.3   Asset and debt profile of older mortgagors

Table 15 documents changes in the asset and debt profile of retired older mortgagors who hold some superannuation wealth. In order to document change between two points in time, a mortgagor is included in the table if he or she has matched observations in two adjacent wealth modules t and t+4. Moreover, the mortgagor must hold superannuation wealth in wave t, plus be retired and aged 55 years or over in either t or t+4. The combination of these criteria results in three panel windows—2002–2006, 2006–2010 and 2010–2014—each of which has a different sample size. For instance, if a person is not retired during the 2002–2005 but has retired by 2006, the person is excluded from the 2002–2006 window but included in the subsequent two windows.

Property and superannuation dominate the wealth portfolios of older mortgagors. Property accounts for over half their asset holdings while property debt makes up at least 80 per cent of their average total debt. Superannuation, the next most important asset, accounts for over one-quarter of total asset holdings. If the primary home were to be separated out from other property, the primary home would still be the most important asset, and debt secured against the primary home remains the biggest source of borrowings (around 40% and 65% respectively). Other property becomes the third largest source of assets and debt after superannuation. Given their importance in wealth portfolios, the choices that wealth holders make with respect to property and superannuation, and the debt secured against, them will be interrelated. These relationships will be critical to an understanding of the long-term implications of decisions to pay down mortgages later in life.

In the first two inter-wealth module windows (2002–2006 and 2006–2010) there were increases in average gross real wealth; from $1.2 million to $1.6 million (a one-third increase) between 2002 and 2006, then $1.6 to $1.7 million (a 6% increase) from 2006–2010. However, in the final window, 2010–2014, average gross wealth is stagnant at $1.6 million. So there has been an abrupt slowdown in wealth accumulation toward the end of the study timeframe. The slowdown in rates of wealth accumulation is in part due to lower property asset holdings over the 2010–2014 window. The value of assets held in the primary home and superannuation continued to

increase, but this was offset by other property investments falling. There were also significant reductions in business assets.

On the other hand, while older mortgagors' wealth accumulation tapered off from 2006 onwards, there is evidence of de-leveraging post-2006. During 2006–2010 average debts were slashed from $246,000 to $177,000, and during 2010–2014 from $235,000 to $191,000.[10] Debt in 2014 is only 81 per cent of the levels four years earlier. These declines are apparent across almost all types of debt secured against the primary home and other property.

Table 15: Mean asset and debt values of retired mortgagors aged 55+ with superannuation wealth, by asset and debt category, 2002–2014

	Mean income unit wealth (real $'000s in 2016 values)					
	2002–2006		2006–2010		2010–2014	
	2002	2006	2006	2010	2010	2014
Asset						
Superannuation	327	400	382	413	385	433
Property assets	648	897	912	953	981	934
Primary home value	469	597	613	680	681	663
Other property value	179	300	299	273	300	271
Business assets value	68	45	74	89	71	16
Bank balance	42	52	36	48	35	49
Financial instruments	84	142	125	117	102	99
Other assets	36	37	38	40	41	47
All assets	1,206	1,574	1,568	1,660	1,616	1,577
Debt						
Property debt	137	134	198	155	208	177
Primary home debt	110	103	161	119	158	129
Other property debt	27	31	36	36	50	48
Business debt	5	2	6	4	3	2
Credit card debt	2	2	3	5	4	2
HECS	1	1	1	1	1	1
Other debt	18	29	38	13	19	9
All debt	163	168	246	177	235	191
Observations		286		343		505

Source: Authors' own calculations from the 2002, 2006, 2010 and 2014 HILDA Survey.

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[10] The means reported for 2010 are different across the two windows of 2006–2010 and 2010–2014 because the two windows draw on different samples, as explained earlier in this section.

There are some noticeable differences in the wealth accumulation strategies adopted by older mortgagors who continue to build savings in superannuation, and those running down their superannuation savings (see Table 16).

There is some evidence in the post-GFC era that those running down their superannuation seem to be reorienting their portfolios toward property. While their average superannuation balances tumbled from $471,000 to $271,000 (a 42% decline) between 2010 and 2014, property holdings actually increased slightly from $798,000 to $810,000, and property debt was slashed from $177,000 to $143,000. As a result their average equity stake in property rose from $621,000 to $667,000 (a 7% increase). The average equity in the primary home rose by 5 per cent and by a stronger 16 per cent in other property. There were similar trends observed in preceding windows—average property equity holdings rising across both 2002–2006 and 2006–2010, while superannuation balances fell. Though house price growth stalled during the GFC window of 2006–2010, overall property equity stakes still rose due to property de-leveraging.

The property wealth strategies of those continuing to accumulate savings in superannuation are the opposite of those drawing down superannuation balances over the timeframe 2010–2014. Their average property holdings declined by roughly 10 per cent from $1.1 million to $1 million. Despite winding back debt secured against property (from $233,000 to $204,000), their average equity stake in property dropped by 8 per cent. The fall is entirely due to decline in other property equity holdings.

This divergence in wealth accumulation strategies is only observed in the 2010–2014 window. In earlier years, equity stakes in property also increased among those who accumulated larger superannuation balances. However, it is worth noting that the growth in property equity lagged behind the growth in superannuation in these earlier windows. Over the 2002–2006 and 2006–2010 windows, their superannuation balances doubled on average from $298,000 to $606,000 and $283,000 to $557,000 respectively. However, the growth in property equity trailed behind at 10 per cent during the GFC window of 2006–2010, and during the housing boom years of 2002–2006, the rise in property equity was 'only' 56 per cent.

Table 16: Mean asset and debt values of retired mortgagors aged 55+ with superannuation wealth, by asset and debt category and whether they reduced or increased superannuation, 2002–2014

(a) 2002–2006

	Mean income unit wealth (real $'000s in 2016 values)			
	Reduced super between 2002 and 2006		Increased super between 2002 and 2006	
Asset				
Superannuation	356	198	298	606
Property assets	648	860	648	936
Primary home value	460	592	477	603
Other property value	188	268	171	333
Business assets value	13	14	123	77
Bank balance	46	59	37	45

	Mean income unit wealth (real $'000s in 2016 values)			
	Reduced super between 2002 and 2006		Increased super between 2002 and 2006	
Financial instruments	71	132	97	153
Other assets	34	32	39	41
All assets	1,169	1,295	1,243	1,857
Debt				
Property debt	116	94	159	174
Primary home debt	98	75	123	132
Other property debt	18	20	36	42
Business debt	2	2	8	2
Credit card debt	2	1	2	2
HECS	1	1	1	1
Other debt	12	42	25	16
All debt	132	140	194	196
Observations		144		142

(b) 2006–2010

	Mean income unit wealth (real $ in 2016 values)			
	Reduced super between 2006 and 2010		Increased super between 2006 and 20120	
Asset				
Superannuation	475	278	283	557
Property assets	934	937	890	969
Primary home value	625	635	601	727
Other property value	309	302	289	242
Business assets value	84	57	63	123
Bank balance	34	34	37	63
Financial instruments	162	120	87	115
Other assets	36	35	41	45
All assets	1,726	1,461	1,401	1,871

	Mean income unit wealth (real $ in 2016 values)			
	Reduced super between 2006 and 2010		Increased super between 2006 and 20120	
Debt				
Property debt	215	127	178	185
Primary home debt	168	103	153	136
Other property debt	47	24	25	49
Business debt	6	3	6	5
Credit card debt	3	4	3	5
HECS	1	0	1	1
Other debt	35	6	41	20
All debt	261	140	230	216
Observations	177		166	

(c) 2010–2014

	Mean income unit wealth (real $ in 2016 values)			
	Reduced super between 2010 and 2014		Increased super between 2010 and 2014	
Asset				
Superannuation	471	271	314	566
Property assets	798	810	1,133	1,036
Primary home value	610	599	740	715
Other property value	188	211	393	321
Business assets value	45	8	92	22
Bank balance	33	41	37	55
Financial instruments	95	92	107	105
Other assets	43	57	39	38
All assets	1,487	1,279	1,722	1,822
Debt				
Property debt	177	144	233	204
Primary home debt	139	106	173	148
Other property debt	38	37	60	57

	Mean income unit wealth (real $ in 2016 values)			
	Reduced super between 2010 and 2014		Increased super between 2010 and 2014	
Business debt	1	1	4	3
Credit card debt	5	2	3	2
HECS	1	1	1	1
Other debt	17	9	21	9
All debt	202	157	262	219
Observations		228		277

Source: Authors' own calculations from the 2002, 2006, 2010 and 2014 HILDA Survey.

4.4 Do older mortgagors use lump sum superannuation payouts to cope with mortgage burdens?

The preceding analysis of the asset and debt profile of older retired mortgagors, over the observation window 2010–2014, shows clear evidence that superannuation and property are substitutes in wealth portfolios. Those mortgagors drawing down their superannuation balances tended to increase equity stakes in property. On the other hand mortgagors with growing superannuation balances typically reduced equity stakes in property holdings. In earlier observation windows the evidence is less strong. However, equity holdings in property acquired by mortgagors with falling superannuation balances increased more strongly than those acquired by mortgagors with growing superannuation balances.

In this section, we further investigate this trend via econometric modelling. We are primarily concerned with older mortgagors in mortgage stress and whether they use lump sum superannuation payouts to pay off mortgage debt burdens in later life. If documented in the empirics it would confirm a strategy of shifting wealth out of superannuation and into housing later in life. We pool together all the matched observations between t and t+4 used to profile the asset and debt of older mortgagors in the previous section. This results in a dataset comprising matched observations from 2002 and 2006, 2006 and 2010, and 2010 and 2014.

We specify a random effects logit model, which allows us to estimate the odds of an older mortgagor drawing down on his or her superannuation balance (between t and t+4), as a function of mortgage stress and other explanatory variables in wave t. The logit specification is as follows:

$$\Pr(SD_{it+4}) = f(M_{it}, X_{it}, \varepsilon_{it})$$

where i indexes individuals, t indexes time, SD represents the decision to draw down on superannuation balances, M represents a mortgage stress indicator, X represents a vector of controls, and ε_{it} represents the error term.

4.4.1 Outcome and predictor variables

The dependent variable is a binary indicator that takes on the value of 1 if a person drew down on their superannuation balance between t and t+4, and 0 otherwise. To measure whether a person drew down on their superannuation balance, we compare their superannuation balance during waves t and t+4. If their superannuation balance in t+4 is lower than in t, we infer that there has been a drawdown from their superannuation account.

The model predictors are listed and defined in Table 17. Our key predictors of interest are mortgage stress indicators. As in previous chapters, we differentiate between investment risk, repayment risk, and difficulty in meeting mortgage payments as measures of mortgage stress. We hypothesise that the three types of mortgage stress measures may have varying impacts on older mortgagors' willingness to draw down on their superannuation.

The MPIR variable is chosen to represent repayment risk. The MPIR is entered as five separate binary indicators, with each representing a quintile of the MPIR distribution. Hence, the first quintile of the MPIR refers to mortgagors in the bottom 20 per cent of the MPIR distribution, the second quintile refers to those in the 20th–40th percentile of the MPIR distribution, and so on. Investment risk is captured via entering two separate explanatory variables into the model—primary home value and primary home debt. In doing so, we are able to observe whether it is primary home value or primary home debt that is more likely to motivate the drawdown of superannuation by an older mortgagor.

Key socio-demographic variables are captured in binary indicators representing sex, age, marital status, health and region of birth. Human capital characteristics are represented by highest educational qualification, which may in turn affect the propensity to draw down on superannuation balances. Labour force status is excluded as all the persons in the sample are retired. Income is excluded due to its collinearity with the MPIR, which already incorporates income in the measure. Geographical areas are represented by capital city and rest of state variables, as housing markets may exhibit different trends in different geographical areas. In the model, we also include variables measuring the dollar value of superannuation, other property, other property debt, as well as net wealth that is neither stored in housing or superannuation. We introduce binary indicators that reflect the three years in which the explanatory variables are measured—2002, 2006 and 2010.

Table 17: Variables in model of the odds of drawing down on the superannuation balance

Variable category	Variable definition	Binary or continuous
Superannuation drawdown	Drew down on one's superannuation wealth between t and t+4	Binary
Sex	Female	Binary
Age	Age in years	Continuous
Marital status	Legally married	Binary
	De facto	Binary
	Separated	Binary
	Divorced	Binary
	Widowed	Binary
	Single never married	Binary
	Change in marital status between t and t+4	Binary
Long-term health condition	Has a disability or long-term health condition for six months or more	Binary
Region of birth	Australian-born	Binary
	Born in overseas English-speaking countries, defined as United Kingdom, New Zealand, Canada, USA, Ireland and South Africa	Binary
	Born in overseas non-English speaking countries	Binary

Variable category	Variable definition	Binary or continuous
Highest qualification	Postgraduate degree	Binary
	Bachelor degree, graduate diploma or graduate certificate	Binary
	Diploma or certificates	Binary
	Year 12 or lower	Binary
Geographical area	Sydney	Binary
	Balance of NSW	Binary
	Melbourne	Binary
	Balance of Victoria	Binary
	Brisbane	Binary
	Balance of Queensland	Binary
	Perth	Binary
	South Australia	Binary
	Rest of Australia, defined as balance of South Australia, Balance of Western Australia, Tasmania and the territories	Binary
2002	Calendar year 2002	Binary
2006	Calendar year 2006	Binary
2010	Calendar year 2010	Binary
Difficulty paying mortgage on time	Faced difficulty paying mortgage on time during the calendar year due to financial difficulties	Binary
Repayment risk	MPIR quintile 1, denoting bottom 20% of the MPIR distribution	Binary
	MPIR quintile 2	Binary
	MPIR quintile 3	Binary
	MPIR quintile 4	Binary
	MPIR quintile 5, denoting top 20% of the MPIR distribution	Binary
Primary home value	Real primary home value in $'000, expressed in 2016 prices	Continuous
Primary home debt	Real primary home debt in $'000, expressed in 2016 prices	Continuous
Other property value	Real other property value in $'000, expressed in 2016 prices	Continuous
Other property debt	Real other property debt in $'000, expressed in 2016 prices	Continuous
Superannuation	Real superannuation balance in $'000, expressed in 2016 prices	Continuous
Non-housing and non-superannuation net wealth	Real non-housing and non-superannuation net wealth in $'000, expressed in 2016 prices	Continuous

Table 18 presents estimates from the logit model. An odds ratio of greater (less) than 1 indicates that the predictor has a positive (negative) impact on the odds of drawing down on superannuation balances. A predictor can be binary (taking a value of either 0 or 1) or continuous in nature. For a binary predictor (e.g. 1 if divorced, 0 if not divorced), the odds ratio is the odds of superannuation drawdown for the group defined when the predictor takes on a value of 1 as a ratio to the odds for the group defined when the predictor takes on a value of 0. For a continuous predictor (e.g. home value), the odds ratio is the percentage change in the odds of superannuation drawdown when the predictor changes by one unit.[11]

The model estimates show that age and ethnicity are both important socio-demographic influences on the propensity to draw down on superannuation wealth. Unsurprisingly, as age increases the odds of a superannuation drawdown also rise. Every one year increase in age raises the odds of a superannuation drawdown by over 5 per cent. Those who are born in Australia or English-speaking countries are less likely to tap into their superannuation than migrants from non-English-speaking countries. Marital status and gender are statistically insignificant.

In regard to our key variables of interest, we find mild evidence that repayment risk does matter; the odds of superannuation drawdown are higher in the upper MPIR quintiles, where repayment risk is higher. In the bottom two MPIR quintiles the odds of cashing out at least some superannuation are only around 60 per cent of the odds in the top quintile. The odds of superannuation drawdown in the third MPIR quintile are roughly half the odds in the top quintile.

Of the two investment risk proxies—primary home value and primary home debt—both appear to matter, though the former is only statistically significant at the 10 per cent level. Higher home values and higher home debt are both associated with lower odds of a superannuation drawdown. Every $10,000 increase in home value (home debt) is associated with a 4 per cent (18%) lower odds of superannuation drawdown. The findings in relation to debt are somewhat puzzling, and suggest that the relationship between investment risk and the probability of drawing down on one's superannuation is complex and requires further investigation.

A higher level of superannuation is also associated with higher odds of dipping into superannuation wealth. The model shows that every $10,000 increase in the level of superannuation wealth raises the odds of drawing down superannuation wealth by 18 per cent.

Table 18: Random effects logit model of the odds of drawing down on superannuation with clustered standard errors, mortgagors aged 55+, 2002–2014

Explanatory variable	Odds ratio (std. error)
Female	1.135
	(0.1166)
Legally married	0.804
	(0.4174)
De facto	1.043
	(0.4402)

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[11] For further technical details on the interpretation of odds ratio, please refer to Singer and Willett (2003), Wood and Ong (2009) and Wood et al. (2013).

Explanatory variable	Odds ratio (std. error)
Separated	0.886
	(0.5613)
Divorced	0.838
	(0.4493)
Widowed	1.401
	(0.5412)
Change of status	1.427
	(0.3902)
Born in Australia	0.714*
	(0.1669)
Born in an English-speaking country	0.567**
	(0.2052)
Age	1.054***
	(0.0108)
Has long-term health condition	1.289
	(0.1308)
Postgraduate degree	0.732
	(0.2498)
Bachelor degree, graduate diploma or graduate certificate	0.913
	(0.1619)
Certificate / diploma	0.931
	(0.1328)
Sydney	1.178
	(0.2463)
Balance of NSW	1.662*
	(0.2401)
Melbourne	0.969
	(0.2370)
Balance of Victoria	1.125
	(0.2815)
Brisbane	1.097
	(0.2599)

Explanatory variable	Odds ratio (std. error)
Balance of QLD	1.329
	(0.2528)
Adelaide	0.847
	(0.2669)
Perth	1.209
	(0.2634)
2006	1.039
	(0.1417)
2010	1.014
	(0.1549)
Non-housing and non-superannuation net wealth	0.9993
	(0.0002)
Superannuation	1.0018***
	(0.0003)
Primary home value	0.9996*
	(0.0002)
Other property value	0.9997
	(0.0002)
Primary home debt	0.9982**
	(0.0006)
Other property debt	1.0000
	0.0006
MPIR quintile 1	0.609*
	(0.2130)
MPIR quintile 2	0.617*
	(0.2084)
MPIR quintile 3	0.515**
	(0.2091)
MPIR quintile 4	0.737
	(0.1851)
Difficulty meeting mortgage payment	0.966
	(0.2566)

Explanatory variable	Odds ratio (std. error)
Constant	0.071***
	(0.7759)
Number of observations	1467

Notes: *** p<0.01, ** p<0.05, * p<0.1. The reference categories are single never married, born in a non-English-speaking country, Year 12 or below, rest of Australia (balance of Western Australia and South Australia, Tasmania and the territories), 2002, and MPIR quintile 5.

Source: Authors' own calculations from the 2002, 2006, 2010 and 2014 HILDA Survey

4.5   Older mortgagors' consumption profile 2006–2016

In this section, we begin by documenting the consumption profile of all mortgagors aged 55 years or over. Unlike the superannuation analysis, we do not have to impose a 'retired status' constraint to our sample as superannuation can only be accessed upon retirement. The necessary data for the consumption analysis is also available in all waves from 2006 to 2016, so there is no need to design four-yearly windows for analysis; rather, we utilised observations from every year of the HILDA Survey between 2006 and 2016.

As shown in Table 19, older outright owners spend considerably less than older mortgagors, with the former spending on average around $30,000 per year compared to the latter's average annual expenditure of over $50,000 per year. This is likely to reflect different stages in the life cycle. Mortgagors are typically younger, have larger household sizes and earn higher incomes than outright owners. However, older mortgagors shoulder average mortgage repayment burdens that rose from $15,000 to nearly $20,000 between 2006 and 2016, while outright owners have zero mortgage repayments.

Among older mortgagors, mortgage repayments take up a significant one-third of their budget. In fact, mortgage repayments are the single largest expenditure item within older mortgagors' budgets. As such, other items generally account for lower budget shares than those items do in the budgets of outright owners. For instance, groceries account for around one-fifth of older mortgagors' budgets compared to around 30 per cent of outright owners' budgets; telephone and internet charges account for 3–4 per cent of mortgagors' budgets compared to around 6 per cent of outright owners' budgets.

If we exclude mortgage repayments from mortgagors' total expenditure, the budget share contributed by each expenditure type is more or less consistent across the two groups. For instance, groceries make up around 30 per cent of older mortgagors' budgets excluding mortgage repayments, which is much closer to the budget share accounted for by groceries in outright owners' budgets. This is also the case for the next most important items—home and vehicle repairs and maintenance, and health and other insurances.

Table 19: Mean annual expenditure and budget shares of older mortgagors and outright owners aged 55+, by expenditure type, 2006, 2010 and 2016

(a) Mean annual expenditure (real $ in 2016 values)

Expenditure item	Mortgagors			Outright owners		
	2006	2010	2016	2006	2010	2016
Mortgage repayment	15,068.9	18,548.5	19,955.0	0.0	0.0	0.0
Groceries	10,929.0	11,245.1	10,894.1	9,358.7	9,655.8	9,098.7
Meals eaten out	2,794.4	3,079.3	3,330.5	2,016.6	2,207.4	2,556.7
Alcohol and tobacco	2,684.9	2,467.4	2,659.8	1,652.8	1,745.0	1,850.7
Electricity and gas bills	1,688.8	1,955.0	2,145.9	1,407.4	1,763.2	1,624.0
Telephone and internet charge	2,292.6	2,250.5	1,914.4	1,708.4	1,756.6	1,803.1
Transportation (public and vehicle fuel)	3,732.0	3,366.0	2,943.7	2,481.6	2,390.9	2,083.3
Home and vehicle repairs and maintenance	5,328.9	4,463.5	6,070.7	3,916.9	4,089.7	3,402.8
Education fees	798.9	958.9	1,045.6	199.6	321.4	392.4
Clothing	1,857.2	1,815.8	1,726.5	1,432.3	1,414.3	1,373.4
Health and other insurances	2,922.8	3,820.6	4,310.4	2,822.9	3,213.4	3,979.5
Health practitioners and medicines	1,817.0	2,056.9	2,053.5	1,806.5	1,945.4	1,806.7
Total	51,915.4	56,027.5	59,050.1	28,803.7	30,503.1	29,971.3

(b) Budget shares (%)

Expenditure item	Mortgagors, including mortgage repayment			Mortgagors, excluding mortgage repayment			Outright owners		
	2006	2010	2016	2006	2010	2016	2016	2006	2010
Mortgage repayment	29.0	33.1	33.8						
Groceries	21.1	20.1	18.4	29.7	30.0	27.9	32.5	31.7	30.4
Meals eaten out	5.4	5.5	5.6	7.6	8.2	8.5	7.0	7.2	8.5
Alcohol and tobacco	5.2	4.4	4.5	7.3	6.6	6.8	5.7	5.7	6.2
Electricity and gas bills	3.3	3.5	3.6	4.6	5.2	5.5	4.9	5.8	5.4

Expenditure item	Mortgagors, including mortgage repayment			Mortgagors, excluding mortgage repayment			Outright owners		
	2006	2010	2016	2006	2010	2016	2016	2006	2010
Telephone and internet charge	4.4	4.0	3.2	6.2	6.0	4.9	5.9	5.8	6.0
Transportation (public and vehicle fuel)	7.2	6.0	5.0	10.1	9.0	7.5	8.6	7.8	7.0
Home and vehicle repairs and maintenance	10.3	8.0	10.3	14.5	11.9	15.5	13.6	13.4	11.4
Education fees	1.5	1.7	1.8	2.2	2.6	2.7	0.7	1.1	1.3
Clothing	3.6	3.2	2.9	5.0	4.8	4.4	5.0	4.6	4.6
Health and other insurances	5.6	6.8	7.3	7.9	10.2	11.0	9.8	10.5	13.3
Health practitioners and medicines	3.5	3.7	3.5	4.9	5.5	5.3	6.3	6.4	6.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' own calculations from the 2006, 2010 and 2016 HILDA Survey

Next, we place expenditure items into two broad classes—necessity and discretionary goods. If older mortgagors cope with their mortgage burdens by reducing their consumption on other items, it is important to be able to deduce whether it is reduced expenditure on discretionary items, or whether it has eaten into expenditure on necessity goods. If expenditures on necessities is compromised there is a risk of mortgage burdens precipitating material deprivation and poverty, a likely source of concern to policy makers. The following items are classified as necessities: groceries, utility bills, public transportation, vehicle fuel, motor vehicle maintenance, other insurances (mainly home insurance), fees paid to health practitioners, and medicines and prescriptions. Discretionary expenditures are spending on alcohol, tobacco, meals eaten out, private health insurance, home repairs and renovation, education fees, clothing, and telephone rentals, call charges and internet fees.

Table 20 shows the average annual expenditure and budget shares accounted for by necessity and discretionary goods. Mortgage repayments are excluded from the calculations as the aim here is to shed light on whether older Australians burdened by mortgage repayments (that is, mortgagors) have systematically different spending habits on other items compared to those without mortgages. The table shows that older mortgagors spend more on both necessity and discretionary goods than outright owners. Older mortgagors' spending (at roughly $21,000 per year) on necessity goods (excluding mortgage costs) is around 17 per cent higher than outright owners' spending on necessities (at roughly $18,000). Similarly, older mortgagors spend more on discretionary goods (rising from $16,000 in 2006 to $18,000 in 2016) than outright owners (rising but from a lower base of $11,000 in 2006, to over $12,000 in 2016). Outright owner's discretionary spending amounts to around 70 per cent of mortgagors' discretionary spending.

Turning to the budget shares estimates, we find that older outright owners' spending is somewhat more heavily skewed towards necessities. Among older outright owners, necessity

goods made up 59 per cent of their 2016 budget compared to 55 per cent for older mortgagors. Back in 2006 older outright owners' spent 61 per cent of their budget on necessities compared to 57 per cent by older mortgagors. Once again this difference likely reflects the different life cycle stages that each group has reached. Outright owners are on average older and have lower incomes, and this is reflected in both their lower overall spending levels, and greater emphasis on necessities despite the absence of a mortgage burden.

Table 20: Mean annual expenditure and budget shares of necessity and discretionary goods (excluding mortgage repayments), older mortgagors and outright owners aged 55+, 2006, 2010 and 2016

(a) Mean annual expenditure (real $ in 2016 values)

	Mortgagors			Outright owners		
Expenditure class	2006	2010	2016	2006	2010	2016
Necessity goods	21,109.1	21,628.1	21,518.5	17,593.9	18,429.3	17,592.8
Discretionary goods	15,737.3	15,850.8	17,576.6	11,209.8	12,073.8	12,378.5
Total expenditure excluding mortgage payments	36,846.4	37,478.9	39,095.2	28,803.7	30,503.1	29,971.4

(b) Budget shares (%)

	Mortgagors			Outright owners		
	2006	2010	2016	2006	2010	2016
Necessity goods	57.3	57.7	55.0	61.1	60.4	58.7
Discretionary goods	42.7	42.3	45.0	38.9	39.6	41.3
Total expenditure excluding mortgage payments	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' own calculations from the 2006, 2010 and 2016 HILDA Survey

Table 21 documents the extent to which older mortgagors might be suffering from material deprivation compared to older outright owners. Even though previous tables indicate that older mortgagors have higher average expenditure levels, and also spend more on discretionary goods, it appears that there is a non-negligible segment of the mortgagor population that is more prone to material deprivation than outright owners. It seems that older mortgagors are a heterogeneous population with different spending patterns and varying degrees of exposure to financial hardship.

Table 21 also shows that between 2006 and 2016, nearly 8 per cent of older mortgagors were unable to pay their utility bills on time, compared to around 3 per cent of outright owners. Moreover, nearly 5 per cent of older mortgagors asked for financial help from friends due to a shortage of money, compared to under 2 per cent of outright owners. The share of older mortgagors suffering from other indicators of material deprivation is also higher than outright owners. For example, Table 21 shows that a higher percentage of older mortgagors have reported having to pawn or sell something, go without meals or heating and ask for help from welfare or community organisations than outright owners. Finally, there are signs of a trend increase in all but one of the mortgagor material deprivation indicators.

Table 21: Percentage of older mortgagors and outright owners aged 55+ experiencing material deprivation, 2006, 2010 and 2010

Material deprivation indicator	Mortgagors			Outright owners		
	2006	2010	2016	2006	2010	2016
Couldn't pay utility bills on time	7.5	7.9	7.7	2.9	3.5	2.9
Pawned or sold something	1.7	2.1	3.2	0.9	0.9	1.1
Went without meals	1.0	1.5	2.3	0.5	0.8	0.7
Unable to heat home	1.7	1.9	2.2	0.7	1.3	1.3
Asked for help from friends	4.8	4.7	5.0	1.2	1.8	1.3
Asked for help from welfare / community organisations	1.5	1.8	1.8	1.2	0.7	0.6

Source: Authors' own calculations from the 2006, 2010 and 2016 HILDA Survey

4.6 Do older mortgagors reduce consumption on necessities to cope with mortgage burdens?

4.6.1 Model

The preceding analysis of consumption profiles documents how older mortgagors spend more on average than older outright owners. The former also devote a greater share of their budgets to discretionary goods, after meeting their mortgage repayments. However, the evidence also points to a greater degree of material deprivation among older mortgagors. Given that mortgage repayments constitute the dominant share of older mortgagors' budgets (roughly one-third), this may point to a mortgage stress effect. We now seek more robust evidence through an econometric modelling strategy designed to gauge if the presence of mortgage stress constrains older mortgagors' consumption, even after controlling for other factors that might explain the emergence of acute spending needs. Our modelling exploits all existing waves of the HILDA Survey at the time of analysis, resulting in the pooling together of cases from all 16 waves of the HILDA Survey covering the observation period 2006–2016. The sample design is restricted to person-waves (years) where individuals have an outstanding mortgage and are aged 55 years or over.

Given the length of the panel used in the modelling, we use random effects estimation of a linear specification in which the dependent variable is the budget share devoted to necessities. We expect that mortgage stressed individuals will devote a higher share of their budget (defined net of mortgage payments) to necessities. The model specification can be written as follows:

$C_{it} = f(M_{it}, X_{it}, \partial_i, \varepsilon_{it})$

where i indexes individuals, t indexes time, C is a measure of consumption profile, M represents a mortgage stress indicator, X represents a vector of controls and ε_{it} represents a random error term.

4.6.2 Outcome and predictor variables

The outcome variable is the percentage measure of the amount of an older mortgagor's budget that is devoted to necessities. If rising levels of mortgage stress lead to a growing share of necessity goods within older mortgagors' budgets, it points to a mortgage excess burden that constrains mortgagors to consuming necessities at the expense of discretionary items.

The model predictors are listed and defined in Table 22. As in the model of the odds of superannuation drawdown, we differentiate between investment risk, repayment risk, and difficulty in meeting mortgage payments as measures of mortgage stress. We hypothesise that the three mortgage stress measures may have varying impacts on older mortgagors' consumption patterns. The MPIR and leverage multipliers are both entered as separate binary indicators, with each representing a quintile of the MPIR and leverage multiplier distribution respectively. To control for other influences we enter a range of socio-demographic, human capital, geographical and calendar year variables that may also influence consumption patterns.

Table 22: Variables in model of the budget share devoted to necessities

Variable category	Variable definition	Binary or continuous
Budget share devoted to necessities	Percentage share of a person's budget devoted to necessities	Continuous
Sex	Female	Binary
Age	Age in years	Continuous
Marital status	Legally married	Binary
	De facto	Binary
	Separated	Binary
	Divorced	Binary
	Widowed	Binary
	Single never married	Binary
	Change in marital status between t and t+4	Binary
Log of household size	Log of number of people in the household	Continuous
Children	Has dependent children	Binary
Long-term health condition	Has a disability or long-term health condition for six months or more	Binary
Region of birth	Australian-born	Binary
	Born in overseas English-speaking countries, defined as United Kingdom, New Zealand, Canada, USA, Ireland and South Africa	Binary
	Born in overseas non-English speaking countries	Binary
Retired	Retired from the labour force	Binary
Highest qualification	Postgraduate degree	Binary
	Bachelor degree, graduate diploma or graduate certificate	Binary
	Diploma or certificates	Binary
	Year 12 or lower	Binary
Geographical area	Sydney	Binary
	Balance of NSW	Binary
	Melbourne	Binary
	Balance of Victoria	Binary

Variable category	Variable definition	Binary or continuous
	Brisbane	Binary
	Balance of Queensland	Binary
	Perth	Binary
	South Australia	Binary
	Rest of Australia, defined as balance of South Australia, balance of Western Australia, Tasmania and the territories	Binary
Area SEIFA	Socio-economic indicators for areas (SEIFA) decile of index of economic resources	Continuous
2006	Calendar year 2006	Binary
2007	Calendar year 2007	Binary
2008	Calendar year 2008	Binary
2009	Calendar year 2009	Binary
2010	Calendar year 2010	Binary
2011	Calendar year 2011	Binary
2012	Calendar year 2012	Binary
2013	Calendar year 2013	Binary
2014	Calendar year 2014	Binary
2015	Calendar year 2015	Binary
2016	Calendar year 2016	Binary
Difficulty paying mortgage on time	Faced difficulty paying mortgage on time during the calendar year due to financial difficulties	Binary
Repayment risk	MPIR quintile 1, denoting bottom 20% of the MPIR distribution	Binary
	MPIR quintile 2	Binary
	MPIR quintile 3	Binary
	MPIR quintile 4	Binary
	MPIR quintile 5, denoting top 20% of the MPIR distribution	Binary
Investment risk	Leverage multiplier quintile 1, denoting bottom 20% of the leverage multiplier distribution	Binary
	Leverage multiplier quintile 2	Binary
	Leverage multiplier quintile 3	Binary
	Leverage multiplier quintile 4	Binary
	Leverage multiplier quintile 5, denoting top 20% of the leverage multiplier distribution	Binary

Table 23 presents estimates from the consumption model. As the outcome variable is the budget share spent on necessities, a positive coefficient indicates that the presence of the predictor drives a shift towards spending on necessities. On the other hand, a negative

coefficient indicates that a predictor allows an individual to spend a larger share of the total budget on discretionary goods.

There are clear links between the life cycle stage of a mortgagor and the budget share he or she has to devote to necessities. The budget share occupied by necessities rises as age increases (presumably due to lower incomes) and if one is beset by ill health, but it also rises as the number of people in the household increases. This is offset by a greater emphasis on discretionary spending if a dependent child is still present in the household. De facto couples are also more likely to have higher discretionary spending budget shares compared to those in other marital states. Those with university degrees also appear to be more willing to allocate larger budget shares to discretionary spending, as do Australian-born mortgagors, and those who have migrated from an English-speaking country.

As in the case of superannuation drawdown, repayment risk does matter; the budget share devoted to necessities is higher in the upper MPIR quintiles. The budget share taken by necessities in the top MPIR quintile is around 3 per cent higher than in the bottom quintile, holding all other factors constant. On the other hand, the budget share devoted to necessities is 3 per cent lower in the highest leverage multiplier quintile than in the bottom leverage multiplier quintile; so exposure to investment risk is correlated with discretionary spending. This may reflect reverse causality in the model, that is, those predisposed to greater levels of discretionary spending take on higher mortgage debt burdens, perhaps encouraged by the house price boom of the 1990s and early 2000s. However, this may not necessarily translate into higher regular mortgage repayments, as borrowers might negotiate longer repayment terms when adding to their mortgages.

Table 23: Random effects linear model of budget share devoted to necessities, mortgagors aged 55+, 2006–2016

Explanatory variables	Model estimates
Age	0.0017***
	(0.0004)
Female	0.0075
	(0.0046)
Legally married	-0.0122
	(0.0131)
De facto	-0.0470***
	(0.0139)
Separated	0.0118
	(0.0161)
Divorced	-0.0049
	(0.0137)
Widowed	-0.0118
	(0.0156)
Log household size	0.0217***
	(0.0061)

Explanatory variables	Model estimates
Children dummy	-0.0192***
	(0.0056)
Long-term health condition	0.0113***
	(0.0034)
Retired	0.0018
	(0.0035)
Postgraduate degree	-0.0448***
	(0.0094)
Bachelor degree, graduate diploma or graduate certificate	-0.0314***
	(0.0061)
Diploma / certificate	-0.0077
	(0.0053)
Born in Australia	-0.0173**
	(0.0066)
Born in an English-speaking country	-0.0181*
	(0.0081)
Sydney	0.0002
	(0.0092)
Balance NSW	0.0143
	(0.0094)
Melbourne	-0.0132
	(0.0092)
Balance of Victoria	0.0138
	(0.0105)
Brisbane	0.0024
	(0.0102)
Balance of QLD	0.0213*
	(0.010)
South Australia	0.0056
	(0.010)
Perth	-0.0102
	(0.0105)
Area SEIFA	-0.001
	(0.0008)

Explanatory variables	Model estimates
Difficulty meeting mortgage payments	0.0097
	(0.0065)
MPIR quintile 1	-0.0291***
	(0.0052)
MPIR quintile 2	-0.0208***
	(0.0049)
MPIR quintile 3	-0.0022
	(0.0046)
MPIR quintile 4	-0.0092*
	(0.0044)
Leverage multiplier quintile 1	0.0323***
	(0.0056)
Leverage multiplier quintile 2	0.0196***
	(0.0053)
Leverage multiplier quintile 3	0.0068
	(0.005)
Leverage multiplier quintile 4	0.0047
	(0.0047)
Constant	0.5260***
	(0.0291)
R2	
N	8,138

Notes: Standard errors in parentheses; *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The reference categories are single never married, born in a non-English-speaking country, Year 12 or below, rest of Australia (balance of Western Australia and South Australia, Tasmania and the territories), 2001, and MPIR quintile 5.

Source: Authors' own calculations from the 2002, 2006, 2010 and 2014 HILDA Survey

4.7 Policy development implications

There is some evidence that mortgage stress influences the wealth management and consumption strategies of older mortgagors. Older mortgagors are more willing to run down their superannuation in order to add to wealth stored in housing equity, especially when repayment risks are present. The odds of a drawdown from superannuation balances are significantly higher among older mortgagors in the upper MPIR quintiles. The share of a consumer's budget (net of mortgage payments) used to purchase necessities also increases as repayment risk rises. These findings seem plausible given mortgage repayments are the single largest expenditure item within older mortgagors' total expenditure budgets (one-third share). Faced with declining and possibly uncertain incomes as they approach the end of their working lives, older mortgagors are more liable to alter their investment and consumption strategies as a way of coping with mortgage stress burdens in later life.

Another important finding is the discovery that a higher proportion of the mortgagor population is prone to material deprivation than outright owners, despite the fact that the former also exhibit higher discretionary spending levels. Nearly 8 per cent of older mortgagors were unable to pay their utility bills on time between 2006 and 2016, compared to around 3 per cent of outright owners. Older mortgagors were more likely to report having to pawn or sell something, go without meals or heating and ask for help from welfare or community organisations than outright owners. This suggests that older mortgagors are a heterogeneous group, with some evidently able to cope with mortgage burdens in later life, while others struggle to meet spending needs on necessities with material deprivation resulting for a minority. Our modelling results indicate that the materially deprived are older, more likely to be in ill health and have large household sizes. On the other hand, those with higher educational qualifications spend a higher share of their budgets on discretionary items.

The policy implications are significant since the presence of repayment risk appears to prompt older mortgagors to draw down on their superannuation wealth. The rising trend towards mortgage indebtedness in later stages of the life course is therefore particularly worrying from a retirement incomes adequacy perspective. If superannuation balances are being run down to pay off mortgage debt rather than meet spending needs in retirement, there will be growing pressure on the age pension system, as increasing numbers of baby boomers retire or are forced (by say ill health or redundancy) to withdraw from the labour force while mortgage balances are unpaid and secured against the family home. This was not the purpose envisaged for the Superannuation Guarantee when it was introduced in 1992.

It is also clear that some will find it difficult to cope with mortgage debts in later life, and material deprivation is then a hazard. This chapter's findings demonstrate a growing risk of poverty in later life and in an ageing population. There is already significant concern in policy circles about older people's vulnerability to poverty, particularly single elderly women, who have longer life expectancies than men, but lower superannuation balances.

The findings are also concerning at an economy-wide level. It appears that Australian households have gained confidence from the sustained house price boom evident (with short interruptions) since the mid-1990s—they seem more prepared to borrow against their housing equity to finance consumption or other investments, because of an expectation that house prices will continue to rise. But as the GFC proved in many other countries, house prices do not always increase, and there are signs of a sustained fall in Australian house prices. High levels of mortgage debt are likely to act as a drag on consumption spending, particularly when house prices fall, and especially the spending of older mortgagors, as they have fewer years of earnings ahead of them. These concerns are accentuated by the absence of insurance instruments that could enable mortgagors to hedge house price declines (Wood and Ong 2012). When house prices are ticking along nicely, the lack of such insurance products is rarely noticed. In the less secure housing market emerging, policy makers should consider whether product innovation along these lines is worth encouraging.

5 Precarious home ownership and population ageing: impacts on poverty rates and the demand for housing assistance

- In 2031, we expect over 200,000 older Australians to be in need of assistance with one or more activities, and living in private rental housing.

- Our modelling predicts an increasingly tenure polarised seniors population. Outright ownership status will be attained later in life and at lower real incomes. Mortgagors will have a relatively younger age profile and higher real incomes. Renters will fall further behind in terms of employment, real incomes and health.

- The combination of tenure change and demographic change is expected to increase CRA eligibility among seniors age 55 years and over; it is forecast to rise from 414,000 in 2016, to 664,000 in 2031, an increase of 60 per cent over the forecasting horizon. The population of seniors is expected to increase by a much lower 35 per cent, so a growing dependence on CRA is anticipated.

- The Australian Government CRA budget cost is predicted to increase steeply, from $972 million in 2016 to $1.55 billion in 2031 (at constant 2016 prices).

- The unmet demand for public housing from private renters aged 55 years and over is expected to climb from roughly 200,000 households in 2016, to 440,000 households in 2031, a 78 per cent increase. Those 75 years and older are anticipated to rise as a proportion of unmet demand from 27.5 per cent in 2016, to 34.2 per cent in 2031.

- Our projections suggest that 1.88 million older Australians could be in housing poverty in 2031, but this count estimate falls by 730 thousand to 1.15 million on an after-housing cost basis. Outright ownership will remain an important but weaker pillar supporting living standards in old age.

In this chapter of the report we address the fourth key research question of this project:

What are the implications of high levels of mortgage debt and falling home ownership rates for future national policy directions in relation to retirement incomes and housing assistance?

Outright ownership has long been regarded as a 'fourth pillar' supporting Australian retirement incomes policies because it shields the elderly from housing affordability stress, and alleviates after-housing cost poverty (Yates and Bradbury 2010). But there are fears that rising indebtedness and falling home ownership rates are eating away at this pillar and the support it offers to Australians in old age (Eslake 2017). In an ageing population these trends have profound implications for both the future wellbeing of the elderly and the Australian housing system. We therefore build on our previous AHURI project by updating the forecasting capabilities of the AHURI-3M microsimulation model to project forward the impacts of demographic change, mortgage indebtedness and falling home ownership rates on retirement incomes, poverty rates and the demand for housing assistance over a forecast period that

extends through to 2031. We begin in Section 5.1 with a review of policy discussions that have emerged around these important themes in recent years.

5.1   Existing research

The Australian Government has primarily relied on public housing and Commonwealth Rent Assistance (CRA) to ensure low-income households have access to affordable rental housing.[12] Older Australians have not been an important client group for these programs because all but a small minority have been home owners, and older Australians comprised a low population share.[13]

However, as the baby boomers move into old age, they will place greater demands on housing assistance programs because of their greater numbers compared to earlier generations. But this demographic transition will become a more pressing issue if combined with falling rates of home ownership, and especially declines in outright ownership. This prospect seems likely due to growing numbers of Australians that are finding it impossible to attain home ownership (Flood and Baker 2010), or if they do succeed, it is much later in life compared to earlier generations, and they therefore carry mortgage debt later in life. But recently there is another relevant phenomenon—the loss of home ownership status among a growing number of middle-aged Australians, especially those experiencing separation and divorce (Wood, Cigdem-Bayram et al. 2017).

Rates of home ownership have in fact been falling since the early 1980s and across the life course. Between 1982 and 2013, and on a person basis, Wood and Ong (2017) document declines of 7.3 percentage points (from 78.3% to 71%) in the 45–54 age group, and 5.1 percentage points (from 81.9% to 76.8%) in the 55–64 age group.[14] The decline in the 65 years and older age group occurred later, but now seems deep-seated. The share of home owners among those 65 years and over peaked at 82.3 per cent in 2000 and has dropped to 80.5 per cent in 2013. These declines will herald a long-term trend among older Australians if the steeper declines among younger cohorts are not reversed in later life. Ownership is a hedge against rising rents (Glaeser and Gyourko 2018) that typically rise in line with consumer prices[15], and its loss will particularly affect the elderly who are often on fixed incomes.

Indeed, the role of home ownership in promoting financial wellbeing in retirement is particularly important in Australia. The OECD (2013: Figure 2.3) reports that Australian pensioners have average equivalised household disposable incomes of roughly 60 per cent of national average equivalised household disposable income for all households, the lowest among 34 OECD countries. An important reason for the Australian elderly's relatively low income is a public

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[12] See Orchard (2014) for a succinct description of the past and current directions in Australian housing policy.

[13] In 1981 persons in the 55–64 and 65 and over age ranges accounted for 9% and 10% (respectively) of the resident population in Australia. Thirty years later (in 2011) the population share of these two cohorts increased to 11% and 14% respectively (ABS Australian Historical Population Statistics, Cat. No. 3105.0.65.001).

[14] Flood and Baker (2010) also offer similar findings. These trends may be exaggerated; 12.6% of investor landlords are themselves renters in the private rental sector though most are in younger age groups (Hulse, Martin et al. 2018: 24). These Australians may be hedging against future rent and house price increases. But even if we assigned these persons to the ownership rather than the rental tenures the overall home ownership rate increases by only 3 percentage points, given a private rental housing share of 25.3% of all households (Australian Institute of Health and Welfare 2018).

[15] The annual percentage increase in the rent index over 1987–2016 averaged around 3% which is a little below the average 4% annual increase in the consumer price index over the same period. The correlation coefficient calculated from the annual % increases in rent and CPI indices was 0.77 over the period 1987–2016 (ABS, Cat. No. 6401.0).

pension program that provides a low base rate of pension, compared to other countries with a similar per capita GDP.[16]

Yates and Bradbury (2010) made an important contribution by showing that while Australia has one of the highest before-housing cost rates of poverty among its elderly population, it nevertheless has one of the lowest after-housing cost poverty rates.[17] This striking discrepancy arises because all but a small minority owned their homes outright, and therefore had no housing costs to meet. Their empirical analysis also documents poverty rates among older Australian renters that were four times the rate among Australian home owners. A significant fall in the elderly's rate of home ownership would then have profound implications for older Australians' living standards, as well as the number eligible for support from housing assistance programs.

Other demographic changes magnify the importance of these developments in Australia's housing system. High rates of divorce and lower marriage rates in recent decades mean that one person and sole parent households, as well as de facto couples, are an increasingly important demographic group in Australia; and growth in singles is forecast to continue among the elderly segment of the population (see Section 5.2.1).[18] Furthermore, their income levels are typically lower than those of the rest of the adult population, and so eligibility for Income Support Programs (ISPs) is correspondingly higher.

When combined with declining rates of home ownership these demographic trends could significantly increase the demand for housing assistance, as tenant status and eligibility for ISPs is a passport into the largest housing assistance program (CRA). Lower home ownership rates among singles (Hendershott, Ong et al. 2009; Bourassa and Yin 2006) add to these expectations. We may also witness a changing profile of older residents in home ownership and rental housing if singles find that they cannot access home ownership. We explore this dimension of the dynamics of Australian housing systems in depth in Section 5.2.1.

These ageing and home ownership related issues have been raised before in the Australian literature, especially in regard to the housing implications of an ageing population—though within the academic literature, rather than official government statements and analyses. Both Yates (2015) and Derby (2015) note that successive Australian Government Intergenerational Reports have failed to consider the consequences of anticipated economic and demographic trends for prospective housing outcomes among older Australians.[19] Yet Kendig and Neutze (1999) spotted many of the developments now worrying commentators on housing policy issues 20 years ago. Back then the baby boomer cohort was entering or approaching the 50 and over age ranges, and because of that cohort's size, they expected a sizeable minority would reach old age as tenants. But the stock of public housing was already contracting, so they predicted

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[16] Across OECD countries expenditure on public pensions is 7.8% of GDP; the pension share in Australia is less than half the OECD average at 3.5% in 2010 (OECD 2013: Figure 2.4). Australia did not introduce mandatory contributions to occupational pensions until 1992, and they will not therefore fully mature for another 20 years or so.

[17] In an earlier paper Ritakallio (2003) shows that much of the difference in poverty rates between Finland and Australia is eliminated when measured on an after-housing cost basis. The impact is especially significant when comparing poverty rates among the elderly in each country.

[18] However, singles *relative frequency* among the elderly could decline due to the increasing longevity of men and women that result in couples living together for longer spells.

[19] Every 5 years Australia's Treasury produces an Intergenerational Report that assesses the long-term sustainability of current Government policies and how demographic changes may impact on economic growth, workforce and public finances over the next 40 years. The first was published in 2002 and the most recent in 2015 and is available at https://treasury.gov.au/publication/2015-intergenerational-report/

that fewer life-long renters would be occupying public tenancies in retirement. As a result, growing numbers of older low-income private renters need CRA for housing support.

Six years later, Hugo (2005) observed that an increasing proportion of mature aged Australians were un-partnered, as divorce became more common and marriage less common in the decades following the 1960s. Older single person household numbers were therefore increasing rapidly. These demographic changes were expected to shape the level and nature of housing needs; an implication is a growing demand for rental housing given relatively low home ownership among single person households.

Yates, Kendig et al. (2008) was importantly the first study to quantitatively model the housing system consequences of projected changes to Australia's demography, as well as declining rates of home ownership. The study assumed stable though lower home ownership rates among the young, and that incremental catchup as the life course progresses remains on a par with past life course dynamics. They also conservatively assume that future rents increase in line with household incomes. Nevertheless, lower income households in housing stress were forecast to increase by 84 per cent through to 2045 (by 120% if in private rental housing). Forecast real expenditures on CRA increase by 170 per cent. They conclude that 'unless major, unanticipated economic, social or policy changes emerge, Australia's current housing system and its system of rental assistance are unsustainable' (Yates, Kendig et al. 2008: 8).

More recently Yates' (2015) projections indicate that even with unchanged ownership rates older renters will double to 600,000 over the next 40 years. But older income poor asset poor households in this pool of older renters will be more common because of a stagnant public housing stock. The number of older persons needing rental housing will be boosted further if falling rates of home ownership among younger cohorts of Australians spill over into the 65 years and older age group. Yates (2015) concludes that increasing numbers of senior Australians will retire without the home ownership status necessary to support retirement incomes, and an inadequate social housing safety net.

The alarming warnings from much of the Australian literature motivate this study. We investigate them by combining Australian Bureau of Statistics (ABS) forecasts of the growth in and composition of Australia's population over the time horizon 2016–2031 (ABS 2015), with microsimulation and tenure choice models that generate tenure profiles and estimates of the demand for housing assistance from older Australians in 2031. The projections are produced assuming that recent home ownership trends among that segment of the Australian population aged 55 years and over are repeated over the forecasting horizon 2016–2031.

5.2 Demographic change, falling rates of home ownership and tenure profiles

5.2.1 Demographic projections 2016–2031

Older/mature age Australians are the focus of this report and we define this group as those aged 55 years and over. Typically when talking about older people the age threshold researchers use to separate middle age from old age is 65 years, which until recently was the qualifying age for the age pension. However, ageing is linked with biological, social, economic and psychological transitions that become evident later in life. The timing of these changes do not occur in harmony (Jones and Petersen 2014); so when considering biological and health changes, increasing longevity is pushing back the age that marks the transition into 'old age'.

However, retirement from the workforce typically occurs at ages younger than 65 years[20], so what we regard as an age threshold signalling transition into retirement and older age is considerably 'younger' from the perspective of social and economic issues associated with retirement and ageing. As this research project is primarily concerned with the social and economic issues that result from older individuals changing status in the housing system, we have chosen 55 years to mark the onset of ageing related housing issues.

To create a 2031 population profile for senior Australians, we employ demographic forecasts from the Australian Bureau of Statistics (ABS) population projection series. The source for these forecasts is the ABS *Household and Family Projections, 2011 to 2036* (ABS cat. no. 3236.0). The latest projection series was issued in March 2015 (ABS 2015). ABS population forecasts rely on assumptions about key biographical and mobility variables such as fertility, mortality, internal migration and net overseas migration. The real values of economic variables and policy parameters are assumed to remain constant over the forecast time horizon 2016–2031.[21] The ABS supplies three projection series—A, B and C—reflecting high, medium and low population growth rate assumptions respectively. Series B posits that current trends in fertility, life expectancy at birth and net overseas migration continue unchanged. Series A and C are then based on deviations from trend that generate population growth rates above or below those that are expected if trends in fertility, life expectancy at birth and net overseas migration were to continue unchanged. We follow the practice in our previous project (Wood, Cigdem-Bayram et al. 2017) and invoke series B's assumptions to project forward base population estimates from the 2016 HILDA Survey to 2031.

These ABS projections provide a forecast count of persons for each year from 2011 to 2036, by state and territories, and broken down by living arrangement[22], as well as by age groups (5 yearly age bands). These predicted counts have been used to compute population growth rates over the forecast period 2016–2031 for each of the subgroups defined by age and living arrangement. The population growth rates are then employed to 'age' the HILDA data by adjusting the 2016 HILDA cross-section population weights corresponding to each responding person aged 55 years or older.

The ABS demographic projections anticipate 35.1% growth in the population of seniors aged 55 years and over between 2016 and 2031. A population of 5,970,825 seniors in 2016 will therefore grow to 8,064,117 in 2031.[23] In this growing population there will be a shrinking share of couples with dependent children but a growing share of childless couples and lone persons, particularly females. There will also be a degree of ageing *within* the senior population.

Figure 1 and Figure 2 document and illustrate these developments in the form of bar charts. In the first of them we offer a 2016 and 2031 breakdown of the population of older Australians by age range. We can expect *relative* growth in the 70 years and above age range. Those in the

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[20] According to ABS 6238.0 – *Retirement and Retirement Intentions, Australia, July 2016 to June 2017* –'The average age at retirement from the labour force for persons aged 45 years and over in 2016–17 was 55.3 years (58.8 years for men and 52.3 years for women)'.

[21] Economic variables and policy variables will likely be simultaneously related to demographic processes. By holding them constant at their base year values we are in effect exploring a hypothetical scenario that isolates the probable impact of anticipated demographic change.

[22] There are fifteen different living arrangement types in the ABS projections while HILDA identifies twenty-six different household classifications. To make the living arrangement classifications consistent between HILDA and the ABS, we created a concordance using HILDA's household type variable (_hhtype) and person's relationship in household (_hhrih). In doing so, we were able to condense HILDA's twenty-five household classifications into the 15 categories reported in the ABS.

[23] This is slightly higher than our previous estimate in Wood, Cigdem-Bayram et al. (2017) because we are applying population growth projections to a more recent base year (2016) as compared to the 2011 base year used in Wood, Cigdem-Bayram et al. (op. cit.)

80–84 age band will show the fastest growth with numbers nearly doubling by 2031; and in the 85 years and over grouping the count is expected to reach a level over 60 per cent higher than in 2016. These patterns could have important implications for the housing system, especially if defined to include the residential age care needs of elderly persons. The Aged Care Financing Authority (2018: Figure 4.3) reports that the proportion of people using age care (home and residential) rises from close to zero at age 65 to roughly 15 per cent at age 85; it then sharply increases to around one-third of the 90 years and over age band, and 60 per cent of 98 year olds and over. Our projections suggest that the population count in the age band 85 years and over will grow from 358,000 in 2016 to 591,000 in 2031. Age care in the home and in purpose built residential age care will show significant growth on these forecasts.

But there is also a wider issue. The ABS *Survey of Disability, Ageing and Carers* shows that 38.6 per cent of the population aged 65 years and over require assistance with one or more activities (Aged Care Financing Authority 2018: Table 4.1). If this share remains constant we can expect nearly 2 million over-65s needing some form of assistance with one or more activities in 2031.[24] Often the mobility issues associated with these assistance needs require the retrofit of family homes, requirements that are eased if new housing designs incorporate amenities that aid mobility around the home. The presence of a growing number of the elderly in private rental housing raises a different set of issues because private landlords might be unwilling to permit such modifications. The insecurity associated with private rental housing tenancies is also relevant because housing stability assists the arrangement of support services.

Figure 1: Demographic projections, by age range of seniors, 2016 to 2031
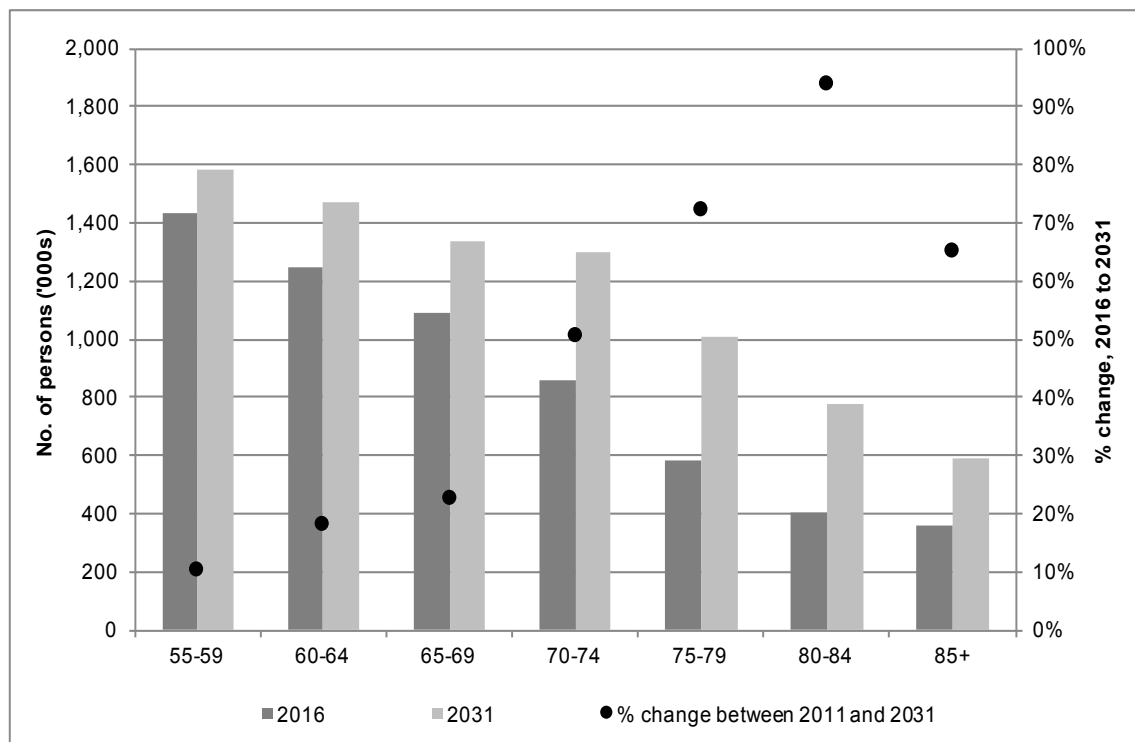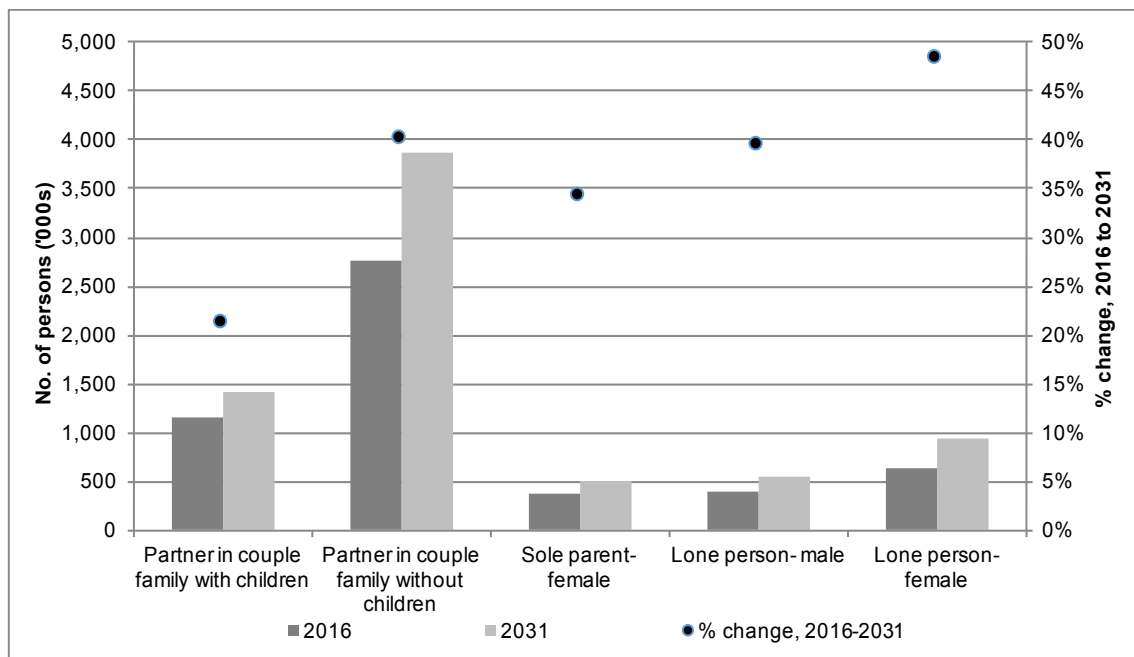

Source: ABS population projections (2015)

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[24] On the basis of ABS demographic forecasts we expect 5,006.971 persons age 65 years and over in 2031. If 38.6% require assistance we arrive at an estimate of 1932690 persons in 2031.

In Figure 2 we offer a breakdown of the population of older Australians by household type in 2016 and 2031. We can anticipate strong growth in lone person households, with the number of seniors in such a living arrangement increasing from just over 1 million persons in 2016 to 1.5 million in 2031. This increase is especially pronounced among females; 50 per cent more female lone person households are anticipated by 2031. Growth in the count of over-55s living in couple with children households will be relatively low at 21 per cent, only a little over half the expansion (40%) in the number of over-55s living in childless couple households. In fact, the growth rate for the latter matches that of sole male households, and the increase in the number of childless couple households exceeds that of all sole person households by a large margin.[25] This reflects increasing longevity which means that couples who do not divorce or separate live together longer. A stronger demand for smaller houses and units could emerge in view of these demographic developments.

Figure 2: Demographic projections, by household type of seniors, 2016 to 2031

Source: ABS population projections (2015)

5.2.2 Tenure change 2016–2031

Our approach to future changes in tenure shares is somewhat different from that in our previous AHURI report where we explored the consequences of two alternative scenarios about declining rates of home ownership (Wood, Cigdem-Bayram et al. 2017). In this report we investigate the consequences for housing assistance if the housing tenure developments of the recent past were to be repeated over the 2016–2031 time horizon.

We achieve this by extrapolating forward historical trends in age-specific home ownership rates using the reported tenure status of household respondents to the repeated cross section ABS *Survey of Income and Housing* (SIH). The forecasting time horizon is the 15-year period 2016–2031; we therefore use trends in the SIH 2001–2016 to represent a time period of the same length but in the recent past. The tendency of home owners to pay down mortgage debt later in

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[25] According to the data presented in Figure 2 seniors living in childless couple living arrangements increase by 1.1 million over the study timeframe, more than double the increase in males and females living alone (465,719).

life is another potentially important influence on outcomes of interest in this project, so we break down the owner occupation tenure into outright ownership and mortgagor shares.

Before looking at this breakdown let us first describe what has happened to the rate of home ownership between 2001 and 2016. As is well known, there have been steep falls in home ownership rates among young Australians that have been evident since the start of the 1980s, or even before for those in early adulthood. In the over-55 age group, declining rates started later and have been less steep, because some, if not most, of the fall in younger age groups has been due to later first transitions into home ownership. Indeed when we chart the path taken by ownership rates for those that have reached pension age (65 years), there has been virtually no change as the millennium has unfolded. The rate has remained steady at 83 per cent. But among those in the 55–64 years age bracket, the typical age bracket for male retirement (see Footnote 14), home ownership has become less common, with its share falling from 86 per cent in 2001 to 81 per cent in 2016.

Table 24 charts the change in the outright ownership and mortgagor shares between 2001 and 2016, and for seniors grouped into 55–64 years and 65 years and over age bands. According to SIH there has been a major change in behaviour with respect to the mortgage debt home owners are prepared to carry later in life since 2001. Back in 2001, just over two-thirds of all owners were mortgage free, but 15 years later (2016) this had shrunk to under one half (45%). Among the 65 years and over age group, many more owners have paid off their mortgages, but nevertheless the mortgage free share has fallen below three-quarters, from close to 80 per cent in 2001.

Table 24: Percentage point change in shares of outright owners and mortgagors, 2001 to 2016, aged 55–64 and 65+

	55–64 years	65+ years
Outright owners		
Share in 2001 (%)	68.2	79.3
Share in 2016 (%)	45.5	73.9
Percentage point change (2016 minus 2001)	-22.7	-5.4
Mortgagors		
Share in 2001 (%)	17.6	3.6
Share in 2016 (%)	35.8	8.6
Percentage point change (2016 minus 2001)	18.2	5

Notes: Percentages are population weighted using HILDA's responding person population weights.

Source: Authors own calculations from the HILDA Survey 2001 and 2016.

We extrapolate these trends forward by first calculating the average per annum changes in outright owner and mortgagor shares between 2001 and 2016. For example, the share of outright owners in the 55–64 age group has fallen by 22.7 percentage points, which averages at 1.5 percentage points per annum. We assume that this average per annum fall in their share of the population of seniors aged 55–64 years continued at the same pace over the time horizon 2016–2031.

Table 25 describes percentage share outcomes in 2021 and 2031 given this method of extrapolating recent trends. Among the over-65s the share of home owners remains almost

unchanged, though there are small declines in the share of outright owners, and increases in the share of mortgagors. Larger overall shifts are evident in the group that are approaching the current (pre-July 2017) 65 years pension age. By 2031 there will be a 4.5 percentage point decline in the share of home owners among 55–64-year-old Australians, and a corresponding increase in their presence in rental housing tenures. But within that home owner group there is a sharp increase in the incidence of mortgagors—over half of 55–64-year-old owner occupiers are expected to be paying off mortgages in 2031. The linear extrapolation method means that 2021 shares are always intermediate between the 2016 base share and that projected in 2031.

Table 25: Current and projected age-specific home ownership rates, 2016 to 2021 and 2031, aged 55–64 and 65+, per cent

		Year	55–64	65 and over
Outright owner	Current	2016	46%	74%
	Projected	2021	38%	72%
		2031	23%	69%
Mortgagor	Current	2016	36%	9%
	Projected	2021	42%	10%
		2031	54%	14%

Source: Authors own calculations from the HILDA Survey 2001 and 2016.

While the focus is on home ownership in these tables, the fraction of the mature age population living in other tenures cannot all remain constant. We assume, again in line with past trends, that the count of public housing tenants in 2021 and 2031 remain the same as in 2016. A constant share of seniors in other tenures is proposed. With these fixed parameters in place, it effectively means that the private rental housing tenure is assumed to expand and accommodate those not housed in the owner occupation, public housing or other housing tenures.

Table 26 lists the forecast 2021 and 2031 population numbers and tenure shares for seniors in each tenure. A sharp decline in the number of 55–64-year-old outright owners from a little over 1.2 million to roughly 700,000 is anticipated. In contrast the projections lead us to expect sharp increases in the number of private renters. This is even apparent among those 65 years and over with the count rising by 264,000 to 543,000 by 2031. As pointed out earlier, private rental housing is an unsatisfactory tenure for those needing assistance with everyday tasks. If the incidence of a need for assistance remains constant at 38.6 per cent (Aged Care Financing Authority 2018: Table 4.1), by 2031 we could have over 200,000 older Australians in need of assistance but living in private rental housing.

Table 26: Actual and projected tenure shares and population counts in years 2016 (actual), 2021 (projected) and 2031 (projected)

Tenure	Year	55–64			65 and over		
		2016	2021	2031	2016	2021	2031
Outright owners	Row %	46%	38%	23%	74%	72%	69%
	Count	1,220,332	1,079,736	707,677	2,430,943	2,784,203	3,427,157

Tenure	Year	55–64			65 and over		
		2016	2021	2031	2016	2021	2031
Mortgagors	Row%	36%	42%	54%	9%	10%	14%
	Count	959,200	1,192,557	1,640,501	282,374	397,412	673,623
Public renters	Row %	4%	3%	3%	5%	5%	4%
	Count	93,909	93,909	93,585	172,059	172,059	172,533
Private renters	Row %	14%	15%	18%	9%	10%	11%
	Count	368,556	438,379	566,693	279,028	366,573	543,433
Other	Row%	1%	2%	2%	4%	4%	4%
	Count	36,337	42,734	45,469	117,403	139,017	179,137
All tenures*	Row %	100	100	100	100	100	100
	Count	2,678,334	2,846,694	3,053,925	3,281,807	3,859,264	4,995,883

Source: Authors own calculations from the 2016 HILDA Survey and ABS population projections (2015).

5.2.3 Future tenure profiles

The projected tenure shares described above are modelled by reassigning some households across tenures until the population-weighted distribution by housing tenure conforms to that projected in 2021 or 2031. Critical to this assignment process is a series of logit models (estimated using population-weighted observations) that explain tenure choice as a function of the socioeconomic and demographic variables commonly employed in such models. These logit models are used to generate predicted probabilities of tenure status.

We first reassigned some households in the HILDA sample using the logit models predicted probabilities until the tenure projections were matched on the unweighted sample. For example, those 2016 outright owners with the *lowest* predicted probability of outright owner status were assigned mortgagor status until their shares were equal to that forecast in 2031 (or 2021).[26] In the next step equivalent population weighted shares were computed, and these shares told us whether we needed to increase or reduce the number of households in the unweighted sample are assigned to a particular tenure, in order to satisfy the projected population-weighted tenure shares. To guide the second iteration we calculated the average 2031 (or 2021) population weight in each sub-tenure. This was then used to judge how many of the HILDA sample roughly needs to be reassigned.[27] The iteration process continued until the projected tenure shares were satisfied on a population-weighted basis.

Details of the methodology are also set out in Wood, Cigdem-Bayram et al. (2017). While all the empirics have been conducted for both 2021 and 2031, findings for 2031 only are reported, in

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[26] A similar approach was taken with respect to 2016 residents in public housing and other housing. For example, we needed to assign some of those living in public housing in 2016 into private rental housing in order to keep their count constant in 2021 and 2031. Those 2016 tenants with the lowest predicted probability of public housing status were assigned to private rental housing until the 2021 and 2031 public housing count was equal to that in 2016.

[27] The iterative process with respect to public housing is not a share projection, but a count. We conducted the iteration to get as close as possible to the 2016 count in public housing (each person in public housing represents about 500 people in the population so it is impossible to exactly match the count constraint).

order to economise on report length. Typically results for 2021 were intermediate between those documented in 2016 and 2031.

In Table 27 we profile the projected personal characteristics of residents by tenure in 2031 compared with those documented in 2016. This highlights the type of seniors occupying each tenure, signalling whether demographic change and falling home ownership would result in tenures becoming more or less like each other in terms of socio-demographic and economic profiles. In order to identify the separate contributions made by demographic change and tenure change we present two simulated 2031 profiles; one conditional on demographic change only (2031A), the other being the product of both demographic and tenure change (2031B). In general demographic change contributes little to changing tenure profiles. On the other hand, when we allow for rising indebtedness among older owners and a declining overall rate of home ownership, our modelling predicts an increasingly tenure polarised seniors population. The following key points of contrast are evident from comparisons across tenure groupings in Table 27:

- By 2031 mortgagors are younger relative to those in other tenures, and increasingly seem to expect to work longer (roughly three in four will still be working) given their generally good health; they also have higher incomes and employment reflecting superior educational credentials. It seems that a growing number of mortgagors are prepared to borrow later in life in order to trade up in the housing market (including buying a second property)[28], and this is reflected in a strong real increase in average housing equity holdings, from $496,000 in 2016 to $605,000 in 2031. But there is some heterogeneity among this growing number of indebted seniors, because a minority have characteristics suggesting that debt is being used to smooth consumption in response to negative shocks. There are clearly some that have experienced biographical disruption (divorce and separation are more common than among outright owners) resulting in indebtedness, a hazard elevated by the presence of dependent children. This second group are more exposed to repayment and investment risks.

- In the years to 2031 outright ownership status will be attained later in life than it was back in in 2016. Moreover around 1 in 4 outright owners were still employed in 2016, but by 2031 less than 1 in 10 are expected to be employed with most now outside the labour force. There is therefore a noticeable decline in average real incomes among outright owners—from $84,000 in 2016 to $65,000 in 2031.Their household incomes were 70 per cent of mortgagors' household incomes, but by 2031 outright owners' incomes have slipped to only 49 per cent of those typical among mortgagors. With retirement from the labour force pushed back later in life, and older home owners showing a greater appetite for debt while still working, outright ownership is being attained later in the life course, when incomes have fallen well below their peak.

- Future trends among older Australians in rental tenures are anticipated to be contrary to those evident among mortgagors. There is an increasing age gap with tenants older than the typical mortgagor, especially evident in the case of public tenants, who are anticipated to be nearly 10 years older than mortgagors in 2031. A growing income divide also separates older private and public rental tenants from their mortgagor counterparts. The average incomes among tenants fall in the forward estimates; public housing accommodates older tenants with much lower incomes, there being a sharp 16 per cent fall from $41,000 in 2016 to $34,000 in 2031. The contrast with a growing number of

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[28] As described earlier tenure change is simulated by reassigning some households in the unweighted sample to different tenures. Those outright owners assigned mortgagor status are given imputed mortgage debt values equal to the mean debt of those 2016 mortgagors of the same age.

mortgagors is stark—their average incomes grow by 11 per cent from $120,000 in 2016 to $133,000 in 2031.

- The tenure gap in heath condition also widens. Despite an ageing profile a long-term health condition is predicted to become less common among mortgagors in 2031 than it was in 2016. In contrast, ill health will become more common among tenants in both rental tenures over the forecasting horizon. Indeed a sharp increase in long-term health conditions is expected among the fixed number of public housing tenants; 80 per cent of those with a public housing landlord will have a long-term health condition, and it rises to over half of all private rental tenants. As tenants have no rights with respect to retrofits of homes managed by private landlords, the growing market penetration of this tenure among seniors raises concerns over how health related immobility will be addressed in their homes.

Table 27: Mean personal characteristics by tenure type in 2016, 2031A (demographic change only), 2031B (demographic and tenure change)

Characteristic*	Outright owner			Mortgagor			Private renter			Public renter		
	2016	2031A	2031B	2016	2031A	2031B	2016	2031A	2031B	2016	2031A	2031B
Female (%)	52	52	53.1	48	48	47.4	51	52	53.2	59	59	57.8
Age (years)	70	71	73.1	61	62	62.5	65	67	66.5	70	72	71.4
Has dependent children (%)	4.6	3.7	2.0	19.1	18.0	15.5	7.4	6.0	6.4	3.0	2.4	2.2
Country of birth												
Australian born (%)	67.3	67.0	68.5	63.6	63.2	62.0	58.9	58.6	60.8	58.4	57.4	52.8
Born in English-speaking country (%)	12.3	12.9	13.0	13.10	13.8	13.2	17.9	18.7	17.9	11.2	11.4	10.6
Born in non-English-speaking country (%)	20.5	20.1	18.6	23.3	23.10	24.8	23.2	22.6	21.3	30.4	31.3	36.6
Marital status												
Married (%)	69.2	68.8	69.0	71.7	71.1	72.3	42.0	42.6	42.5	33.1	35.4	28.2
De facto (%)	4.8	4.4	2.9	8.0	7.9	9.3	5.2	4.7	5.0	5.5	5.0	5.0
Separated (%)	2.0	1.8	1.4	3.3	3.2	2.9	7.7	7.4	7.10	5.4	4.8	5.4
Widowed (%)	13.4	15.0	17.7	5.4	6.0	4.6	11.9	13.9	14.8	21.9	24.1	23.8
Divorced (%)	6.4	6.2	4.9	8.4	8.6	8.4	25.4	24.2	23.4	21.0	19.2	23.6
Single, never married (%)	4.2	3.8	4.10	3.3	3.10	2.4	7.9	7.2	7.3	13.2	11.5	14.0
Income and labour force status												
Household disposable income ($'000)	83.8	79.8	64.9	120.4	118.6	132.5	72.2	69.7	67.7	40.8	39.8	34.2
Employed (%)	25.5	21.9	7.3	64.6	62.0	72.8	39.8	35.6	32.9	9.6	8.0	6.2
Underemployed (%)	1.6	1.4	0.6	3.8	3.7	4.10	3.4	3.0	2.7	0.8	0.6	0.7

Characteristic*	Outright owner			Mortgagor			Private renter			Public renter		
	2016	2031A	2031B	2016	2031A	2031B	2016	2031A	2031B	2016	2031A	2031B
Unemployed (%)	0.4	0.3	0.4	0.6	0.6	0.3	1.4	1.3	1.4	1.5	1.10	1.6
Not in labour force (%)	74.10	77.8	92.3	34.8	37.3	27.0	58.7	63.10	65.7	89.0	90.9	92.2
Highest educational qualification												
Postgraduate degree (%)	4.2	4.0	3.3	5.6	5.5	5.9	3.9	3.6	4.0	2.8	3.10	3.8
Graduate diploma or graduate certificate (%)	6.0	5.6	4.9	8.0	7.9	8.6	3.2	3.2	3.0	1.2	1.2	0.5
Bachelor degree (%)	9.3	8.8	6.8	14.6	14.5	16.4	7.7	7.5	7.10	5.6	5.0	4.7
Advanced diploma/diploma (%)	9.5	9.5	8.6	14.10	13.9	14.1	7.1	7.3	7.8	6.6	6.0	4.1
Certificate (%)	22.2	21.7	20.7	25.10	24.8	25.6	26.2	25.0	23.8	15.2	15.5	15.1
Year 12 (%)	9.0	8.7	8.9	8.8	8.8	8.5	9.5	9.3	8.6	9.7	9.4	11.9
Year 11 (%)	39.8	41.7	46.9	23.8	24.7	20.9	42.4	44.2	45.8	58.9	59.8	59.9
Health												
Long-term health condition (%)	44.3	46.10	51.3	28.2	29.4	25.10	50.3	52.2	53.10	70.3	70.10	80.0
Housing wealth												
Primary home mortgage debt ($'000)	0	0	0	278.2	273.5	232	N/A	N/A	140	N/A	N/A	N/A
Primary home equity ($'000)	70.2	68.5	63.6	496.1	495.8	605.2	N/A	N/A	-57.8	N/A	N/A	N/A

*Notes: * The percentage measures are column percentages.*

Source: Authors' own calculations using the 2016 HILDA Survey.

The wider implications of tenure polarisation as forecast in the above table are explored in two ways. First we used the AHURI-3M microsimulation model to estimate the expected demand for housing assistance in 2031 given projected demographic change, as well as the changes in tenure shares that can be anticipated if recent trends were to continue. Secondly, before- and after-housing cost poverty rate predictions are presented.

5.3 The demand for housing assistance: 2016–2031

5.3.1 Commonwealth Rent Assistance

Table 28 charts the expected growth in enrolments into the CRA program, the main form of housing assistance to tenants in private rental housing, as well as the average entitlement that those eligible can expect to receive. The modelling also generates forward estimates of the aggregate cost to the Australian Government budget of CRA payments. It is worth recalling that these projections hold constant the real value of financial parameters defining eligibility and entitlement to CRA. Demographic change is expected to increase the real budget cost of CRA to Australians aged 55 years or over by $347 million, an increase of over one third (36%) on the 2016 budget cost. The average amount of assistance is more or less unchanged over the 2016–2031 time horizon, so almost all of the rising cost is due to growth in eligibility of 142,000, to over half a million seniors in 2031. Nearly 80 per cent of this growth in enrolments comes from individuals belonging to lone person or childless couple households, and a little over 83 per cent comes from those aged 65 years or over. CRA makes an average annual 2016 (2031) contribution of $3,081 ($3,078) and $2,901 ($2,931) to alleviate the housing cost burden of lone person and childless couple household types. This is somewhat below the average annual amount received by all eligible Australians over age 55 years ($3,037).

Table 28: Population estimates of CRA eligible recipients, budget cost and average amount received, in 2016, 2031A (demographic change only)

	2016			2031A		
	Mean annual amount received, $	Budget cost, $ million	No. of recipients	Mean annual amount received, $	Budget cost, $ million	No. of recipients
Household type						
Couple, no dependents	2,901	264.2	159,295	2,931	375.4	220,377
Couple with dependents	3,086	64.6	23,117	3,086	75.5	27,005
Sole parent, with dependents	3,092	104.6	38,926	3,084	126.3	46,935
Sole parent, no dependents	3,126	94.3	33,370	3,162	127.3	44,271
Lone person	3,081	347.7	112,857	3,078	503.4	163,571
Other	3,268	96.5	46,234	3,263	111.3	54,016
Age range						
55–64	3,044	418.9	186,171	3,043	476.4	210,346
65 and over	3,032	553.0	227,628	3,047	842.8	345,829
All persons aged 55+	3037	971.9	413,799	3,045	1,319.3	556,175

Notes: HILDA cross-sectional population weights have been adjusted to incorporate ABS's population projections for 2031. The unit of analysis is the person, and the unit of measurement is the household. All financial magnitudes are constant 2016 prices.

Source: Authors' own calculations using AHURI-3M and wave 16 of the HILDA Survey.

In Table 29 we extend the analysis by incorporating tenure change as well as demographic change projections into the forward estimates. The falling rates of home ownership push growing numbers of households into private renting, numbers that are added to by low-income households normally accommodated in public housing, but rationed out because we assume that the public housing stock remains unchanged.[29] In this more complex but interesting scenario we find that growth in CRA eligibility is expected to push recipient numbers up from 414,000 in 2016 to 664,000 in 2031, an increase of 60 per cent over the forecasting horizon.

Because of extrapolated tenure shifts the percentage increase in eligibility far exceeds population growth of 35 per cent in the 55 years and over cohort. With a trend decline in average household disposable incomes expected among the changing pool of older tenants (see Table 27), the average CRA payment creeps up in real terms from $3,045 to $3,087 per annum. Strong growth in eligibility combines with some increase in average real payments to

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[29] As described earlier in this section, tenure change is simulated by assigning some households to different tenures. Those reassigned to private rental housing have rents imputed by using the predicted values for a hedonic rent regression. Estimates of this regression are available from the authors upon request.

generate a surge in the budget cost, which is expected to increase by nearly 60 per cent, from $972 million in 2016 to $1.55 billion in 2031.

It should be noted that these estimates assume that real rents remain constant, and they are also based on what might be considered an optimistic assumption of gentle falls in home ownership rates. The robust growth in eligibility for CRA that we forecast is then likely to be a conservative one.

Table 29: Population estimates of CRA eligible recipients, budget cost and average amount received, 2031A (demographic change only), 2031B (demographic and tenure change)

	2031A			2031B		
	Mean annual amount received, $	Budget cost, $ million	No. of recipients	Mean annual amount received, $	Budget cost, $ million	No. of recipients
Household type						
Couple, no dependents	2,931	375.4	220,377	2,987	467.8	277,844
Couple with dependents	3,086	75.5	27,005	3,144	78.8	28,878
Sole parent, with dependents	3,084	126.3	46,935	3,087	127.0	47,122
Sole parent, no dependents	3,162	127.3	44,271	3,264	217.3	78,308
Lone person	3,078	503.4	163,571	3,096	536.6	173,346
Other	3,263	111.3	54,016	3,273	123.3	58,503
Age Range						
55–64	3,043	476.4	210,346	3,067	511.6	225,372
65 and over	3,047	842.8	345,829	3,097	1,039.2	438,629
All persons aged 55+	3,045	1,319.3	556,175	3,087	1,550.9	664,001

Notes: HILDA cross-sectional population weights have been adjusted to incorporate ABS's population projections for 2021 and 2031. The unit of analysis is the person, and the unit of measurement is the household.

Source: Authors' own calculations using AHURI-3M and the 2016 HILDA Survey.

5.3.2 Public housing

Eligibility for public housing is conditional on tenure status as well as income. With an increasing number of seniors renting from a private landlord, and strong indications that it will become a tenure housing a growing number of disadvantaged Australians in this age group, we can expect a growing demand for public housing to accompany the rising enrolment numbers on the CRA program. Table 30 reports the findings from an exercise that incorporated each state and territory's income eligibility thresholds into the AHURI-3M microsimulation model, and then identified those households renting from a private landlord but satisfying state housing authorities' income tests. The exercise therefore estimates the *potential* length of waiting lists for public housing.

We begin by describing the eligibility count in 2016 in each state and territory, and for all age groups, not just the 55 years and over group that is the focus of this report (Table 30). We calculate that nearly 1 million households renting from private landlords, are in fact eligible for public housing according to the income test in their state or territory. Table 30 splits each state into state capital and rest of state divisions to give some sense of how the unfulfilled demand for public housing varies between major cities and the rest of Australia, as well as across state boundaries.

Unsurprisingly, Sydney has the highest level of unmet demand at over 150,000 households; and as the most populous states NSW and Victoria host more private renters eligible for public housing than other states—these two combined account for 55 per cent (518,000) of all eligible households. The share of the private rental tenant population eligible for public housing is typically higher in regional and remote regions outside of state capitals. For example, on a population-weighted basis under one-third of tenants in metropolitan Perth satisfy income eligibility rules, but over one half (56%) do so in the rest of WA. This general pattern is evident in all states other than Queensland, and likely reflects lower household incomes in regional Australia.

Table 30: Population estimates of households residing in private rental housing and eligible for public housing, all ages, 2016

State breakdown (1)	Number of households eligible for public housing (2)	% of all private rental households (3)	% of all households (4)
Sydney	157,008	27.0%	8.6%
Rest of NSW	118,919	44.8%	10.9%
Melbourne	166,106	33.2%	9.4%
Rest of Victoria	70,965	52.1%	11.5%
Brisbane	111,655	40.8%	12.5%
Rest of QLD	112,829	38.4%	11.7%
Adelaide	47,377	43.6%	9.3%
Rest of SA	23,937	62.1%	14.0%
Perth	58,092	32.1%	8.2%
Rest of WA	36,895	56.0%	14.2%
Tasmania	23,648	48.8%	11.0%
NT	6,451	33.5%	9.5%
ACT	7,474	17.6%	4.8%
Australia	941,356	36.8%	10.2%

Notes: HILDA cross-sectional population weights have been applied to derive population estimates.

Source: Authors' own calculations using AHURI-3M and the 2016 HILDA Survey.

Table 31 is forward looking and focuses on seniors' (aged 55 years and over) eligibility for public housing; it also offers a breakdown by household type and age. Two future scenarios are extrapolated; a 2031 anticipated outcome with demographic change only and a second 2031 forecast conditional on both demographic and tenure change combined. Demographic change

adds close to 100,000 to the number of persons eligible for public housing in 2031. This is equivalent to a 40.5 per cent increase (from 247,000 to 347,000) over the forecasting horizon 2016–2031. Despite a modest projected decline in the rate of home ownership, tenure changes add nearly 100,000 to the number of seniors eligible for public housing in 2031. At 440,000 the count of eligible older Australians is nearly 200,000, or 78 per cent, higher than in 2016.

We can think of these estimates as measures of the *potential* length of waiting lists for seniors eligible for public housing consequent upon population ageing and tenure change. They suggest that if all else in the housing system (including the public housing stock) and the rest of the economy is unchanging, waiting lists for Australia seniors will increase by over three-quarters of their 2016 levels, a growth rate that is *more than twice* the 35.1 per cent increase in the population of seniors over the timeframe 2016–2031.

Table 31: Population estimates of private renters aged 55+ who are eligible for public housing, by household type and age range, in 2016, 2031A (demographic change only), 2031B (demographic and tenure change)

	2016		2031A		2031B	
	% of seniors eligible for public housing	Count	% of seniors eligible for public housing	Count	% of seniors eligible for public housing	Count
Household type						
Couple, no dependents	39	96,498	41.4	143,660	48.2	212,402
Couple with dependents	8.2	20,213	6.6	22,794	4.7	20,873
Sole parent, with dependents	5.1	12,531	4.1	14,327	3.6	15,976
Sole parent, no dependents	2.7	6,611	2.3	7,802	1.4	6,023
Lone person	44	108,890	44.9	155,741	41	180,558
Other	1	2,492	0.8	2,839	1.1	4,625
Total	100	247,235	100	347,163	100	440,457
Age range						
55–59	18.4	45,357	14.5	50,494	13.3	58,719
60–64	18	44,429	15.3	53,027	17.9	78,798
65–69	19.6	48,520	17.3	60,120	15	66,002
70–74	16.6	40,962	18.1	62,953	19.6	86,245
75–max	27.5	67,967	34.7	120,569	34.2	150,693
All persons aged 55+	100	247,235	100	347,163	100	440,457

Notes: HILDA cross-sectional population weights have been adjusted to incorporate ABS's population projections for 2031. The unit of analysis is the person, and the unit of measurement is the household.

Source: Authors' own calculations using AHURI-3M and the 2016 HILDA Survey.

On examining age breakdowns in Table 31 we found that a little over 1 in 4 older persons eligible for public housing in 2016 are aged 75 years and over. The count measure is 68,000 and it is expected to more than double (a 122% increase) to 151,000 in 2031. Their share of all mature age eligible persons is expected to increase from 27.5 per cent in 2016 to 34.2 per cent in 2031. Health and mobility issues become more common in this 75 and over age group and their need for support services increases, especially those living alone. These projections suggest that age care services will face growing challenges as the number of older persons with serious health conditions, but living in unstable housing circumstances, spirals over the 2016–2031 time horizon.

Finally we consider the living arrangements of seniors on housing waiting lists; 2016 population count estimates suggest that childless couples and lone person households were the most common living arrangements among those seniors eligible for public housing. They account for the living arrangements of 86 per cent of all eligible persons aged 55 years and over. That dominance increases a little over the projection period, but the increase in childless couple households is greater—their eligibility more than doubles to 212,000 so by 2031 they overtake lone person households as the most common living arrangement.

Our literature survey cites the work of numerous academics and policy analysts who argue that outright home ownership is a critically important pillar supporting living standards in old age. The projections suggest strong growth in the demand for public housing and a large increase in private rental housing as a tenure housing older Australians, and these trends raise fears for older Australians' wellbeing. We therefore conclude this section by presenting forecasts of before- and after-housing cost poverty in 2031, consequent on expected demographic change and extrapolated trends in housing tenure.

5.4   Before- and after-housing cost poverty

5.4.1   Poverty measurement approach

A key methodological task was working out a way of calculating rates of before- and after-housing cost poverty status in 2016, 2021 and 2031 under our two future scenarios—demographic change only, and combined demographic and tenure change. We followed the same approach as in Yates and Bradbury (2010)—poverty status is determined by an income poverty threshold set at 50 per cent of equivalised household disposable income, calculated across *all households* in the HILDA sample.

To calculate the *before-housing cost income poverty threshold* in the demographic change only scenario, we first calculated equivalised disposable household income in the *all households* unweighted wave 16 HILDA sample. The 2016 HILDA population weights were then applied to translate into a population-weighted distribution of equivalised household disposable incomes, and the median from this population-weighted distribution computed. Those in the population-weighted distribution (in our case focusing on 55 years and over) that fall below 50 per cent of this median are in before-housing cost poverty in 2016.

Our methodological approach held constant the real incomes of households in the HILDA sample at their 2016 values in order to isolate the impact of future demographic (and tenure) change. We also held the before-housing cost poverty thresholds in 2021 and 2031 constant at the 2016 value, and then determined poverty status using the 2021 and 2031 population-weighted distribution of equivalised household disposable incomes.

The *after-housing cost poverty threshold* was generated by first subtracting *actual* housing cost from the *equivalised* household disposable incomes of all households in the 2016 HILDA unweighted sample. Population weights (2016) were then applied to this net housing cost income measure, and we computed the median from the population-weighted distribution of

after-housing cost equivalised household disposable incomes. The 2016 after-housing cost poverty threshold was set at 50 per cent of the median, and 2021 and 2031 thresholds were held constant at the 2016 value.

In the combined demographic and tenure change scenario the housing costs of those households predicted to change tenure status were imputed (see Section 5.2.3). This impacted their *after-housing* cost household equivalised disposable incomes, but left their before-housing cost household equivalised disposable incomes unchanged (since tenure change was assumed not to affect household income).[30] After-housing cost poverty status in this demographic and tenure change scenario was determined by comparing the adjusted 2021 or 2031 population weighted *after-housing* cost household equivalised disposable incomes with the after-housing cost poverty threshold, assumed to remain constant at its 2016 value.

We expect outright owners and rent free tenants to have lower after-housing cost rates of poverty. Over time, demographic change should lift rates of poverty to the extent that there is a growing share of singles (and falling share of couples) in the population[31]; singles are more vulnerable to poverty because they only have one income stream, while couples also benefit from economies of scale with respect to consumption. Tenure change will not affect before-housing cost rates of poverty; but the after-housing cost rate of poverty should be lifted by projected tenure change that anticipates a declining share of outright owners and increasing share of private renters.

5.4.2   Findings

We report findings for 2031 as those for 2021 are intermediate between 2016 and 2031 results and therefore do not alter conclusions based on the longer timeframe.[32] We begin in Table 32 by listing our count and incidence estimates of before- and after-housing cost poverty in 2016, as well as those projected in 2031 under demographic change only, and combined demographic and tenure change scenarios. Two other key pieces of information are revealed in the same table—the final column lists the median equivalised household disposable income as well as 50 per cent of this median, the latter being the income poverty threshold. Underneath the before- and after-housing cost poverty counts we also list mean housing costs in the population-weighted sample of *older* households.

Consider first the demographic change only projections in the first panel of Table 32. On a before-housing cost basis the number of older Australians (55 years and over) in poverty increases by over 600,000 across the 2016–2031 horizon, or from 1.25 million in 2016 to 1.88 million in 2031. This increase pushes the incidence of poverty up from a little over 1 in 5 (21%) in 2016, to nearer 1 in 4 (23.3%). These high rates of before-housing cost poverty and increases in these rates among the older population are especially noticeable among those that have reached 65 years of age. They confirm the relatively high rates of before-housing cost poverty in the older population that are reported in international comparisons conducted in OECD (2013), and further evidenced in Yates and Bradbury (2010).

Our estimates also confirm the important role that Australia's housing system fulfils in preventing mature age Australians from slipping into after-housing cost poverty. In 2016 the count (incidence) measure for *after-housing cost* poverty among 55 years and over Australians

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[30] For individuals losing home ownership status we are assuming that any housing equity holding was either spent or used to pay off debts.

[31] Seniors residing in couple living arrangements share of all seniors slips from 73.4% in 2016 to 72.4% due to a decline in the share of partnered seniors with children (see figure 2).

[32] Results are available from the authors on request.

is 802,000 (13.5%), 450,000 (7.5 percentage points) less than the 1.25 million (21%) falling into poverty on a before-housing cost basis.

In 2031 growth in the level and composition of the Australian population causes the count (incidence) measure of *after-housing cost* poverty to edge up from 802,000 (13.5%) to 1.1 million (13.7%). However, the gap between before- and after-housing costs widens from 8 to 10 percentage points despite a declining rate of home ownership. The housing system becomes a more effective source of protection from poverty due to demographic change; this is because there is a growing share of single person households (see Figure 2), and very old persons (see Figure 1) in the population who have especially high before-housing cost rates of poverty and lower housing costs. Indeed, mean annual real housing costs among older Australians are projected to fall from $6,414 in 2016 to $5,774 in 2031 (see Table 32). Ageing of the population is responsible for a larger increase in after-housing cost poverty in the 65 and over age group (from 479,000 to 733,000) over the time horizon 2016–2031; in the 55–64 age group a more modest increase from 323,000 to 369,000 is anticipated.

Table 32: Mean before- and after-housing cost poverty rates among persons aged 55–64 and 65+, in 2016, 2031A (demographic change only), 2031B (demographic and tenure change)

Above/below poverty threshold	2016: Count in '000s (%)			2031A: Count in '000s (%)			2013a: Count in '000s (%)			Median equivalised household disposable income in 2016 (50% of the median)
	55-64	65 +	55 +	55-64	65 +	55 +	55-64	65 +	55 +	
Above before-housing cost poverty threshold	2,410.2 (90.0)	2,295.2 (69.9)	4,705.5 (79.0)	2,743.5 (89.8)	3,431.1 (68.7)	6,174.6 (76.7)	2,743.5 (89.8)	3,431.1 (68.7)	6,174.6 (76.7)	53,594 (26,797)
Below before-housing cost poverty threshold	268.1 (10.0)	986.5 (30.1)	1,254.7 (21.1)	310.4 (10.2)	1,564.8 (31.3)	1,875.2 (23.3)	310.4 (10.2)	1,564.8 (31.3)	1,875.2 (23.3)	53,594 (26,797)
Above after-housing cost poverty threshold	2,355.4 (87.9)	2,802.4 (85.4)	5,157.8 (86.5)	2,684.5 (87.9)	4,262.6 (85.3)	6,947.1 (86.3)	2,654.0 (86.9)	4,240.9 (84.9)	6,894.9 (85.7)	39,503 (19,752)
Below after-housing cost poverty threshold	323.0 (12.1)	479.3 (14.6)	802.3 (13.5)	369.4 (12.1)	733.4 (14.7)	1,102.7 (13.7)	399.9 (13.1)	755.0 (15.1)	1,154.9 (14.4)	39,503 (19,752)
Mean housing costs*	10,475	3,101	6,415	10,346	2,980	5,774	12,488	3,396	6,847	N/A

Notes: * Mean housing costs measure includes outright owners and rent-free tenants with zero housing costs.

Source: Authors' own calculations from the 2016 HILDA Survey and ABS population projections (2015).

Consider now our estimates that combine demographic and tenure change. Falling rates of home ownership and an increasing share of private rental housing increase the mean annual housing costs of those 55 years and over by $1,000, from $5,800 to $6,800, and push an additional 50,000 older Australians into after-housing cost poverty. The after-housing cost rate of poverty creeps up to 14.4 per cent. But the Australian housing system will, if the tenure trends of the recent past are repeated (among the elderly), continue to provide an effective safety net that keeps large numbers of older Australians above the poverty line. The projections reported in Table 32 suggest that 1.88 million older Australians could be in before-housing poverty in 2031; but this count estimate falls by 730,000 to 1.15 million on an after-housing cost basis.

Table 33 and Table 34 offer further insights by offering a breakdown of poverty rates by finer definitions of age groups, as well as household types in the older population. In Table 33 it is striking to find that in 2016, our computations suggest that because of a much higher share of mortgagors (and private renters) among those approaching pension age (65 years), after-housing cost rates of poverty are higher (or more or less the same) as before-housing cost rates of poverty. Consider, for example, the 55–59 years age range. A little over 1 in 10 persons are in after-housing cost poverty, while a lower 7.4 per cent are in before-housing cost poverty. This relationship reverses as we shift up the age bands and move beyond pension age. On reaching the 75+ age group we find that after-housing cost poverty rates are less than half the before-housing cost rate, and the gap between the two has widened to nearly 25 percentage points.

There is little change in these patterns by age ranges over the 2016–2031 time horizon. However, population ageing results in the 'very old' gaining higher population shares (see Figure 1), and since this is where the housing system offers the strongest 'safety net', the gap between before- and after-housing cost poverty rates widens among 55 years and over Australians.

Table 33: Before- and after-housing cost poverty rates, by age range, in 2016, 2031A (demographic change only), 2031B (demographic and tenure change)

Age range	2016		2031A		2031B	
	Before-housing cost poverty	After-housing cost poverty	Before-housing cost poverty	After-housing cost poverty	Before-housing cost poverty	After-housing cost poverty
55–59	0.074	0.113	0.074	0.112	0.074	0.121
60–64	0.131	0.130	0.131	0.131	0.131	0.142
65–69	0.197	0.130	0.197	0.130	0.197	0.132
70–74	0.274	0.157	0.274	0.156	0.274	0.166
75+	0.402	0.153	0.400	0.151	0.400	0.154
All aged 55+	0.211	0.135	0.233	0.137	0.233	0.143

Source: Authors' own calculations from the 2016 HILDA Survey and ABS population projections (2015).

The changing demography with respect to household type also serves to amplify the gap between before- and after-housing poverty rates. In Table 34 the breakdown by household type documents an interesting pattern. Consider first our 2016 base year; we report higher after-housing cost poverty rates among families because mortgagor and private rental housing status is relatively common among older Australians with dependent children still present in the household. But among mature age Australians in those household types where children are not

present, housing offers significant protection against poverty. Once again, these patterns are stable over the 2016–2031 time horizon. Population numbers in childless households are expected to grow more rapidly than in households with children present, so this changing demographic picture causes the gap between before- and after-housing cost poverty to increase.

Table 34: Mean before- and after-housing cost poverty rates by living arrangement, in 2016, 2031A (demographic change only), 2031B (demographic and tenure change)

Household type	2016		2031A		2031B	
	Before-housing cost poverty	After-housing cost poverty	Before-housing cost poverty	After-housing cost poverty	Before-housing cost poverty	After-housing cost poverty
Couple family with children	0.033	0.046	0.035	0.045	0.035	0.049
Couple family no children	0.229	0.129	0.248	0.132	0.248	0.136
Sole parent, female	0.082	0.133	0.082	0.121	0.082	0.136
Lone person, male	0.415	0.247	0.432	0.242	0.432	0.254
Lone person, female	0.559	0.253	0.576	0.245	0.576	0.261
All aged 55 +	0.211	0.135	0.233	0.137	0.233	0.143

Source: Authors' own calculations from the 2016 HILDA Survey and ABS population projections (2015).

5.5   Policy development implications

There are emerging housing design issues that could pose significant challenges for planning systems, given an expectation of nearly 2 million 65 years and over Australians needing some form of assistance with one or more activities in 2031. Often the mobility issues associated with these assistance needs require the retrofit of family homes, future requirements that are eased if today's new housing designs incorporate amenities that aid mobility around the home. Housing and planning authorities might consider further modifications to housing design regulations to ensure that a growing share of new build will not require future retrofits.

By 2031 we also anticipate that over 200,000 older private rental housing tenants will be in need of assistance with one or more activities. The presence of a growing number of elderly, and possibly frail, persons in private rental housing raises a different set of issues, because private landlords may be unwilling to permit modifications that aid mobility in the home. The insecurity associated with private rental housing tenancies is also relevant because housing stability assists arrangement of support services. If social housing remains a small residual tenure, as assumed in the forecasts in this report, there will be growing pressure on governments to review tenancy regulations that impede tenant rights to install amenities that help infirm and immobile elderly people to conduct day-to-day activities.

Population ageing will result in a projected 35 per cent increase in the population aged 55 years and over between 2016 and 2031. But growth in the number of small households, and especially lone person households, is expected to be faster. Males in lone person households are expected to increase by 38 per cent to 557,000 in 2031, and lone females by 48 per cent to 946,000 in 2031 (see Figure 2). A stronger demand for smaller houses and units could emerge from these demographic developments, so the kind of modifications to planning requirements

suggested above might be better targeted to smaller houses and units. But stronger demand for smaller dwellings might not eventuate if impediments to downsizing are not addressed. Stamp duties, pension income and asset means tests that penalise downsizers, as well as a lack of suitable smaller dwellings in the neighbourhoods of older empty nesters and lone person households, are all potentially important. The steep increase in older Australians living alone over the 2016–2031 time horizon will likely motivate pressure for policy changes to incentivise downsizing.

Housing assistance for older Australians will add to the fiscal pressures on government budgets even if there is no net increase in public housing, as has been assumed in this study. Given this assumption two developments are especially 'eye-catching'. Firstly there will be rapid real growth in government outlays on CRA payments to senior Australians. This is partly due to population ageing, but largely due to a modest fall in the projected rate of home ownership and the inability of a fixed public housing stock to accommodate growing demand. This growing demand for public housing is the second key development; eligibility for public housing is expected to increase from 247,000 to 440,000 seniors over the timeframe 2016–2031. Not all eligible older Australians will join waiting lists, but many will and state housing authorities as well as community housing organisations would come under extreme pressure.[33]

Hence there is a growing need for an alternative housing solution to be implemented as a safety net to meet the housing needs of low income seniors living in private rental housing. By 2031 the Superannuation Guarantee (introduced in 1992) will have matured. Those entering the labour force since 1992, and approaching retirement age in the 2030s, will have accumulated substantial sums in their accounts, provided they enjoyed regular employment through their working lives. For those living in private rental housing in their later years, and seeking more secure housing, the accumulated sums could open up new housing opportunities, especially if governments assist with innovative programs such as shared ownership. These government initiated programs could permit seniors to use part or all of their accumulated superannuation balances to buy one part of their dwelling, and to rent the remainder. The down payments that seniors provide from their superannuation are the source of some of the capital funding needed to construct the housing necessary for the program to operate. There will also be savings from reduced CRA payments.

A criticism is that allowing people to raid their superannuation accounts undermines a major aim of the Superannuation Guarantee, which is to promote financial independence in old age. While this is a valid objection to schemes that permit young people to draw down their super, it carries less weight in relation to a program that is targeted on seniors. The other more valid criticism is that it could undermine another aim of the Superannuation Guarantee, which is to curb growth in the budget cost of age pensions. Seniors' superannuation balances are an assessable asset in the age pension asset test, but their ownership share in the proposed program would be exempt as it is a housing equity holding in the senior's primary residence.

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[33] According to the Productivity Commission (2018) *Report on Government Services* there were 319,913 dwellings in public housing and 82,902 dwellings that are Community Housing tenancy rental units as of 30 June 2017 (www.pc.gov.au/research/ongoing/report-on-government-services/2018/housing-and-homelessness/housing). The 440,000 seniors in private rental housing that are projected to become eligible in 2031 would then overwhelm current social housing capacity.

6   Policy development options

This report is motivated by concerns about a growing number of middle-aged Australians who are carrying mortgage debt into retirement, and paying off higher levels of debt relative to house values and income than their parents did. These trends have potentially significant consequences for older Australians' wellbeing because they affect the ways in which older home owners manage their wealth portfolios, as well as plan their working lives. The rising level of indebtedness among older Australians also triggers economy wide concerns because debt is a drag on consumption growth, and is likely to be especially so for older mortgagors, as they approach the end of their working lives.

Mortgage indebtedness later in life also poses challenges for retirement incomes policies and housing assistance programs. Home ownership has often been dubbed the fourth pillar of the retirement incomes system (Yates and Bradbury 2010). However, rising mortgage indebtedness and falling rates of home ownership are eroding this pillar's 'foundations'.

There are three important threats—firstly, for older mortgagors the risk of serious ill health and involuntary transitions out of the labour force increases with age. Many if not most of those with large mortgages may plan to work beyond the pension eligibility age, but these risks will become a reality for a minority. Some will be forced to raid their superannuation balances in order to pay off mortgages, and stay in home ownership. Relying on the age pension is a likely result, and one not envisaged when the Superannuation Guarantee was introduced.

A second threat for older mortgagors is falling out of home ownership due to mortgage stress. Older mortgagors are not immune, as documented in our earlier research (Wood and Ong 2017). Biographical disruption is a common trigger of these exits, and women are especially vulnerable because they accumulate lower superannuation balances, and rely more on the family home as their main retirement asset. Their transitions into rental housing will add to the demand for housing assistance.

Finally, there are older mortgagors that have borrowed in order to increase their property holdings, either by trading up to a higher value primary home, or adding an investment property to existing property portfolios. House prices have been on a mainly upward trend since the early 1990s, and have proved resilient to threats such as the GFC. But in recent times Australian house prices have fallen, especially in our largest cities. There are commentators who believe that these falls will be sustained, and decreases of 20 per cent in nominal terms (from previous peaks) are being predicted.

Highly leveraged older mortgagors will then experience large reductions in their housing wealth. This will be especially painful for those older Australians that have re-oriented wealth portfolios toward property and away from superannuation. So far, financial innovation has failed to produce insurance contracts that would enable residential property owners to hedge house prices. This issue could become more prominent in the short term.

This chapter supports forward-looking policy development and budget planning to address these household and policy challenges. The following sections highlight the key findings from this report and discuss in more detail the implications for policy making in an era of population ageing and increasingly precarious home ownership in Australia.

6.1   Investment and repayment risks

We find that older mortgagors' debt has grown at a rate that has outstripped both house price and income growth over several decades, raising important questions about their exposure to investment risk, repayment risk and mortgage payment difficulties. Investment risk affects a

growing albeit minority share of older mortgagors. If house prices were to suddenly plunge by 10 per cent (based on 2015 data), the share of older mortgagors who would hold less than a 40 per cent equity stake in their family home would rise from 13.7 per cent to 17.5 per cent. Repayment risk is more significant and also rising. Older mortgagors' average MDIR tripled from 71 per cent to 211 per cent between 1987 and 2015.

6.1.1   Long-term financial planning strategies

Our modelling results suggest that long-term planning for a mortgage debt repayment strategy over the life course will be crucial in mitigating a rise in repayment risk as a mortgagor ages. This is important because we have (at least mild) evidence that it is repayment risk, rather than investment risk, that raises the chances of mortgage payment difficulties among older mortgagors. Moreover older home owners have a growing appetite for mortgage debt compared to previous generations of home owners, so more seniors are exposed to repayment risk. Such financial planning will need to take into account net financial wealth (other than housing). Non-housing financial assets can potentially act as a buffer, helping those at risk of default to continue making payments. This may prove especially valuable for those vulnerable to biographical disruption, or with weak labour market engagement. Financial planning is also complicated by the increasing fluidity of housing wealth, as financial innovations enable home owners to use flexible mortgages to draw down on the wealth stored in their family home without moving (Ong, Haffner et al. 2013a).

6.1.2   Hedging exposure to mortgage payment difficulties

Those who are actively involved in the labour market in later life are more likely to avoid mortgage payment difficulties. This is important because Cigdem-Bayram Ong et al. (2017) find that more older Australians are now willing to extend working lives to pay down their mortgages. An ageing population working longer has a positive outcome for retirement incomes policy and economic productivity. But unexpected life shocks such as serious ill heath, unemployment and bereavement are more common in later stages of the life cycle, and can plunge older mortgagors into severe mortgage stress, especially those with over-optimistic expectations.

It is important for policy makers to consider measures to assist older mortgagors to hedge their exposure to mortgage payment difficulties. For instance, government regulation could make it a requirement for certain mortgagors to take out a form of insurance that will enable them to continue making mortgage repayments should they suffer from financial hardship. This requirement could be applied to mortgagors once they have passed a certain age threshold with a mortgage debt burden in excess of some multiple of household income.

6.2   Mortgage stress and wellbeing

The report presents evidence of a mortgagor excess stress burden in later life, with older mortgagors reporting lower mental health and higher psychological distress scores than older outright owners. When older mortgagors experience difficulty in meeting mortgage payments, their SF-36 mental health scores are reduced by 2 points for men and 3.7 points for women. Late mortgage payments also raise males' K10 psychological distress scores by nearly 2 points. These effects are comparable to those resulting from long-term health conditions, so clearly mortgage stress is an important influence on wellbeing in later life.

6.2.1   Equity-oriented funding solutions for owner-occupation

Our findings suggest a need for innovative financial solutions for funding owner-occupation that reduce the requirement for debt finance, to help address this negative association between mortgage debt and wellbeing. Studies such as Smith, Whitehead et al. (2013) and Wood, Smith et al. (2013) have proposed equity (rather than debt) solutions for funding owner-occupation. An

example is equity finance, which funds home purchase by spreading the investment risks and rewards of the purchase between the home buyers and financing institutions. However, this has rarely been tried and the sector is small. Existing equity finance products have not managed to achieve scale, reflecting the slow pace of institutional and regulatory adjustments in response to product innovation on this front. However, there are also other practical issues, including lack of clarity around the benefits and costs to home buyers (Smith, Whitehead et al. 2013). Downsizing may also be an option for 'empty nesters' if it unlocks sufficient equity to reduce mortgage debt. However, as found by Ong, Jefferson et al. (2013b), downsizing is often hampered by barriers such as the lack of affordable and appropriate housing in the local area, the financial disincentives posed by stamp duties on home purchase and the operation of pension and allowance means tests.

6.2.2 Gender equity considerations

The negative associations between mortgage indebtedness and wellbeing levels also raise gender equity concerns. Older female mortgagors generally have lower levels of mental health and higher levels of psychological distress than older male mortgagors. The average SF-36 score for older female mortgagors is 73.5 compared to 77.1 for older male mortgagors. At the same time, the K10 score for older female mortgagors is 15.9, compared to 14.6 for older male mortgagors. Older female mortgagors' personal wellbeing (measured by the SF-36 mental health score) is also more sensitive to their personal circumstances. In addition, women have longer life expectancies than men, are more likely to experience career interruptions, and are less inclined than men to re-marry following a marital breakdown. Hence, ageing female mortgagors face challenges on multiple fronts, signalling a need to carefully design policies and programs that provide adequate support for women at risk of housing insecurity and poverty in old age.

6.3 Mortgage stress, superannuation and consumption

We find evidence that mortgage stress influences both the wealth management and consumption strategies of older mortgagors. Faced with declining incomes as they approach the end of their working lives, older mortgagors are prone to alter their investment and consumption strategies to cope with mortgage stress.

6.3.1 Retirement incomes adequacy

Growing numbers of baby boomers are retiring with outstanding loan balances against the family home. These older mortgagors appear prepared to draw down their superannuation to bolster wealth stored in housing equity when repayment risks are present. For example, we find the odds of drawing down on superannuation are significantly higher in the upper MPIR quintiles than the bottom MPIR quintiles. These observations are particularly worrying from a retirement incomes adequacy context. If superannuation balances are being run down to pay off mortgage debt rather than to sustain spending needs in retirement, there will be growing pressure on the age pension system.

6.3.2 Asset substitution–preferences and strategies

The links between the value of the family home, mortgage debt and superannuation are complex. Our research shows at least two wealth management strategies by older mortgagors, reflecting different investor preferences, but both suggesting asset substitution between superannuation and housing wealth. We found that every $10,000 decline in home value increases the odds of superannuation drawdown by 4 per cent. Hence, if a home owner faces the threat of falling housing equity, he or she may adopt a strategy of dipping into superannuation to meet spending needs to reduce the need to borrow against housing equity.

On the other hand, every $10,000 increase in home debt lowers the odds of superannuation drawdown by 18 per cent. Mortgagors who are faced with rising mortgage debt (or falling housing equity) may in fact be more reluctant to dip into their superannuation funds in order to preserve as much non-housing wealth as possible.

6.3.3   Financial literacy needs

The budget share devoted to necessities increases as repayment risk rises. A non-negligible segment of the mortgagor population is more prone to material deprivation than outright owners, despite the fact that the former also exhibit higher discretionary spending levels. Nearly 8 per cent of older mortgagors had been unable to pay their utility bills on time between 2006 and 2016, compared to around 3 per cent of outright owners. Older mortgagors are more likely to report having to pawn or sell something, go without meals or heating and ask for help from welfare or community organisations than outright owners. This suggests that older mortgagors are a heterogeneous group, with some evidently able to cope with mortgage burdens in later life, while others are forced to cut expenditures to necessities and suffer material deprivation as a result of their mortgage stress.

Older mortgagors with higher educational qualifications appear better able to sustain discretionary spending than those with lower qualifications. The typical share of budgets devoted to necessities is 4.5 per cent lower among older mortgagors with postgraduate degrees compared to those with high school qualifications, holding other factors constant. Similarly, the budget share devoted to necessities is 3 per cent lower among older mortgagors with a bachelor degree compared to those with high school qualifications, again holding other factors constant. Educational qualifications usually mean increased financial sophistication, and their statistical importance in explaining budget shares demonstrates a need for financial literacy programs to assist older mortgagors, especially those with lower lifetime incomes, to better meet their mortgage payments and consumption of other goods and services.

6.3.4   Insurance instruments

While investment risk was not found to be a driver of mortgage payment defaults, it is nevertheless important because house price declines threaten the wealth holdings of older home owners. This challenge is especially threatening to those that have rebalanced wealth portfolios by substituting property wealth for superannuation. The lengthy era of house price inflation has encouraged this, as have generous fiscal concessions to residential housing. There is increasing evidence of an end to the era of sustained rising house prices. Fears of a housing market led decline in consumption are accentuated by the absence of insurance instruments that could enable mortgagors to hedge house price declines (Wood and Ong 2012). When house prices are ticking along nicely, the lack of such insurance products is rarely noticed. In the less secure housing market emerging, policy makers should consider whether product innovation along these lines is worth encouraging. If property owners could enter insurance contracts that hedge house price declines, better financial planning would be facilitated. However, practical difficulties may exist in developing workable insurance contracts to hedge house price risk. For instance, insurance contracts may not be able to go beyond hedging market risk to hedge risks that are specific to the home or neighbourhood of the property owner.

6.3.5   Monetary policy and prudential regulations

From the perspective of overall economy health, our findings are concerning. High levels of mortgage debt are likely to act as a drag on consumption spending, particularly when house prices fall, and especially the spending of older mortgagors, as they have fewer years of earnings ahead. Our findings confirm Ong, Wood et al.'s (2017) report on the links between housing and the economy, which show that the takeup of further debt among highly leveraged households exposes them and the macroeconomy to significant investment and repayment

risks. Hence, though monetary policy levers are not directly housing related, they have important influences on housing wealth related consumption effects. Overall, there is a need for policy makers to carefully monitor the growth of household indebtedness and ensure robust prudential regulations that limit the exposure of households and the economy to unacceptably high levels of debt-driven consumption.

6.4 Mortgage debt, falling home ownership rates, and planning for the housing futures of older Australians

We forecast that nearly 2 million 65 years and over Australians will need some form of assistance with one or more activities in 2031.[34] This raises significant issues for a range of policy portfolios—including housing design and planning systems, tax, private rental sector regulation, housing assistance, the retirement incomes system and fiscal policy in general.

6.4.1 Housing design and planning systems

Demographic projections show an impending rise in the number of elderly Australians, many of whom will likely be in need of various forms of housing assistance. Growing numbers with mobility issues will mean an increasing need for housing designs and planning systems that support retrofits which aid mobility in existing homes, as well as incorporate such amenities into new builds.

6.4.2 Barriers to downsizing

Because growth in the number of small households, and especially lone person households, is expected to accelerate, a stronger demand for smaller houses and units could emerge, and the kind of modifications to planning requirements suggested above might be better targeted to smaller houses and units. However, the stronger demand for smaller dwellings might not eventuate if impediments to downsizing are not addressed. Stamp duties, pension (and allowance) income and asset means tests that penalise downsizers, and a lack of suitable smaller dwellings in the neighbourhoods of older empty nesters and lone persons households, are all potentially important.

6.4.3 Private rental sector regulations

Over 200,000 older private rental housing tenants will be in need of assistance with one or more activities by 2031. The presence of a growing number of elderly, and possibly frail, persons in private rental housing raises a different set of issues, especially if private landlords prove unwilling to permit modifications that aid mobility around the home. The insecurity associated with private rental housing tenancies is also a concern because housing stability assists arrangement of support services. If social housing remains a small residual tenure, as assumed in the forecasts in this report, there will be growing pressure on state governments to review tenancy regulations that impede tenants' rights to install amenities to help infirm and immobile elderly people conduct daily activities.

6.4.4 Budgeting for housing assistance to low-income renters

Housing assistance for older Australians will add to the fiscal pressure on government budgets even if there is no net increase in public housing, as has been assumed in this report. There are two important policy ramifications. First, there will be rapid growth in real government outlays on

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[34] On the basis of ABS demographic forecasts we expect 5,006.971 persons age 65 years and over in 2031. Currently 38.6% require assistance; if that share remains unchanged we arrive at an estimate of 1932690 persons in 2031.

CRA payments to older private renters, due to a combination of factors—population ageing, a modest fall in projected home ownership rates and continued rationing of the public housing stock. Second, the growing demand for public housing is significant; eligibility for public housing is expected to increase from 247,000 to 440,000 seniors over the period 2016–2031. Though not all eligible older Australians will join waiting lists, it is conceivable that many will. This will in turn put state housing authorities and community housing organisations under extreme pressure.

6.4.5   The role of superannuation in housing decisions

Hence there is a growing need for an alternative housing solution to be implemented as a safety net to meet the housing needs of low income seniors living in private rental housing. The accumulated superannuation wealth of future retirees could open up new housing opportunities as the superannuation system will have matured by 2031. Governments could assist by introducing innovative programs such as shared ownership. These government initiated programs could permit seniors to use part or all of their accumulated superannuation balances to buy one part of their dwelling, and to rent the remainder. Indeed the program could operate in a way similar to residential age care, where seniors can lodge a refundable accommodation deposit to help meet some or all their care and accommodation costs.

Of course, a key criticism of such a policy measure is that it undermines a major aim of the Superannuation Guarantee, which is to promote financial independence in old age. However, this objection may carry less weight in relation to a program targeted to seniors than it does for younger people. The other more valid criticism is that it could undermine another aim of the Superannuation Guarantee, which is to curb growth in the budget cost of age pensions.[35]

6.5   Final remarks

The international literature offers a significant pool of studies that have examined the drivers and implications of mortgage stress, but few have focused on older mortgagors. Yet the confluence of population ageing, housing market instability and record levels of indebtedness among Australian home owners presents new policy challenges that will undoubtedly persist into the coming decades. So this report's explicit focus on older mortgagors is timely; the evidence base and new information generated by this study will support forward-looking policy formulation to sustain an ageing Australian population.

This report has captured a wide spectrum of topics relating to the personal circumstances of older mortgagors—the investment and repayment risks they face, their wellbeing, and wealth and consumption management strategies. It also presents empirical evidence that allows us to project the future landscape that policy makers face in designing systems and programs that support an ageing population structure. Given the breadth of topics covered in this report, there is undoubtedly scope to drill down further to uncover more nuanced information.

For instance, we know that adverse life shocks such as unemployment or marital breakdown are more common in the later stages of the life cycle, and can expose older mortgagors to unanticipated and severe mortgage stress. There is certainly a need for further research to shed light on the circumstances of those taking out large mortgages in later life. It would be useful to know whether older mortgagors typically avoid the hazards (e.g. ill health, redundancy, and bereavement) that can cause severe mortgage stress, or whether they are more prone to these hazards as they age. If the latter, there is greater cause for policy concern, particularly if they

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[35] The accumulated savings that are transferred out of superannuation are no longer an assessable asset once used to purchase owner-occupied housing.

lack a buffer to help maintain their financial position in the wake of such hazards. Panel data sets such as the HILDA Survey, and repeated cross section data sets such as the ABS Retirement and Retirement Intentions module of the Multipurpose Household Survey (introduced 2004–2005) are potentially useful in advancing such research.

There is also scope to enhance the sophistication of the econometric modelling strategy deployed with respect to our analysis of the impact of mortgage stress on wellbeing. For instance, the risk of reverse causality in our models can be further minimised by lagging the key mortgage stress predictors by one year and beyond to examine whether mortgage stress in year t has a statistically significant impact on personal wellbeing in the year (or years) after t+1. The panel nature of the HILDA data could also be further exploited to examine the impact of duration in mortgage stress on wellbeing. For instance, while we do not detect statistically important relationships between the repayment or investment risk observed in a particular year and personal wellbeing in the same year, it may be the case that extended exposure to repayment or investment risk over a number of years may exert a more significant impact on personal wellbeing.

We also know from this report's analysis that older mortgagors are likely to be a heterogeneous group. Our findings point to at least two wealth management strategies in later stages of the life course. One group favour wealth accumulation in housing equity, while another favours storing savings in superannuation accounts. This sort of heterogeneity is also evident in consumption patterns. Among older mortgagors, there are those able to sustain relatively high discretionary spending, while another group appears to be more financially precarious, liable to cut spending on necessities and even fall into material deprivation due to mortgage stress. It is important to discover more about the characteristics of these heterogeneous groups of older mortgagors, and their correlation with asset and debt portfolio preferences and their consumption patterns. Nuanced information about these various subgroups would assist with better targeting of policy assistance to those most in need.

As the superannuation system matures, it raises new possibilities (as well as new complexities) for the housing options available to older Australians unable to purchase a home in earlier stages of their life course. The proposal to use superannuation to purchase housing in later life, for instance, lacks the detailed design that would allow us to gauge feasibility and effectiveness.

This report points out a number of uncertainties—for instance, would most older private renters becoming eligible for public housing in 2031 have the sustained employment record to enable the accumulation of substantial superannuation balances? Would the capital funding sourced from superannuation-financed down payments fund a housing construction program of sufficient scale to make a difference? Are savings to CRA programs a strong evidence-based claim in favour of the initiative? These are questions that should be addressed in future research.

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Appendix 1: Median trends in mortgage stress indicators, home value and income for mortgagors

Table A1: Median trends in income unit mortgage stress indicators, home value and income for mortgagors aged 55+ years, 1987–2015

	Mortgage debt, income and home value, real terms (2015 values)				Investment risk		Repayment risk	
Year	Annual mortgage debt	Annual mortgage repayment	Disposable income	Home value	LVR* (%)	Leverage multiplier ** (ratio)	MDIR (%)^	MPIR (%)#
1987	11,596.7	1,567.9	30,006.6	173949.9	7.3	1.078	38.6	5.2
1990	14,993.9	3,411.1	30,393.0	221160.1	6.8	1.073	49.3	11.2
1997	37,046.0	9,213.2	35,408.8	241604.3	20.0	1.250	104.6	26.0
2003	68,191.9	10,637.9	54,009.5	340959.5	22.6	1.292	126.3	19.7
2008	105,621.3	14,524.1	64,872.9	528106.3	18.8	1.231	162.8	22.4
2012	115,109.1	13,855.7	65,923.6	532912.6	21.0	1.266	174.6	21.0
2015	120,155.0	14,248.0	74,474.4	550,000.0	21.7	1.277	161.3	19.1

*Notes: Estimates are weighted using cross-sectional population weights provided in the SIH dataset. ~Outright owners included in sample to calculate incidence of mortgage indebtedness. *Averages are estimated using the sample mean of individual mortgage debt/ individual home value; **Leverage multiplier estimated using 1/(1– Overall Mean LVR); ^Averages are estimated by taking the ratio of Overall Mean Mortgage Debt in Year X/Overall Mean Disposable Income in Year X; # Averages are estimated by taking the ratio of Overall Mean Mortgage Repayment in Year X/Overall Mean Disposable Income in Year X.*

Source: Authors' own calculations using the SIH 1987, 1990, 1997, 2003, 2008, 2012, 2015.

Table A2: Median trends in income unit mortgage stress indicators, home value and income for mortgagors aged under 55 years, 1987–2015

	Mortgage debt, income and home value, real terms (2015 values)				Investment risk		Repayment risk	
Year	Annual mortgage debt	Annual mortgage repayment	Disposable income	Home value	LVR* (%)	Leverage multiplier** (ratio)	MDIR (%)^	MPIR (%)#
1987	57,983.3	10,251.5	57,890.5	185,546.6	31.4	1.458	100.2	17.7
1990	65,598.3	14,131.8	61,686.6	243,651.0	26.0	1.351	106.3	22.9
1997	107,916.6	15,746.2	64,480.5	241,604.3	44.0	1.786	167.4	24.4
2003	136,383.8	14,680.4	70,593.3	354,597.8	43.0	1.754	193.2	20.8
2008	203,263.4	21,969.2	93,193.8	481,163.5	41.1	1.699	218.1	23.6
2012	245,139.8	23,277.6	100,006.2	500,937.9	50.0	2.000	245.1	23.3
2015	275,000.0	21,944.0	101,510.2	550,000.0	52.0	2.083	270.9	21.6

Notes: See Table A1.

Source: Authors' own calculations using the SIH 1987, 1990, 1997, 2003, 2008, 2012, 2015.

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