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Unlocking housing wealth through mortgage debt: do patterns and motivations vary by age?

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ABSTRACT

Successive waves of house price appreciation have prompted homeowners to tap into housing wealth, increasing mortgage debt to meet spending needs. This paper addresses three questions about equity borrowing behaviour *via* panel-data modelling. First, how do homeowners' asset and debt portfolios affect equity borrowing behaviour? Second, is equity borrowing influenced by financial behaviours relating to saving, planning and risk-taking? Third, do equity borrowing drivers vary by age? Our findings confirm that equity borrowing is generally influenced by asset and debt portfolios, with notable age-related differences. Younger homeowners exhibit greater sensitivity to changes in primary home value and debt, and risk willingness. Income, labour force status and ownership of other property are crucial for those aged 55–64, while homeowners aged 65+ are generally insensitive to asset, debt or income changes. We discuss policy implications, emphasizing the prospects of longer working lives among pre-retirees, the need for safeguards for elderly equity-borrowers, and the welfare consequences of later-life debt burdens or home-ownership loss.

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1. Introduction

Countries with deregulated homeownership-centric housing systems have enjoyed successive waves of house price appreciation over the past decades. This phenomenon has positioned the owner-occupied home as the centrepiece of households' wealth portfolios from which equity can be extracted to fund consumption in countries such as Australia, the USA, the UK, and other European countries (Bhutta & Keys, 2016; Collins *et al.*, 2020; Haurin & Moulton, 2017; Ong *et al.*, 2015a; Smith *et al.*, 2022).

Historically, in the absence of financial products that would facilitate *in situ* equity release, a drawdown of housing wealth was only achieved through the costly means of selling the family home. However, the housing boom of recent decades has been

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paralleled by the rapid rise of flexibility in mortgage markets. Mortgage equity borrowing products now allow owner-occupiers to draw down their housing wealth when needed by increasing the mortgage debt secured against their home without having to move (Haffner *et al.*, 2015; Haurin & Moulton, 2017; Lowe *et al.*, 2012; Ong *et al.*, 2013a).¹

The spread of mortgage equity borrowing products have led to two significant developments. First, the owner-occupied home has been transformed from an illiquid store of wealth into an ‘ATM’ that can generate an income stream with relatively low transaction costs (Klyuev & Mills, 2007; Smith *et al.*, 2022). Second, homeowners can dip into their housing wealth easily not just in old age, but during their lifetime as spending needs arise. As the use of equity borrowing has become more common over the life course, interest has increased in the welfare role that equity borrowing performs not just for the elderly, but for younger owner-occupiers (Benito, 2009; Ong *et al.*, 2013a, 2015a; Parkinson *et al.*, 2009; Wood & Nygaard, 2010).

Indeed, research has shown that equity borrowing *via* increasing one’s mortgage debt is now a common financial tactic in mortgage-backed homeownership societies. For instance, one in five homeowners in Australia and the UK released equity by increasing their mortgage debt in the decade leading up to the GFC, and the aggregate value of equity released through this means accounted for over *two-thirds* of the total flow of funds from housing into the cash economy in both countries (Ong *et al.*, 2013a). As equity borrowing has become more widespread, the rate of mortgage usage has expanded up the age range in countries like Australia and the USA (Lusardi *et al.*, 2018, 2020; Mayer, 2017; Ong *et al.*, 2019). In Australia, the share of homeowners with mortgage loans against their primary home more than doubled among the over-55s between 2001 and 2017. In the USA, the share of mortgaged households also rose over this period; since 2009, at least 50% of homeowners aged over-55 were reporting outstanding mortgage loans every year (Smith *et al.*, 2022). Collins *et al.* (2020) notes that between 1980 and 2015, American older households more than tripled their use of home mortgage debt.

While there is now a rich international literature on equity borrowing, particularly from the USA, nuanced evidence from Australia remains relatively scarce. The Australian case is an important contribution to the literature because equity borrowing in Australia takes place within different institutional settings from the USA. In both countries, the take-up of reverse mortgage products have been low (Davidoff *et al.*, 2017; Haffner *et al.*, 2015; Mayer & Moulton, 2022). Equity borrowing typically takes places through refinancing of conventional loans and HELOCs in the USA, while in Australia it has spread through the use of flexible mortgage loans secured against the primary home that offer borrowers the flexibility of repaying their mortgage in varying instalments while at the same time allowing them to draw down on their housing equity to a specified limit (Haffner *et al.*, 2015; Haurin & Moulton, 2017). Mortgage interest on the primary home is typically fixed in the USA and tax deductible, while it tends to be variable and not tax deductible in Australia (Collins *et al.*, 2020; Haffner *et al.*, 2015). Thus, one might expect equity borrowing behaviour to vary between the two countries due to institutional differences.

Australia is also a classic example of a housing asset-based welfare system, where households are encouraged by generous tax concessions on property to accumulate

wealth in the owner-occupied home over their lifetime, so that housing costs can fall as people enter retirement as outright owners (Castles, 1998; Yates & Bradbury, 2010). The equity borrowing behaviour of Australian homeowners therefore presents an interesting case study for other countries that are similarly reliant on housing wealth as a base for welfare, or which may be shifting towards such strategies because of sustained real property price increases over time.

Figures 1 and 2 report key trends in equity borrowing across age bands in Australia from 2006 to 2021. The borrowing environment over this period was characterized by declining interest rates. However, we did not observe an uptick in equity borrowing during 2006–2021 in any age group. It is possible that other changes in the financial environment outweighed the reduced cost of servicing loans. First, the period was marked by an international banking crisis in the form of the GFC during 2008–09. Second, the housing debt to residential land and dwelling ratio grew steadily during this period, reflecting significant growth in the value of housing (Australian Bureau of Statistics, 2019). Thus, households had to take on higher debt to become homeowners, exposing them to higher house price and repayment risks. These factors may have tempered the appetite for equity borrowing despite a decline in interest rates.

Figure 1 confirms that patterns of equity borrowing vary significantly across age bands. Between 2006–07 and 2021–22, equity borrowing was consistently most

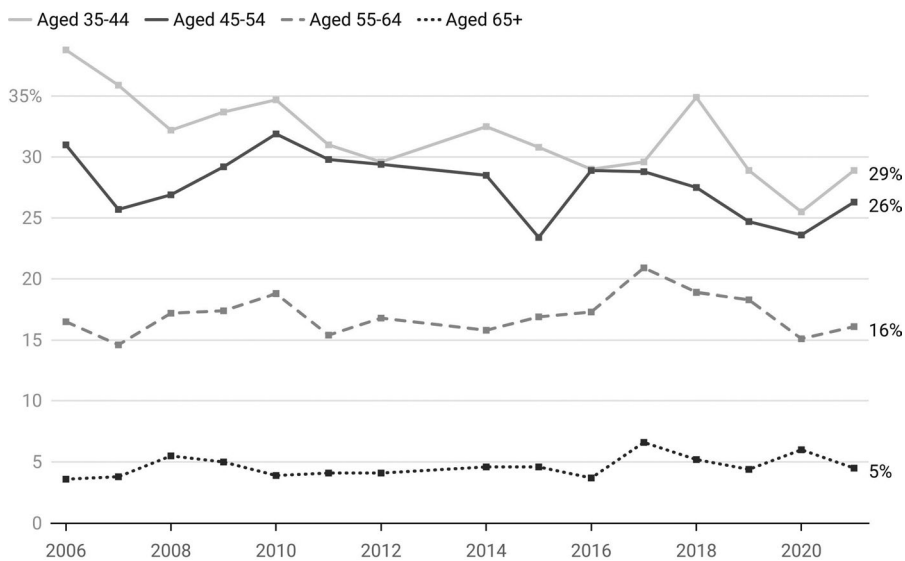


Figure 1. Incidence of equity borrowing amongst homeowners who did not move between adjacent waves, by age band, 2006–07 to 2021–22.

Source: Authors' own calculations using waves 6 to 22 of the HILDA survey.

Notes:

- Sample consists of owner-occupiers in year t who do not move between t and $t+1$.
- Equity borrowing by homeowners is defined as an increase in debt owing on their primary home across each pair of adjacent years between 2006 and 2022.
- Estimates are weighted using cross-sectional population weights of enumerated persons.
- We omit the 2013–14 period due to a change in the equity calculation methodology within the HILDA Survey, regarding the treatment of mortgage offset accounts. For further details see the *Modelling sample* section of this paper.

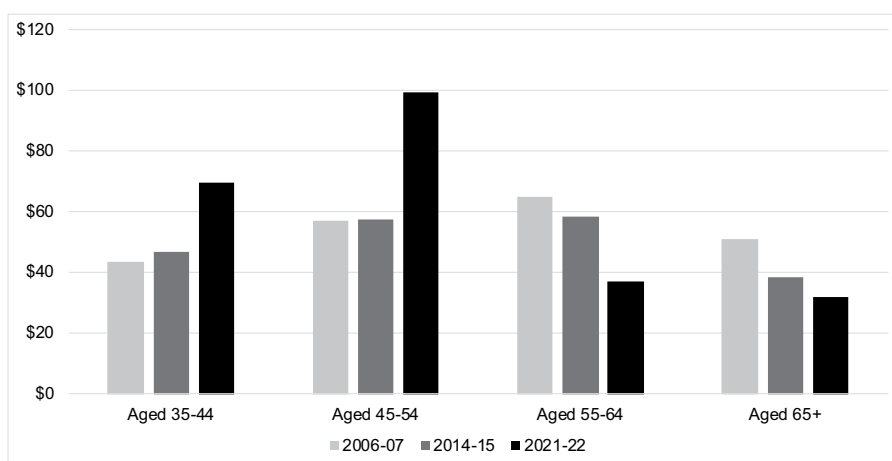


Figure 2. Real median value (AU\$'000) of equity borrowed amongst equity borrowers, expressed in 2022 price levels, by age band, 2006–07, 2014–15 and 2021–22.

Source: Authors' own calculations using waves 6 to 22 of the HILDA survey.

Notes: Sample consists of owner-occupiers in year t who do not move between t and $t+1$ and who engaged in equity borrowing (increased debt owing on their primary home t to $t+1$). Weighted using cross-sectional population weights of enumerated persons.

common among homeowners aged 35–44 and 45–54 years old, despite younger households owning less housing equity than their older counterparts. In 2006–07, the incidence of equity borrowing was over 39% and 31% among these younger age groups. This was around double the incidence of equity borrowing of 16% among those aged 55–64. The incidence of equity borrowing is much lower among older groups, with only 4% of homeowners aged 65+ borrowing equity in 2006–07.

Other interesting differences arise with respect to the *median value* of borrowed equity by age band (see Figure 2). In 2006–07, equity borrowers aged 35–44 withdrew the lowest amount of equity at AU\$43k. Within the same year, this increased up the age band to AU\$65k among those aged 55–64, before dropping to AU\$51k among the oldest group. However, the patterns over time diverge greatly across age groups. Median equity borrowed rose among the two younger groups over the study timeframe, but fell systematically among the two older groups. These differences were sufficient to shift the patterns of equity borrowed by 2021–22. In this year, it was the 35–44 and 45–54 year olds who had the highest median amount of equity borrowed at AU\$70k and AU\$100k respectively. On the other hand, the median amount attributable to equity borrowers aged 55–64 and 65+ had fallen to a low of AU\$37k and AU\$32k respectively. As a result, equity borrowers aged 35–44 years old borrowed twice as much as equity borrowers aged 65+ in 2021–22.

Against this backdrop of age-related differences in equity borrowing behaviour, our paper examines equity borrowing behaviour in Australia *via* panel-data modelling. We interrogate not just the drivers of the propensity to equity borrow, which has been the focus of most previous studies (Bhutta & Keys, 2016; Choi & Zhu, 2022; Ong *et al.*, 2015a; Wood *et al.*, 2013a), but also the drivers of the value of borrowed equity. Furthermore, we examine how equity borrowing behaviour varies across age groups.

2. Literature review and contributions of this study

At the household level, it is well-documented that equity borrowing is correlated with socio-economic characteristics such as the presence of young children and labour market attachment (Ong *et al.*, 2015a; Parkinson *et al.*, 2009). Adverse life events such as marital dissolution can also raise the odds of equity borrowing (Wood *et al.*, 2013a). However, bereavement and job losses are correlated with more drastic forms of equity extraction that involves selling the primary home (Jefferson *et al.*, 2017; Ong *et al.*, 2013a; Ong *et al.* 2015b).

Existing literature has also examined decisions around how equity borrowing decisions are intertwined with the borrower's overall asset and debt portfolios (Brown *et al.*, 2015; Collins *et al.*, 2020; Conklin *et al.*, 2023; Moulton *et al.*, 2022). However, these studies have largely stemmed from the USA. Australian and British studies have tended to omit such interactions in analysis of equity borrowing with the exception of Wood *et al.* (2013a) whose analysis pre-dates the GFC.

While equity borrowing is pervasive across all age groups (see Figures 1 and 2), many studies have focused on homeowners in mid-to-late life stages to investigate how housing wealth is intended to support retirement. In the USA, Moulton *et al.* (2022) and Collins *et al.* (2020) focused on those aged 50+, while in Australia, Wood & Nygaard (2010) and Ong *et al.* (2015a) examined those aged 45+. Much of this literature is couched within the life cycle hypothesis that posits households will smooth consumption over the life cycle based on their expected lifetime income (Modigliani & Brumberg, 1954). Wealth acts as a buffer between consumption and income, so households will accumulate wealth during earlier life course stages when income exceeds consumption and divest wealth in later life when income falls below levels required to support consumption in old age. However, many studies have also documented a reluctance to divest housing wealth in old age due to precautionary motives associated with longevity risk and bequest intentions (Haurin & Moulton, 2017; Jefferson *et al.*, 2017).

Other studies have opted to capture entire populations of homeowners, noting that equity borrowing is now pervasive across all age groups and not just the elderly (Benito, 2009; Parkinson *et al.*, 2009; Smith *et al.*, 2017; Wood *et al.*, 2013a). The growing attention on equity borrowing and other forms of housing equity extractions to generate an income flow now straddle a broad literature founded on several related themes. One theme is the homeownership-welfare state trade-off, which suggests that high homeownership levels are associated with a less developed welfare state (Kemeny, 2001). A related theme centres around the expansion of housing asset-based welfare in which housing wealth serves as a private source of welfare that reduces reliance on the welfare state (Benites-Gambirazio & Bonneval, 2022; Fox O'Mahony & Overton, 2015). The expansion of credit availability through deregulation has further facilitated the growth of equity borrowing as a private alternative to the welfare state, resulting in a credit-welfare state trade-off (Mertens, 2017; Wiedemann, 2022).

In our study, we seek to fill gaps in the literature by presenting new evidence not considered by existing studies.

First, we examine how equity borrowing behaviour in Australia is influenced by a homeowner's asset and debt portfolio. Most of the evidence on interactions with

asset and debt portfolios suggest that house price growth is important but these have largely stemmed from the USA, with the exception of Wood *et al.* (2013a) which pre-dates the GFC. We therefore provide up-to-date evidence on the importance on asset and debt portfolios within the post-GFC Australian context to test whether the effects observed in the USA are currently applicable within Australia. Both these countries are mortgage-backed homeownership-dominant societies.

Second, we examine whether equity borrowing behaviour is affected by homeowners' financial behaviours relating to savings, financial planning and risk preferences. The literature shows that wealth accumulation is affected by these three financial behaviours, e.g. saving (Pawasutipaisit & Townsend, 2011), financial planning (Ameriks *et al.*, 2003; Binswanger & Carman, 2012) and risk-taking (Giannikos & Korkou, 2023; Heo *et al.*, 2017). However, none have explicitly modelled the impacts of these financial behaviours on equity borrowing, which is a form of wealth decumulation. Our analysis will therefore shed light on how these behaviours affect wealth decumulation as opposed to wealth accumulation.²

Third, our study unpacks age-related differences in equity borrowing by scrutinizing homeowners in 10-year age bands separately – 35–44, 55–44, 55–64 and 65+ years. This offers more nuance than studies that have captured entire populations (Benito, 2009; Parkinson *et al.*, 2009; Smith *et al.*, 2017; Wood *et al.*, 2013a). It also offers more insights than studies that have focused on broader life course stages such as Collins *et al.* (2020), Brown *et al.* (2015) and Bhutta & Keys (2016). As documented later in this study, distinct differences exist across the 10-year age bands that warrant this nuanced examination.

3. Data and method

3.1. Data source and mortgage equity borrowing measurement

We leverage data from the Household, Income, and Labour Dynamics in Australia (HILDA) Survey, an annual panel survey initiated in 2001 (wave 1), encompassing approximately 14,000 individuals within 7,700 responding households. In the latest wave available, wave 22 in 2022, the survey has expanded to about 16,000 interviewed persons in 9,000 households. The HILDA Survey is Australia's nationally representative panel dataset and closely follows the design of other long-running panel surveys such as the British Household Panel Survey and Panel Study of Income Dynamics (Watson & Wooden, 2012).

There is an established precedent for analysing equity borrowing using the HILDA survey (Ong *et al.*, 2013c, 2015a; Parkinson *et al.*, 2009), and so we use the same measure of equity borrowing as this literature. For owner-occupiers, equity borrowing is distinct from other types of housing equity withdraw in that it does not involve moving from one's home.³ Our mortgage equity borrowing measure then refers to equity borrowing *via* increasing mortgage/loan debt on a homeowner's current dwelling.⁴ The HILDA Survey does not contain any explicit questions on the use of mortgage equity borrowing.⁵ It does, however, collect the total mortgages/debts owed by the household on their main home, for each wave of the survey. We can then identify those who engaged in equity borrowing as those homeowners in wave

t who do not move between t and $t+1$, but whose total primary home debt increases between these adjacent time periods. Therefore, we can refer to those engaged in mortgage equity borrowing against their primary home as ‘equity borrowers’, while those who maintain or reduce outstanding mortgage debt across adjacent waves are ‘equity savers.’

In Section S1 of the [Supplementary Materials](#), we clarify two facets of this measure: the impact of mortgage redraws and offset accounts on debt measures in the HILDA survey, and that our measure represents *net* equity borrowing, not a *gross* measure of equity withdrawal *transactions*.

3.2. Modelling sample

As necessitated by our measure of equity borrowing, our modelling sample consists of owner-occupiers in each wave t , who did not move home between t and $t+1$.

We pool together person-year observations from 14 waves of the HILDA Survey spanning the years 2006 to 2022. We begin at wave 6 (2006) of the survey as our measure of financial risk appetite – a key predictor in our analysis – is not available in prior waves. Additionally, we exclude observation from wave 10, as another key predictor, financial hardship, is inaccurate in that wave.⁶ As discussed in Section S1 of the [Supplementary Materials](#), the treatment of offset accounts in determining home debt in the survey changed between waves 13 and 14 – in the former offset balance reduced home debt and in the latter it did not. We therefore exclude observations from wave 13, as debt could be artificially inflated at $t+1$ (wave 14) by this change and erroneously indicate equity borrowing.

We impose three further sample restrictions. First, we ensure sample members are indeed the owners of the home they reside in. In each survey wave, homeownership is captured at the *household* level. However, the residents that are the legal owners are only identified every fourth wave, commencing in 2002, in what are referred to as ‘wealth module’ waves. We then infer homeownership status at the *person* level using the following rule: if an individual was a part of an income unit identified as containing a legal homeowner in a wealth module wave, that individual is deemed to be a homeowner up until the next wealth module wave, if that individual remains living in an owner-occupied house.⁷

Second, if multiple household members are identified as owners in the previous step, we include person-year observations from only one of those members for that wave in our sample. It is unlikely that those residing together would be able to make independent decisions about equity borrowing against jointly owned property. Including multiple household members would then violate the independence of observations and cause households with multiple owners to be overrepresented in the sample. Therefore, we retain the oldest household member for whom equity borrowing status between t and $t+1$ is known.

Third, since some of our wealth and income variables are measured at the household level, we exclude group or multifamily households. These complex household compositions might confuse the link between household wealth and equity borrowing. The resulting modelling sample consists of 6,794 individuals and 44,844 person-year observations, with an average of 6.6 observations per person.

3.3. Model specifications and key variables

We begin by constructing a fixed effects linear probability model (LPM) of the propensity to engage in equity borrowing, where equity borrowing between t and $t+1$ is a binary indicator modelled as a function of age band, asset and debt portfolios (including primary home value and debt), income, financial behaviours, financial hardship, a set of controls, and calendar year fixed effects.⁸

The predictors are measured at t unless otherwise stated, and all monetary variables were first converted into real values (at 2022 prices).⁹ Complete descriptions of all the predictors are provided in [Supplementary Table S1](#). [Supplementary Table S2](#) describes the characteristics of our modelling sample for all predictors and by equity borrower status.

To our knowledge, prior studies modelling equity borrowing using the HILDA survey have typically employed a random effects estimator, as opposed to fixed effects (e.g. Benito, 2009; Ong *et al.*, 2013c; Wood *et al.*, 2013a). However, this approach can lead to biased and inconsistent estimates if entity-specific unobserved heterogeneity is correlated with the measured independent variables (Cameron & Trivedi, 2010). For example, an inherently optimistic person might both overestimate their home value and be more willing to borrow, resulting in an upward bias in the home value coefficient. The application of a Hausman test to our modelling sample refutes the random-effects assumption of no correlation, and so we employ the fixed effects estimator, which controls for all time-invariant traits of our sample members.¹⁰

It is probable that the prior studies avoided the use of fixed effects as propensity to engage in equity borrowing is both a binary outcome variable and a relatively rare event, especially amongst older age groups (the focus of most studies). A binary outcome variable suggests that a fixed-effects *logit* or *probit* model is appropriate. These models, however, require sample members to have engaged in equity borrowing at least once, which excludes the majority of the sample. Since we employ a fixed effects LPM, this concern does not apply. Recent literature suggests that in the case of fixed effects in panel data with a binary dependent variable and rare events data, the LPM can outperform logistic regression (Timoneda, 2021). According to Hellevik (2009), even if the use of a LPM imposes heteroskedasticity issue that violate ordinary least squares assumptions, these are generally corrected by employing robust standard errors. Hence, in all our models, we apply cluster robust standard errors.

Apart from modelling the propensity to engage in equity borrowing, we also model the drivers of the *value of borrowed equity*. We do so by estimating a fixed effects linear regression, using the inverse hyperbolic sine (IHS) transformation of the value of borrowed equity between t and $t+1$ as the dependent variable. Naturally, for those that did not engage in equity borrowing, the value of borrowed equity will be zero.

Researchers often use the natural logarithm of wealth variables to mitigate right-tailed skewness and compress outliers. However, natural logs cannot be applied to values of zero. The IHS transformation is a useful alternative, as it addresses skewness while retaining zero and negative values (Friedline *et al.*, 2015). This allows us to transform the value of borrowed equity for all our modelling sample. The

interpretation of an IHS-transformed variable closely approximates that of a natural logarithm (Friedline *et al.*, 2015), allowing the value of borrowed equity model to be interpreted similarly to a traditional log-level regression. For all models we also apply the IHS transformation to our continuous wealth predictors, allowing the coefficients of these variables to be interpreted as Semi-elasticities in the propensity models and as elasticities in the value of borrowed equity model.

3.4. Sample stratification

To uncover age variations in the determinants of equity borrowing, the sample is divided into owners who are aged 35–44 years, 45–54 years, 55–64 years, and 65+ years. There are two obvious modelling strategies. First, we could interact each predictor in the model by age band. This allows us to estimate a single model, and the age-interacted terms tells us how each equity borrowing predictor varies as age changes. While an age-interacted model is conceptually sound, to elucidate how effects vary across four different age bands will inevitably lead to many predictors interacted with different age bands that can be complicated to interpret. An alternative approach is to estimate a series of un-interacted models that are stratified by age band. In our case, it would mean estimating four separate models with the same predictors, but for separate groups aged 35–44, 45–54, 55–64 and 65+ years. We opt for the second more easily interpretable approach.

However, stratified models suffer a limitation in that their coefficients are not directly comparable in non-linear models if differences in residual variance exist between groups (Allison, 1999; Hoetker, 2007). Since we employ a LPM instead of a non-linear logit or probit model, this limitation is not a concern, as *linear* models that are stratified by age produce exactly the same results as a single model in which every predictor is interacted with age. We can therefore directly compare coefficients across age groups.

3.5. Primary home value and debt

The HILDA Survey provides self-reported property and mortgage debt values, which are widely used in analyses of housing wealth and housing equity withdrawal. For instance, in their analysis of alternative forms of housing equity withdrawal in Australia, Ong *et al.* (2015, 2013) and Parkinson *et al.* (2009) apply self-reported property and mortgage debt values. Smith *et al.* (2022) and Arundel and Ronald (2021) also apply self-reported values to investigate housing wealth inequalities in Australia, the UK and the USA.

The existing literature suggest that loss aversion and the presence of endowment effects can lead to over-optimism regarding the value of one's home (Genesove & Mayer, 2001; van der Crujisen *et al.*, 2018). However, evidence on the magnitude of over-estimation is mixed. For instance, in the USA, over-estimations have been estimated from 4% (Chan *et al.*, 2016; Haurin *et al.*, 2018) to 8% (Benítez-Silva *et al.*, 2015). In Australia, the documented ranges of over-estimations are smaller, such as 1% (Windsor *et al.*, 2015) and 3% (Melser, 2013). Tomal's (2024) international review suggests that over-estimations tend to be larger in countries like China

(Gao & Liang, 2019), Israel (Tur-Sinai *et al.*, 2020) and Mexico (Gonzalez-Navarro & Quintana-Domeque, 2009).

We conclude that the over-estimation of property values is smaller in Australia than several other countries. Importantly, we argue that equity borrowing decisions are likely to be made based on the homeowner's self-assessed home equity. Hence, in the context of our study, self-assessed values are relevant measures.

4. Drivers of equity borrowing behaviour, full sample

Table 1 reports estimates from two models on equity borrowing behaviour not stratified by age, but with age bands entered as predictors. The first is a fixed effects LPM of the propensity to engage in equity borrowing. The second model is a fixed effects linear model of the IHS transformed value of borrowed equity. Both models are estimated on the full sample of homeowners.

Both models clearly show that financial behaviours relating to savings, financial planning, and risk preferences are largely unimportant. Instead, the decision to borrow against home equity and the amount borrowed are predominantly driven by asset, debt, and income profiles.

Turning first to the model of the propensity to engage in equity borrowing, the composition of one's asset and debt portfolio (including both housing and non-housing assets and debt) are critical determinants of the decision to engage in equity borrowing.

A \$10,000 gain in primary home value raises the probability of equity borrowing by 2.5 percentage points (%pts), but a \$10,000 increase in primary home debt decreases the probability of equity borrowing by 1.1%pts.

Other forms of asset and debt also matter. Homeowners who own other property are more likely to equity borrow against the primary home than those who do not own other property, reflecting the role of other property as collateral for increasing debt against the primary home. Conversely, the presence of liquid assets reduces the probability of equity borrowing, suggesting that homeowners with sufficient liquid assets to fund expenditures are less likely to borrow against their home. The presence of non-property debt raises the probability of borrowing against the home by 2%pts, presumably because the interest rates charged against home loans are lower than those charged on unsecured debt like credit cards.

Income and earning capacity are also impactful, with middle-to-high income and full-time employed homeowners more likely to engage in equity borrowing than low-income, part-time employed or unwaged homeowners.

The value of borrowed equity is driven by a similar set of factors. Clearly, property asset and debt remain important for the value borrowed. A 10% gain in home value raises the value borrowed by 3.2%, while a 10% gain in home debt reduces the value borrowed by 1.5%. The presence of other property assets and non-property debt boost the value of borrowed equity against the primary home by 31.9% and 23.4%, respectively, while a 10% increase in liquid non-property assets reduces the value borrowed slightly by 0.9%. Once again, income and labour force participation matter. Those on middle-to-high incomes and who are full-time employed are well-positioned to borrow higher amounts against the primary home.

Table 1. Fixed effects models of equity borrowing behaviour and value of borrowed equity, 2006–07 to 2021–22^a.

	Propensity to engage in equity borrowing	IHS transformed value of equity borrowing
Home value (IHS transformed)	0.025 (0.010)*	0.318 (0.123)**
Home debt (IHS transformed)	-0.011 (0.001)***	-0.150 (0.009)***
Household has other property equity	0.019 (0.009)*	0.319 (0.103)**
Liquid non-property household assets (IHS transformed)	-0.008 (0.002)**	-0.093 (0.028)***
Illiquid non-property household assets (IHS transformed)	0.002 (0.002)	0.029 (0.021)
Has non-property household debt	0.020 (0.007)**	0.236 (0.081)**
Superannuation wealth of household (IHS transformed)	-0.002 (0.001)	-0.020 (0.010)*
Equivalentized household disposable inc.		
Lowest quintile	0.000 (0.000)	0.000 (0.000)
Second quintile	0.011 (0.006)	0.123 (0.066)
Middle quintile	0.019 (0.007)**	0.217 (0.081)**
Fourth quintile	0.018 (0.008)*	0.214 (0.091)*
Highest quintile	0.014 (0.009)	0.194 (0.101)
Labor force status of income unit		
Employed full time	0.000 (0.000)	0.000 (0.000)
Employed part time	-0.038 (0.009)***	-0.483 (0.101)***
Unemployed	-0.070 (0.024)**	-0.802 (0.268)**
Not in the labour force	-0.052 (0.010)***	-0.637 (0.111)***
Financial risk prepared to take		
Above average or substantial risk	0.022 (0.011)	0.257 (0.133)
Average risk	0.006 (0.006)	0.083 (0.063)
No risk (financially risk averse)	0.000 (0.000)	0.000 (0.000)
Savings and spending horizon		
Next week/few months	0.000 (0.000)	0.000 (0.000)
Next year/2–4 years	-0.004 (0.005)	-0.049 (0.061)
Next 5–10 years/more than 10 years	-0.013 (0.006)*	-0.147 (0.075)
Savings behavior		
Don't save	0.000 (0.000)	0.000 (0.000)
Save whatever is left over	-0.005 (0.007)	-0.019 (0.083)
Save regular or other income	0.004 (0.008)	0.060 (0.090)
Prosperity given current needs		
Prosperous	-0.001 (0.020)	-0.003 (0.242)
Very comfortable	0.000 (0.007)	-0.006 (0.081)
Reasonably comfortable	0.000 (0.000)	0.000 (0.000)
Just getting along	0.005 (0.007)	0.058 (0.078)
Poor or very poor	-0.018 (0.020)	-0.177 (0.222)
Hardship paying utility bills or heating home	-0.017 (0.010)	-0.182 (0.110)
Age band		
Aged 35–44	0.000 (0.000)	0.000 (0.000)
Aged 45–54	-0.006 (0.011)	-0.016 (0.129)
Aged 55–64	-0.053 (0.015)***	-0.578 (0.174)***
Aged 65+	-0.083 (0.018)***	-0.951 (0.206)***
Number of person-year observations	44,844	44,844
Number of persons	6,794	6,794
R-squared for within model	0.02	0.03
F-statistic (50, 6793)	14.3***	15.1***

Source: Authors' own calculations from waves 6 to 22 of the HILDA Survey.

Notes: Standard errors in parentheses and robust to clusters.

*** $p < .001$, ** $p < .01$, * $p < .05$.

^aWhile not reported in the table, the model predictors include the full range of model covariates listed in [Supplementary Material Table S1](#). Refer to [Supplementary Material Table S3](#) for the complete model results.

Next, we turn our focus to the age band and calendar year predictors. Importantly, after controlling for variables that may help explain variations in equity borrowing behaviour, age remains an important determinant in both models. The propensity to

equity borrow reduces steadily as age increases. Relative to homeowners aged 35–44, those aged 55–64 are 5%pts less likely to equity borrow and this propensity further declines to 8%pts among the oldest age group. Similarly, the value of borrowed equity declines as one gets older. Clearly, older age groups are less willing to either engage in equity borrowing or borrow large amounts relative to younger cohorts. The coefficients for the calendar year predictors, presented in [Supplementary Material Table S3](#), indicate that the appetite for equity borrowing has steadily declined since 2006, resulting in the probability of equity borrowing being 10.6%pts lower in 2021.

5. Drivers of the propensity to engage in equity borrowing, stratified by age

[Table 2](#) reports estimates from a series of LPMs of the propensity to engage in equity borrowing, stratified by age. These models allow the model predictors to vary by age, so that we can ascertain whether there are distinct age-related differences in the impact of key predictors on the propensity to equity borrow.

First, the sensitivity of equity borrowing behaviour to changes in primary home value and debt declines by age. An increase in primary home value raises the propensity to equity borrowing for the youngest age group only; the predictor is statistically insignificant for those aged over 44. While all age groups are less likely to equity borrow in the presence of a gain in primary home debt, its impact is again largest among the youngest age group where a \$10,000 gain in home debt reduces the propensity to equity borrow by 2.8%pts, declining to 1%pt for those aged 65+.

Secondly, equity borrowing behaviour is most sensitive to income and labour force status for those aged 55–64 years. The probability of equity borrowing rises as one reaches a higher income quintile in this age group. Among those aged 55–64 years, the probability of equity borrowing is 5%pts higher in the top income quintile than for those in the lowest income quintile. Furthermore, those who are full-time employed are significantly more likely to equity borrow than the part-time employed or unwaged. This may reflect the importance of demonstrating income-earning capacity to both oneself and the lending institution when seeking to withdraw equity through increased debt beyond the typical peak earning stage. Ownership of other property is also important for the 55–64-year-olds, who likely hold greater equity in investment properties than younger age groups that act as collateral for borrowing against the primary home.

Third, risk preferences exert an influence when we stratify the sample by age, but only among the youngest age group. Those who are willing to take greater financial risk are also more willing to equity borrow. The propensity to equity borrow is 7.9%pts (4.1%pts) higher among those who take substantial (average) risk relative to those who are risk-averse.

Finally, there is scattered evidence that financial hardship can underpin the decision to equity borrow across different age groups. Among those aged 35–44 and 45–54, the propensity to equity borrow rises by around 6%pts when they face difficulty paying utility bills on time. Among those aged 65+, the probability of equity borrowing is higher when they perceive that they are just getting along financially relative to when they feel prosperous.

Table 2. Fixed effects linear probability model of equity borrowing behaviour by age band, 2006–07 to 2021–22^a.

	Aged 35 to 44	Aged 45 to 54	Aged 55 to 64	Aged 65+
Home value (IHS transformed)	0.100 (0.039)**	0.019 (0.033)	-0.009 (0.021)	0.010 (0.010)
Home debt (IHS transformed)	-0.028 (0.002)***	-0.023 (0.002)***	-0.018 (0.001)***	-0.010 (0.002)***
Household has other property equity	-0.002 (0.029)	0.017 (0.024)	0.044 (0.020)*	0.021 (0.012)
Liquid non-property household assets (IHS transformed)	-0.014 (0.008)	-0.008 (0.007)	-0.009 (0.006)	-0.001 (0.004)
Illiquid non-property household assets (IHS transformed)	0.011 (0.008)	0.003 (0.008)	0.005 (0.005)	-0.000 (0.001)
Has non-property household debt	0.014 (0.026)	0.046 (0.020)*	-0.001 (0.016)	-0.002 (0.010)
Superannuation wealth of household (IHS transformed)	-0.000 (0.011)	-0.001 (0.006)	-0.001 (0.003)	0.000 (0.001)
Equivalentized household disposable income				
Lowest quintile	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Second quintile	0.043 (0.042)	0.034 (0.027)	0.028 (0.016)	-0.001 (0.005)
Middle quintile	0.031 (0.045)	0.033 (0.028)	0.047 (0.018)**	0.002 (0.007)
Fourth quintile	0.025 (0.046)	0.021 (0.030)	0.066 (0.018)***	0.001 (0.009)
Highest quintile	0.013 (0.049)	0.026 (0.032)	0.050 (0.018)**	0.007 (0.010)
Labor force status of income unit				
Employed full time	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Employed part time	-0.030 (0.032)	-0.000 (0.024)	-0.042 (0.017)*	-0.009 (0.016)
Unemployed	-0.002 (0.083)	0.004 (0.060)	-0.121 (0.030)***	0.023 (0.075)
Not in the labour force	-0.022 (0.064)	-0.020 (0.044)	-0.059 (0.019)**	-0.030 (0.015)*
Financial risk prepared to take				
Above average or substantial risk	0.079 (0.031)*	0.020 (0.027)	0.009 (0.025)	-0.012 (0.014)
Average risk	0.041 (0.020)*	0.016 (0.016)	0.003 (0.013)	-0.008 (0.005)
No risk (financially risk averse)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Savings and spending horizon				
Next week/few months	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Next year/2–4 years	0.004 (0.019)	-0.001 (0.015)	-0.015 (0.013)	-0.003 (0.005)
Next 5–10 years/more than 10 years	0.008 (0.025)	-0.031 (0.017)	-0.009 (0.015)	-0.010 (0.006)
Savings behavior				
Don't save	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Save whatever is left over	0.023 (0.027)	0.015 (0.019)	-0.006 (0.018)	0.010 (0.008)
Save regular or other income	0.047 (0.031)	0.033 (0.023)	0.000 (0.020)	0.009 (0.008)
Prosperity given current needs/responsibilities				
Prosperous	0.087 (0.055)	0.044 (0.049)	-0.035 (0.038)	-0.008 (0.022)
Very comfortable	0.007 (0.023)	0.010 (0.019)	-0.006 (0.013)	-0.009 (0.006)
Reasonably comfortable	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Just getting along	0.016 (0.021)	-0.009 (0.018)	-0.001 (0.016)	0.015 (0.007)*
Poor or very poor	0.010 (0.055)	-0.065 (0.049)	-0.050 (0.041)	0.044 (0.029)
Hardship paying utility bills or heating home	-0.064 (0.031)*	-0.059 (0.024)*	0.004 (0.021)	0.019 (0.011)

(Continued)

Table 2. Continued.

	Aged 35 to 44	Aged 45 to 54	Aged 55 to 64	Aged 65+
Number of person-year observations	7,551	10,448	10,934	15,911
Number of persons	2,184	2,633	2,622	2,905
R-squared for within model	0.04	0.04	0.05	0.02
F-statistic	(47, 2183) 4.4***	(47, 2632) 6.4***	(47, 2621) 7.7***	(47, 2904) 2.4***

Source: Authors' own calculations from waves 6 to 22 of the HILDA Survey.

Notes: Standard errors in parentheses and robust to clusters.

*** $p < .001$, ** $p < .01$, * $p < .05$.

^aWhile not reported in the table, the model predictors include the full range of model covariates listed in Supplementary Material Table S1. Refer to Supplementary Material Table S4 for the complete model results.

6. Conclusion and discussion

This paper examines the factors influencing equity borrowing behaviour among Australian homeowners and how these factors vary across age groups.

Our findings confirm that homeowners' equity borrowing behaviour are affected by their asset and debt portfolios. First, housing wealth matters. The propensity to borrow against one's primary home, and the value borrowed, rises in the presence of a gain in primary home value, a reduction in primary home debt, and ownership of other property. Our findings align with American studies (Bhutta & Keys, 2016; Brown *et al.*, 2015; Choi & Zhu, 2022) and pre-GFC Australian findings on the importance of property assets as collateral for equity borrowing against the primary home (Wood *et al.*, 2013a).

Second, non-housing asset liquidity matters. We find that liquid assets reduce the propensity to equity borrow as well as the value borrowed. Presumably, this is because the availability of readily liquid assets reduces the need to extract home equity to fund consumption. These findings were not tested in the Australian study by Wood *et al.* (2013a).

Third, non-housing debt raises the probability of equity borrowing and value borrowed in the full sample. In the USA, studies have proposed that borrowing against the home is a substitute for other more costly forms of borrowing, such as credit cards (Brown *et al.*, 2015), and is linked to less financial stress than unsecured debt (Dunn & Mirzaie, 2016; Loibl *et al.*, 2022).

We also find major differences in the drivers of equity borrowing behaviour by age.

The equity borrowing behaviour of younger homeowners is more sensitive to changes in primary home value and debt than older homeowners. The strong correlation between increased equity borrowing and home price gains among young people has been demonstrated in other countries, such as the USA (Bhutta & Keys, 2016) and Denmark (Andersen & Leth-Petersen, 2021). This is consistent with the fact that young homeowners face higher loan-to-value ratios than older homeowners; they then face tighter credit constraints in the absence of price increases and are more sensitive to changes in both house price and debt values. Risk willingness also increases the propensity to equity borrow among young people, a pattern not observed in older age groups.

Among those aged 55–64, income, labour force status, and ownership of other property are particularly important, perhaps reflecting mature age borrowers'

considerations about their ability to sustain mortgage debt and the required interest repayments into later life. The equity borrowing behaviour of elderly homeowners aged 65+ are the most insensitive to changes in asset, debt, and income among all age groups.

Overall, our findings record a reduction in willingness to engage in equity borrowing as homeowners age. This may reflect elderly homeowners' personal reluctance to draw down on housing equity due to precautionary motives such as longevity risk and associated health and end-of-life expenditures, risk of unexpected home maintenance, and the possibility of needing to provide children funds in emergencies (Haurin & Moulton, 2017). Bequest motives are also an important personal motive for retaining wealth (De Nardi *et al.*, 2016). Elderly homeowners may dislike the idea of passing on housing debt to their children, and children expecting to inherit their parents' home can also voice negative feelings regarding a reduction in inheritable equity (Jefferson *et al.*, 2017; Ong *et al.*, 2013c). Some elderly homeowners may be willing to equity borrow, but even so, they may be hampered by lack of access to unbiased and truthful financial advice (Jefferson *et al.*, 2017), and possess poor financial literacy (Duca & Kumar, 2014; Yu *et al.*, 2021). Furthermore, equity borrowing options may simply be more limited for the elderly than younger households, due to concerns about their ability to service a new or increased loan in old age (Mayer & Moulton, 2022). The majority of elderly homeowners aged 65+ have already paid off their mortgage loan¹¹, so engaging in equity borrowing would entail qualifying for a new loan.

Yet elderly retirees are the group with the largest amount of housing equity among all age groups (i.e. the most housing asset-rich) while typically being the group with the lowest income (i.e. the most income-poor). The question then arises as to how elderly retirees might mobilize excess housing wealth in a manner that is secure. Government regulatory safeguards are required to ensure robust protections for elderly homeowners who choose to equity borrow, to avoid instances of elder abuse and to gain the support of adult children who might otherwise oppose their elderly parents' decisions to engage in equity borrowing. Tax policies are also important. In Australia and some European countries, the mortgage interest against the primary home is not tax deductible (Bourassa *et al.*, 2013). In the USA, where this is tax deductible, equity borrowing against the home has risen significantly among the elderly in recent decades (Bhutta & Keys, 2016; Collins *et al.*, 2020; Mayer, 2017).

Finally, for both pre-retirees and retirees, it is important to consider the consequence of mortgage debt and equity borrowing on individual wellbeing. Several studies have cited concerns that adding to mortgage debt can impose an undesirable mental health penalty on borrowers (Smith *et al.*, 2017; Truong *et al.*, 2023), and may also be an unsustainable practice that precipitates a loss of homeownership (Ong *et al.*, 2013a; Wood *et al.*, 2013b). Ong *et al.* (2015b) further document the scarring effect of loss of homeownership by showing that those losing homeownership in mid-to-late life have a higher chance of becoming reliant on rental housing assistance programs than even similarly positioned long-term renters.

While this study has produced new evidence on the variations in equity borrowing behaviour across age groups, it suffers from two limitations that present opportunities for future research, subject to data availability. First, the panel we used is not long

enough to conduct a robust analysis of cohort effects versus aging effects. Therefore, we are unable to determine the extent to which the age group differences are due to birth cohort effects as opposed to aging effects. Second, the idea that the potential need to provide funds for children in emergencies (Haurin & Moulton, 2017) and bequest motives (De Nardi *et al.*, 2016) are important personal motives for retaining housing wealth hints at an ever-expanding role of housing wealth as an foundation for both personal and intergenerational welfare. Much of the literature has focused on intergenerational cash transfers and bequests. More research is needed on the varied ways in which homeownership parents might mobilize their own housing wealth to boost the life prospects of their children and the impacts these have not just on the children, but on the housing and care needs of ageing parents as well.

Notes

1. In the USA, the term 'home equity withdrawal' is sometimes used to denote various forms of equity borrowing (see Do, 2012; Klyuev & Mills, 2007).
2. We note that Duca & Kumar (2014) has modelled the links between financial literacy and equity borrowing, through questions testing survey respondents' understanding of compounding, inflation and diversification. However, while the study controls for risk preferences, the impacts of risk on equity borrowing are not reported, and savings and financial planning are also omitted from this study.
3. A typology and conceptual definitions of the different forms of housing equity withdrawal, including mortgage equity borrowing, are available in Ong *et al.* (2013b).
4. Equity borrowing from investment properties or second homes is not consistently measurable in the HILDA survey and is outside the scope of this paper. While the survey includes a set of questions about other property ownership, which includes the total amount of debt on these properties, these questions are only included every fourth wave, starting in 2002, during what are known as 'wealth module' waves. Furthermore, there is no way to determine whether the same properties have been held between wealth waves. As a result, any increase in debt might simply reflect changes in the properties being compared rather than actual equity borrowing on the same property.
5. It does contain partial information on mortgage refinancing and holding of secondary mortgages/equity loans, but not enough to completely capture incidence of equity borrowing.
6. In wave 10, the HILDA Survey mistakenly asked respondents whether they experienced financial hardship in 2009, instead the current calendar year of 2010.
7. In the HILDA Survey an income unit consists of household members that systematically pool their incomes and wealth, and there can be multiple income units within a household.
8. In a fixed effects model, there is no need to include common time-invariant controls such as gender and ethnicity. We also excluded common controls that are only time-variant for a very small portion of our sample, such as educational attainment and state of residence, as their inclusion led to highly inflated standard errors.
9. Inflation adjustment was performed using the Consumer Price Index of the individual's state of residence, from the Australian Bureau of Statistics catalogue 6401.0.
10. The Hausman test evaluates the validity of the random-effects assumption. The null hypothesis is that the individual-specific effects are uncorrelated with the independent variables (Hausman, 1978). This assumption is rejected for our modelling sample at the 0.01 significance level.
11. 86% of homeowners aged 65+ years were unmortgaged in 2019–20, according to our calculations from the Survey of Income and Housing.

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