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# House prices post-GFC: More household debt for longer

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## Abstract

Real house prices and household debt have risen in Australia amid growing concern of risks to the economy from a market correction. An intertemporal model of the housing market with household retirement and debt explains three observations relating to the post-GFC housing boom. First, people are remaining households for longer, which combined with strong population growth, has elevated the rate of household formation. Second, households are working for longer. Third, households are carrying more debt for longer: 1 in 2 home-owners aged 55-64 years have a mortgage, more than one third of whom are over-indebted. Ensuring that the rate of land release keeps pace with the rate of household formation and that banks maintain improved lending standards may help alleviate upward pressure on real house prices and contain risk for a given level of debt. Lower current real house prices indicate the burst of a speculative bubble in the absence of a fall in the present discounted value of real wages or rate of household formation relative to housing supply. The influence on house prices of ageing households, low interest rates, first home buyer grants, negative gearing and capital gains taxation calls for responsible lending.

**Keywords**

GFC, house prices, household debt, population

**JEL Classification**

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## Abstract

Real house prices and household debt have risen in Australia amid growing concern of risks to the economy from a market correction. An intertemporal model of the housing market with household retirement and debt explains three observations relating to the post-GFC housing boom. First, people are remaining households for longer, which combined with strong population growth, has elevated the rate of household formation. Second, households are working for longer. Third, households are carrying more debt for longer: 1 in 2 homeowners aged 55-64 years have a mortgage, more than one third of whom are over-indebted. Ensuring that the rate of land release keeps pace with the rate of household formation and that banks maintain improved lending standards may help alleviate upward pressure on real house prices and contain risk for a given level of debt. Lower current real house prices indicate the burst of a speculative bubble in the absence of a fall in the present discounted value of real wages or rate of household formation relative to housing supply. The influence on house prices of ageing households, low interest rates, first home buyer grants, negative gearing and capital gains taxation calls for responsible lending.

*Keywords*: GFC; house prices; household debt; population

## 1. Introduction

In the wake of the Global Financial Crisis (GFC) in late 2008, Australia distinguished itself from other developed economies by avoiding a technical recession, defined by one rule of thumb as two quarters of negative growth in real Gross Domestic Product (GDP). The Australian economy was buoyed both by lower interest rates and by the fiscal stimulus package of its own government and that of its major trading partner, China, which stimulated growth in export demand.[1] Australia has been free of technical recession for 27 years – the longest stretch of uninterrupted GDP growth for an advanced economy.[2]

However, Australia has also set post-GFC records with respect to population growth, house prices and household debt. Australia's population grew at an average annual rate of 1.6 per cent - more than twice the rate of the United Kingdom or the United States.[3] Overall population increased in 2018 by 388,000, roughly the size of its capital city, Canberra, to surpass 25 million (ABS, 2019) people residing in approximately 9.5 million households (ABS, 2016). Referring to Figure 1, Australia has witnessed a marked boom in house prices which continued post-GFC. Household debt to income has climbed to 190 per cent. Australian households collectively owe around $1.8 trillion in housing debt.

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[1] The March 2009 quarter GDP growth contribution from net exports was 2.0% (Makin, 2010), of which exports to China was 1.17% (Day, 2011). Had export volumes to China been commensurate with pre-stimulus rates, Australia would have experienced three consecutive quarters of negative real GDP (Day, 2011).

[2] GDP growth has benefited from strong population growth. Australia has witnessed consecutive quarters of negative growth in real GDP per capita since the GFC, most recently in the September and December quarters of 2018.

[3] Post-GFC, population growth in the United States declined, whereas population growth in the United Kingdom stabilised at its highest rate in 50 years.

This paper explores how Australia's increasing number of new and ageing households have contributed to the post-GFC housing price boom and associated rise in household indebtedness. The analysis shows how household formation rates, housing loans, interest rates and expected future prices influence house prices. The intertemporal profile for housing debt to income reveals why optimising households may carry more housing debt for longer. The age distribution of housing debt and over-indebtedness is calculated to explore how debt has evolved across households.

The OECD recently cautioned policy makers to prepare contingency plans in light of risks to Australia's economy of a faltering housing market and heavy household debt (OECD, 2018). However, rising household debt in and of itself is not a problem. Households borrow to finance the purchase of housing which would not be possible using disposable income alone. Housing is an intrinsically useful asset, serving a dual role as an investment vehicle and a durable good that households consume. The usefulness of housing as a consumer durable implies a user cost that falls as future prices increase relative to current prices. The role of housing as an investment vehicle means that housing debt assists in the accumulation of wealth to fund elderly consumption.

Nevertheless, high levels of debt relative to income and assets could indicate household vulnerability to an economic shock, such as a fall in house prices or loss of employment. The unwinding of a house price boom impacts economic activity via construction, the wealth effect and supply of credit. Concern over house prices is therefore an important influence on monetary policy (McDonald, 2017, Cargill and Pringle, 2019).

This paper formalises the intuition for the roles of household formation, user cost of housing and mortgage debt within a framework where people live for two periods. As households during the first period, people purchase and consume housing for which they repay a housing loan. The second period marks the end of the household, as elderly people sell housing and use the capital gains on housing to fund consumption, including residence in non-private dwellings, such as aged-care facilities. House prices are endogenously determined by a market where demand grows relative to supply as new households form over time.

An emerging literature predicts that population ageing contributes to excess demand for housing and higher house prices (Bell and Rutherford, 2012, Coleman, 2014, Day, 2018a, 2018b). This contrasts earlier work which predicted a significant decline in real house prices due to population ageing (Mankiw and Weil, 1989) and is consistent with empirical evidence that the effect of ageing on house prices is much smaller (Guest and Swift, 2010) or inconclusive (Poterba, 1991, Hamilton, 1991, Hendershott, 1991). This paper extends the recent literature by explaining three interwoven observations with respect to rising real house prices: people are remaining households longer; households are carrying more housing debt for longer; and households are working longer.

The analysis contributes to the debate on rising house prices and debt post-GFC in several respects. First, it reviews aggregate trends in Australia's house prices, debt and population. Second, it explains how the rate of household formation, later retirement, interest rates and expected future house prices contribute to rising house prices relative to wages over time. Third, it shows how house prices, lending rates,

amortising payments and income growth affect an optimising household's downward sloping profile for housing debt to income. Fourth, it disaggregates housing debt and over-indebtedness by age to explore the vulnerability of pre-retiree households. Finally, aspects of pre and post GFC monetary and fiscal policy are discussed in relation to the key findings of this paper.

## 2. House prices, debt and population

### 2.1 Post-GFC trends

Australian households are the most indebted of English-speaking countries. The majority of household debt is in mortgage debt, which comprises three quarters of total debt. Figure 1 depicts the trend in real house prices prior to and since the GFC in several English-speaking countries including Australia. In the decade prior to the GFC, real house prices increased significantly across these countries. Post-GFC, real house prices declined in the United States and United Kingdom before subsequently recovering, and resumed their upward trend in Australia, Canada and New Zealand.

[Figure 1 about here]

In Figure 2, household debt to GDP shows a similar picture. The rise in household indebtedness up until the GFC reflects the structural decline in interest rates worldwide, shown in Figure 3. Post-GFC, household indebtedness has fallen in the United States and United Kingdom and somewhat stabilised in New Zealand, while household borrowing continued to rise in Australia and Canada.

[Figures 2 and 3 about here]

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The Debt Service Ratio (DSR) is the flow of required debt payments relative to the flow of disposable income and thus a useful measure of household indebtedness across countries. Figure 4 reveals that Australia is the most indebted country by this measure,[4] spending approximately 16 per cent of household income to service debt. Australia's DSR escalated in the lead up to the GFC and has since moderated. Current owner-occupier standard variable mortgage rates offered by major banks in these countries are: Commonwealth Bank (Australia) 5.37%; RBC Royal Bank (Canada) 3.57%; HSBC (United Kingdom) 4.19%; Wells Fargo (United States) 4.78%. While Australia's lending rate is slightly higher, the difference is not enough to account for the much higher DSR.

[Figure 4 about here]

Figure 5 reveals the two components of population increase in Australia, natural increase and net overseas migration. Significant increases in net immigration account for most of the post-GFC rise in population. Migration increases the working age population seeking to enter the housing market as most migrants, 88 per cent, are working age and under 40 years (ABS, 2016).

[Figure 5 about here]

Underlying market pressure arises as the number of households seeking to enter the market outstrips the number exiting. Population growth feeds into growth in the number of households, which affects house prices in the long term. Day (2018a)

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[4]DSR for New Zealand is not available from the data source, Bank of International Settlements.

shows that the influence of Australia's population growth on house prices has been compounded by a smaller average household size due to population ageing.

Older Australians, who are healthier and wealthier than their predecessors, tend not to liquidate housing wealth for general consumption because they prefer to remain in their own home as long as possible (de Silva et al 2016). The share of people aged 85 years or older residing in retirement or nursing homes fell over the past two decades from 40 per cent to 25 per cent. Accordingly, the number of single-person and two-person households is increasing, thereby depressing average household size. The result is that the net number of new households formed every year is expected to rise at a rate of 1.84 per cent, which is double the rate in the United Kingdom (ABS, 2015).

**2.2 Model of house prices with borrowing and endogenous retirement**

Consider a stylised two period model where people reside in housing and thus live as households in period $t$. Households could be working in paid employment or retired.[5] Elderly people are not counted as households when they sell housing in period $t+1$. At time $t$, households purchase housing $h_t$ from the elderly at the market price, $p_t$.

An optimising household finances the housing purchase with a self-amortising mortgage. The required deposit ratio for a housing loan is $b$ and thus the household borrows $(1-b)p_t h_t$. The mortgage debt is paid at the amortising rate $q$, which is determined by equating the present value of mortgage payments to the initial mortgage debt. For a home loan of length $m$, the amortising payment as a fraction

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[5]Referring to the appendix, each household is endowed with a unit of time in period $t$, of which they choose to supply $l_t$ as labour for paid work, $0 < l_t < 1$.

of housing purchase is

$$q = \frac{v}{\left[1 - \frac{1}{(1+v)^m}\right]} \tag{1}$$

where $v$ is the real lending rate. Intuitively, $q$ comprises the payment of interest and principal such that the mortgage is paid off at maturity. All else equal, $q$ is decreasing in $m$, as summarised in the following remark.

**Remark 1** *For a given lending rate, the rate at which debt is amortised decreases with the length of the mortgage*

Aggregate labour supply, $L_t = l^* N_t$, where the household's labour supply, $l^*$, is given in the appendix, is distinguished from the number of households, $N_t$, at time $t$. Some authors use this two period specification as a model of endogenous retirement (Heijdra, 2009).[6] The approach is useful for the analysis here because it allows us to model a market for housing where growth in the number of households relative to the number of elderly who no longer consume housing determines growth in the number of buyers relative to the number of sellers over time.

Referring to the appendix, market demand for housing is

$$h_t^D = \frac{\gamma}{\pi_t} \frac{(1 + \rho)}{(2 + \rho)} w_t N_t \tag{2}$$

where $\pi_t = (q(1 - b) + b) p_t - p_{t+1} / (1 + r_{t+1})$ is the user cost of housing, $p_{t+1}$ and $r_{t+1}$ is the housing price and return on savings for period $t + 1$, $w_t$ is the real wage and $N_t$ is the number of households at time $t$. The stock of housing available for

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[6]Referring to (A5.4) in the appendix, as the preference for leisure, $\delta$, decreases, optimal leisure time, $(1 - l^*)$, and thus portion of households who are retired in the first period declines.

purchase may grow over time at the rate of government land release, $x$, from an initial amount of $\bar{h}$. Thus, market supply is

$$h_t^S = \bar{h}(1+x)N_{t-1} \tag{3}$$

where $N_{t-1}$ is the number of households at time $t-1$, who are now elderly selling housing at time $t$. The number of households grows over time at the rate $n$, so that $N_t = (1+n)N_{t-1}$.

## 2.3. Market price for housing

House prices are endogenously determined by a market equilibrium where housing demand equals supply. The user cost of housing comprises a direct cost and implicit cost. The direct cost of housing increases with both the purchase price and cost of housing debt since households finance the purchase of housing by borrowing. There is an implicit cost associated with housing as a consumer durable and investment vehicle.

Equating (2) and (3), the market price for housing is

$$p_t = \frac{1}{q(1-b)+b}\left[\frac{p_{t+1}}{(1+r_{t+1})} + \gamma\frac{(1+\rho)}{(2+\rho)}\frac{(1+n)}{\bar{h}(1+x)}w_t\right] \tag{4}$$

which is decreasing in the home loan deposit ratio $b$, amortising loan payment $q$ and rate of land release because there is $(1+x)$ more housing land available, and increasing in the discounted future price $p_{t+1}/(1+r_{t+1})$, real wages $w_t$ and rate of household formation because there are $(1+n)$ as many buyers as there are sellers.

These properties of equation (4) are summarised in the following remark

**Remark 2** *The market price of housing is increasing in the discounted future price, real wages and the rate of household formation, and decreasing in the rate at which mortgage debt is amortised and the rate of housing land supply*

Intuitively, household demand for housing is downward sloping or decreasing in the user cost, which in turn is decreasing in the discounted future price because appreciation in house prices reduces the implicit cost of housing. Thus, speculation on higher future prices increases demand for housing. Increasing wages boost household demand because housing is a normal good. The higher the rate of payments required to amortise housing debt, the higher the cost of housing. The stock of housing is depleted by an increase in the number of households seeking to buy relative to the number seeking to sell. However, an increase in the rate of land release may replenish the stock of housing, alleviating upward pressure on the market price.

Referring to the appendix, rational expectations over time horizon $T$ gives

$$p_t = \frac{1}{C_0} \prod_{i=0}^{T} \frac{1}{E_t a_{t+i}} p_{t+T} + \frac{C_1}{C_0} \sum_{i=0}^{T-1} \prod_{i=0}^{T-1} E_t w_{t+i} \frac{a_t}{E_t a_{t+i}} \tag{5}$$

where $C_0 = q(1-b) + b$, $C_1 = \gamma \left[(1+\rho)/(2+\rho)\right] / \left[(1+n)/\bar{h}(1+x)\right]$ and $E_t a_{t+1} = (1 + E_t r_{t+1})$. The first term $\frac{1}{C_0} \prod_{i=0}^{T} E_t \frac{1}{a_{t+i}} p_{t+T}$ captures the expected appreciation central to the existence of a bubble. The second term on the right hand side of the equality in (5) is the sum of current and present discounted value of expected future wages, which is scaled by $C_1/C_0$.

Intuitively, in the absence of a bubble, current real house prices are proportional

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to the present discounted value of real wages, where the rate of household formation $n$ relative to the rate of land release $x$ is a scaling factor. Some interesting implications arise. An increase in $n$ relative to $x$ magnifies real house prices proportional to the sum of present discounted value of real wages. If the government could set $x = n$, this would eliminate the scaling effect of the household formation rate on house prices. Thus, lower current real house prices could be due to an increase in housing supply or burst of a speculative bubble.

## 3. Housing debt

### 3.1 Evolution of optimal housing debt

Amortising payments ensure that the mortgage is paid off by the end of period $t$. During period $t$, the household's mortgage debt evolves according to

$$D_{n-1} = (1 + v) D_n - qD_n = D_n - (q - v) D_n \tag{6}$$

where $n \in \{0, 1, ..., m\}$ is the number of remaining mortgage payments, $v$ is the lending rate and $D_m = (1 - b) p_t h_t$ is the initial amount borrowed to finance the purchase of housing. Intuitively, $vD_n$ and $(q - v) D_n$ denote the parts of mortgage payments toward interest and principal, respectively.

From equation (6), the household's housing debt to income ratio is

$$d_{n-1} = \frac{(1 + v - q)}{1 + g} d_n \tag{7}$$

where $g$ is the growth rate in household income between $n$ and $n - 1$ and $d_m =$

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$[(1-b)\,p_t h_t]\,/w_t l$ is the initial debt relative to income. Differencing equation (7) gives the change in housing debt to income

$$\Delta d_{n-1} \approx (v - g - q)\,d_n < 0 \tag{8}$$

where the approximation holds for a low $g$. For non-negative growth in income $(g \geq 0)$, the household's mortgage balance to income declines over time because amortising payments $q$ by definition exceed the mortgage interest rate $v$.

Equation (8) shows that mortgage debt to income declines over time for an optimising household and how the decline can be decomposed into the mortgage payments to income growth differential and initial debt to income. That is, the decline in the mortgage debt to income ratio is attenuated by higher interest rates, lower growth in household income and higher initial borrowing, which in turn depends on the purchase price of housing and deposit ratio. This discussion is summarised in the following remark.

**Remark 3** *A higher purchase price of housing and mortgage interest rate or lower amortising payments and income growth attenuate the decline in optimal housing debt to income.*

Intuitively, the housing debt to income profile for an optimising household is downward sloping as the household pays down the debt. Lower amortising payments attenuates the decline, meaning the household carries more housing debt relative to income for longer. Similarly, rising house prices require buyers to increase borrowing and thus housing debt will need to decline from a larger base. This helps to frame our

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discussion of post-GFC trends in Australia's overall housing debt to income ratio.

## 3.2. Australia's housing debt post-GFC

[Figure 6 about here]

**Observation 1** *Rising house prices contribute to rising aggregate housing debt to income.*

Referring to Figure 6, housing debt to income in Australia doubled between 1998 and 2018. The upward trend in Australia's housing debt to income ratio mirrors the movements in real house prices shown in Figure 1. Although an optimising household pays down housing debt to income over time, rising house prices inflate aggregate housing debt because debt is aggregated across an overlap of established households with remaining debt and new households with increasing initial debt. This raises the question of how housing debt is distributed among new and older households.

[Figure 7 about here]

Figure 7 reveals that Australian households are carrying mortgage debt for longer. The percentage of home owners who carry housing debt has risen across all age categories. However, the rise in incidence of mortgage debt for pre-retirees is striking, especially post-GFC. Among home owners aged 55-64 years, the incidence of mortgage debt tripled from around 1 in 6 home owners in 1995-96 to almost 1 in 2 home owners in 2015-2016. The incidence of owner occupier households without mortgage debt in this age category has dwindled from 83 per cent in 1995-96 to 66 per cent in 2005-06 to 52 per cent in 2015-16.

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A greater portion of home owners with mortgage debt in one age category feeds into higher age categories over time. This is evident in the rising share of home owners who carry mortgage debt after retirement. In 2015-2016, the share of home owners aged 65-74 years with mortgage debt reached 14.8 per cent. The percentage of home owners aged 45-54 years with mortgage debt has ticked up to 77 per cent. This would suggest that more than 1 in 2 home owners aged 55-64 years will carry mortgage debt in coming years.

**Observation 2** *Households are carrying housing debt for longer: 1 in 2 homeowners aged 55-64 years have a mortgage, compared with 1 in 3 homeowners aged 55-64 in 2006 and 1 in 6 homeowners aged 55-64 in 1996.*

It is not clear whether the growing tendency to carry mortgage debt later in life increases the risk that pre-retiree households will encounter financial stress. Households are not only carrying housing debt for longer, but also working longer. The average age at which persons in the labour force aged 45 years and over intend to retire is 65 years, with 50 per cent intending to retire between 65 and 69 years and 20 per cent intending to retire 70 years and older (ABS, 2017a). For those intending to retire, 41 per cent regard financial security as the main factor influencing the decision about when to retire (ABS, 2017a). This raises the question of whether households are working longer because they are paying down housing debt later in life or vice versa.

On the one hand, households may remain in the workforce longer due to increased life expectancy and improved health, which in turn improves their ability to service

higher debt over a longer period. The increase in household income in turn relaxes the household's budget constraint and therefore capacity to borrow.

On the other hand, higher house prices require that households borrow more in order to enter the market. Thus, indebted households may postpone retirement and continue working in order to meet mortgage repayments over a longer period. This could present an increased risk of financial stress if older households are unable to pay down housing debt by the time they retire.

It is important to note that house prices are endogenously determined by market supply and demand, the latter of which is decreasing in the amortising loan payment ($q$) that ensures the household pays down housing debt. An increase in length of the mortgage would lower $q$ and thus strengthen the rise in house prices, all else equal. Thus, households remaining in the workforce longer contributes to rising house prices.

If inter-temporal choice is distorted by, for instance, an incentive to understate $q$ due to moral hazard or a speculative bubble, then house prices and housing debt to income would follow a sub-optimal path. In this case, households may over-borrow and be unable to pay down housing debt by the time they plan to retire. This raises the question of how much housing debt do pre-retirees carry and how much is too much.

[Table 1]

The ABS uses two measures of over-indebtedness based on definitions by the OECD: household debt three or more times annual disposable income and debt 75 per cent or more of the value of assets. Based on these measures, almost 1 in 2 (48.1 per cent) owner occupier households with mortgage debt were over-indebted in

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2015-2016. Table 1 shows the distribution by age of over-indebted households with mortgage debt and their average principal outstanding.

From Figure 7 and Table 1, we know that, of the 1 in 2 homeowners aged 55-64 years with mortgage debt, 36.6 per cent are over-indebted in terms of debt to disposable income and value of assets. Table 1 reveals that the incidence of over-indebtedness declines with home owner age, while the size of housing debt rises to reach a maximum in the pre-retiree category. In 2015-2016, approximately three in five (62 per cent) home owners with mortgage debt aged 25-34 years were over-indebted, holding an average principal of $439,200, whereas almost three in eight (36.6 per cent) of 55-64 year old home owners with mortgage debt held an average principal of $567,300.

**Observation 3** *Of the 1 in 2 homeowners aged 55-64 years with mortgage debt, more than 1 in 3 are over-indebted with an average mortgage debt of $567,300, which is the highest of all age categories.*

The measures of over-indebtedness need not indicate households' increased risk of financial stress for the simple reason that the cost of and ability to service debt is not considered. Despite housing debt relative to income and value of assets reaching a record high for indebted home owners aged 55-64 years, the real mortgage rate ($v$) and thus the cost of servicing debt is at a record low.

Referring to Table 1, over-indebted pre-retiree home owners carry more housing debt in investor properties ($335,400) than in owner occupied dwellings ($227,900). Interest only mortgages finance the purchase of investor housing, thereby contributing to the higher mean principal outstanding. Pre-retiree home owners hold more

wealth as house prices rise which yields capital gains when housing is sold and through superannuation. This improves their ability to continue to service higher housing debt. By the same reasoning, pre-retiree home owners face a negative wealth effect as house prices fall which yields a capital loss if they sell housing for less than the purchase price.

## 4. Monetary and fiscal policy influences

The analysis thus far shows how demographics, interest rates, borrowing requirements and speculation on future prices are the important drivers of housing demand relative to supply in explaining pre and post-GFC trends in house price and household debt. We herein discuss the influence of monetary and fiscal policy with respect to some of these drivers.

### 4.1 Monetary policy

In July 2019, the RBA reduced the cash rate to a record low of 1 per cent. Prevailing low rates reflect present concern of weak wages growth amid global headwinds, post-GFC expansionary monetary policy and a secular global decline in interest rates which preceded the GFC.

The shift to a low-inflation environment in the 1990s saw nominal interest rates decline. As shown in Figure 3, the RBA maintained Australia's cash rate between 5 and 7 percentage points in the decade prior to the GFC. The corresponding low home lending rate, along with easing of serviceability requirements, were significant drivers of Australia's pre-GFC rising house prices and household debt. In the model here, a downward trend in interest rates reduces the user cost of housing through both

lower borrowing costs and higher discounted future house prices. This contributes to higher current house prices, all else equal.

The monetary policy response to the GFC comprised a succession of cuts to the cash rate.[7] Figure 3 shows the decline in home lending rates, although the widening gap between lending and cash rates reveals that banks have not passed on rate cuts in full. The Australian Prudential Regulation Authority (APRA) has also implemented stronger banking regulations. The recent focus on improving bank's lending standards has particular relevance for first-home buyers and over-indebted pre-retiree home owners with interest-only mortgages and investor property debt.

Interest-only (IO) loans reached 40 per cent of total loans in 2015. However, the share of IO loans has since fallen. In December 2014, APRA announced an investor lending benchmark restricting annual investor credit growth to 10 per cent. In March 2017, APRA announced an IO lending benchmark, at 30 per cent of new lending, and reinforced the 10 per cent restriction on growth in investor lending. Investor and IO benchmarks were removed in July 2018 and January 2019, respectively, for banks with improved lending standards.

The Banking Royal Commission Report calls for increased focus on responsible lending obligations, including a customer's ability to repay a loan. If borrowers are required to pay a higher home loan deposit ratio and discouraged from understating the rate at which mortgage debt is amortised then the market price for housing would fall, other things being equal. Recent falls in house prices, most notably in Sydney and Melbourne, coincided with tighter credit conditions. However, consistent with

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[7]The cash rate fell from 7.25 per cent in August 2008 to 3 per cent by April 2009.

the model, new housing supply and a fall in speculative demand have also played a role.

## 4.2 Fiscal policy

Australia's post-GFC fiscal stimulus package comprised significant boosts to the First Home Buyer Grant for existing and new homes. In 2017, a scheme was introduced to allow first home buyers to save for a deposit within their superannuation fund. Most recently announced, the First Home Loan Deposit Scheme seeks to assist low income entrants to the housing market by topping up their 5 per cent deposits with a government guarantee for 15 per cent of the loan. Buyers therefore avoid paying lenders mortgage insurance. The recent scheme is limited to 10,000 households, approximately one eleventh of the number of first home buyers in 2018, and thus relatively small in scale.

First home buyer schemes bring forward housing demand by subsidising the home loan deposit ratio, thereby contributing to higher house prices other things being equal. However, the fundamentals of household debt remain unchanged. A subsidised home loan deposit means higher amortising loan payments over time, which could reinforce the trend towards homeowners carrying more debt for longer if tighter lending standards are not enforced.

Since 1999, investors have received a 50 per cent discount on capital gains tax paid on an asset held for more than 12 months. At the 2019 federal election, the Australian Labor Party proposed halving the capital gains tax discount to 25 per cent and removing negative gearing[8] for buyers of existing properties.

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[8] A negatively geared property investor deducts the net loss of property expenses minus income

In the model here, the market price for housing is increasing in the future price because capital gains from housing sold at an appreciated price help fund future consumption. We may intuit that the introduction of a capital gains tax discount could lower the user cost of housing for a marginal buyer by raising the relative net return to speculation on house prices. This would contribute to higher house prices, all else equal.

Negative gearing is pertinent to the analysis here given over-indebted pre-retiree home owners carry more housing debt in investor properties. The impact of anticipated changes to negative gearing on house prices during the first half of 2019 is uncertain. On the one hand, potential investors may have been encouraged to bring forward the purchase of housing which would contribute to higher house prices. On the other hand, the anticipation of less future buyers under the proposed changes and thus lower future prices may have encouraged investors to sell, thereby contributing to recent house price falls.

## 5. Conclusion

Australia sidestepped a recession during the GFC, only to face rising real house prices amid growing concern about risks to the economy of a market correction and burgeoning household debt. Australian households are the most indebted of English-speaking countries. The analysis presented in this paper explains how higher rates of household formation, driven by strong population growth and older Australians remaining in their own homes longer, have contributed to rising housing prices. This

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against their tax liability at the marginal tax rate.

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in turn relates to households carrying more housing debt for longer and working for longer.

House prices are determined by a market where demand grows relative to supply as new households form over time. Households finance the purchase of housing by borrowing. An optimising household amortises housing debt at a rate which decreases with the length of the mortgage. The analysis predicts that the market price of housing is increasing in the discounted future price, real wages and the rate of household formation, and decreasing in the rate at which housing debt is amortised and the rate of housing land supply.

Under rational expectations, current real house prices may reflect a speculative bubble and are proportional to the present discounted value of real wages, where the rate of household formation relative to the rate of land release is a scaling factor. Recent falls in real house prices therefore indicate the burst of a speculative bubble in the absence of a lower present discounted value of real wages or fall in the rate of household formation relative to housing supply.

The analysis explains three observations relating to the post-GFC housing boom:

1. Ageing Australians are remaining households for longer. Strong population growth, due to higher net immigration, combined with smaller average household size, due to population ageing, increases the rate of household formation.

2. Households are carrying more housing debt for longer: 1 in 2 homeowners aged 55-64 years have a mortgage – 50 per cent more than in 2006; of the 1 in 2 with mortgage debt, more than one third are over-indebted with an average principal outstanding of $567,300.

3. Households are working for longer. Of working Australians aged 45 years and over, 50 per cent intend to work until 65-69 years and 20 per cent intend to work until at least 70 years.

The first observation fits the model's prediction that real house prices rise over time as the rate of household formation outstrips the rate of housing supply. The second is consistent with rising house prices and thus a larger base from which housing debt will need to decline. The third suggests that increased longevity and improved health enables homeowners to service debt over a longer period with lower amortising payments, which contributes to rising house prices.

Some interesting policy implications arise. First, ensuring that the rate of land release and infrastructure keeps pace with the rate of household formation may help relieve upward pressure on real house prices. Second, because over-indebted pre-retirees carry mostly investor property debt, interest-only loans contribute to the higher principal outstanding. Monetary policy has comprised cuts to interest rates and tighter lending standards. Ensuring that banks maintain improved lending standards following the removal of investor and interest only lending benchmarks may help reduce risk for a given level of debt. Fiscal policy further influences housing prices and debt through first home buyer schemes, negative gearing and the capital gains tax discount. Third, the demographic trend towards households working longer and carrying debt for longer is consistent with slower wages growth and an adjustment to a low interest rate environment.

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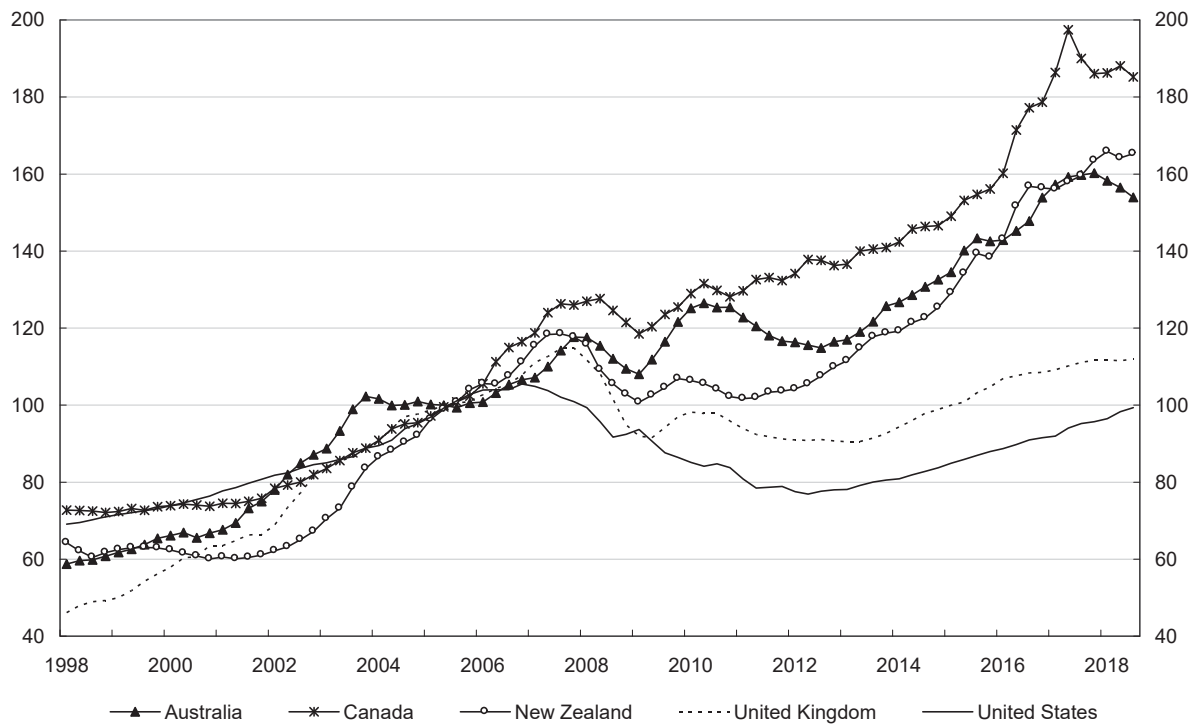
FIGURE 1

Real House Price Index, 1998-2018

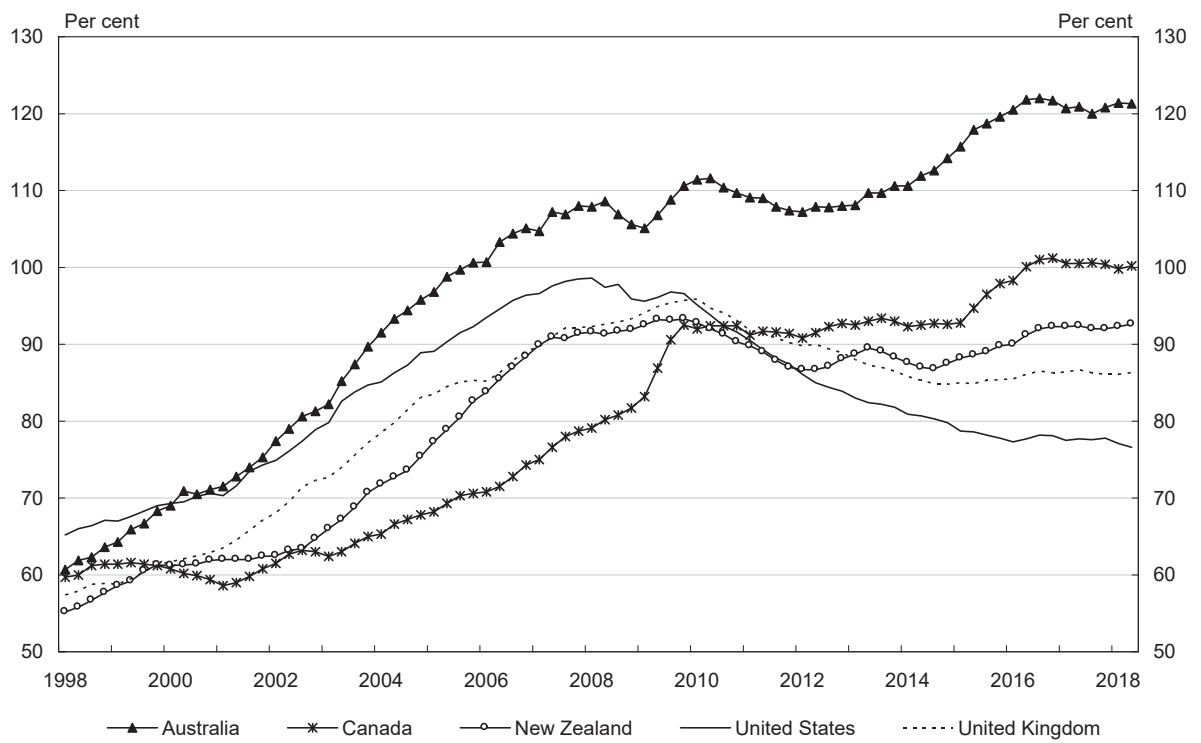Source: Federal Reserve Bank of Dallas (2019)

FIGURE 2

Household Debt to GDP, 1998-2018

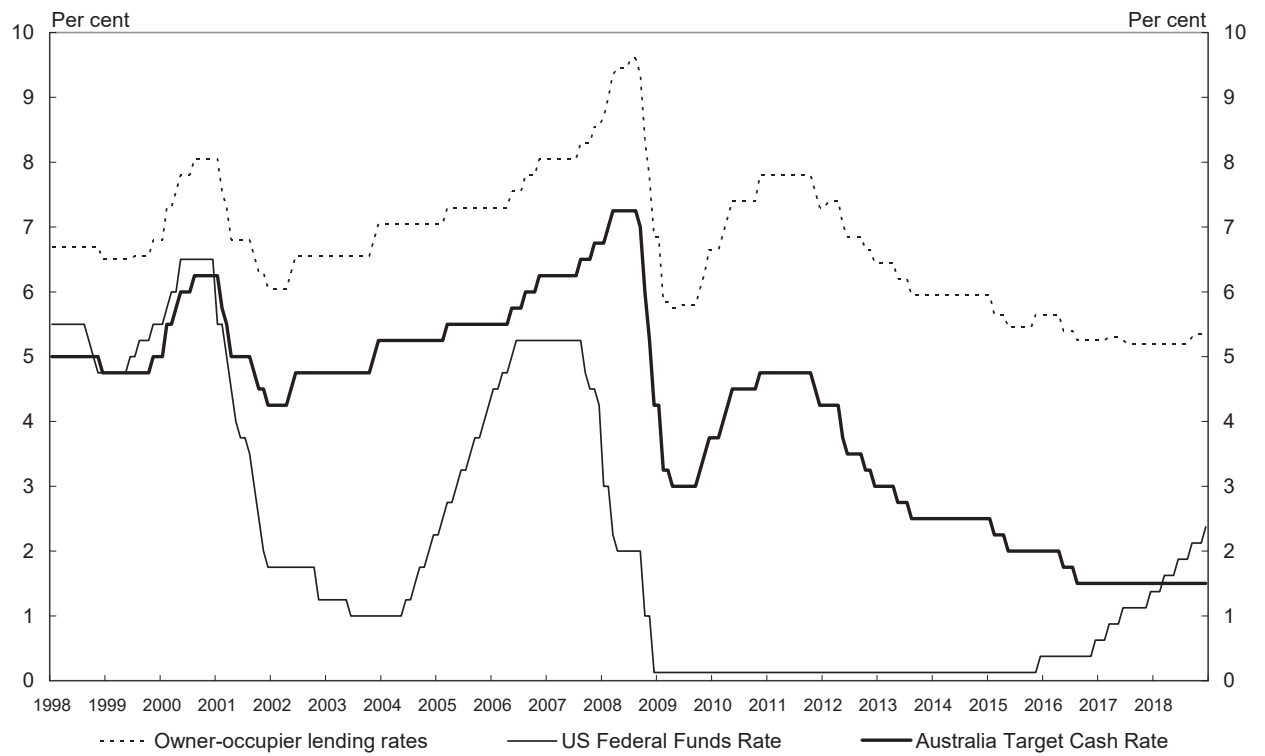Source: Bank of International Settlements (2019)

FIGURE 3

Australia cash and owner-occupier lending rate, 1998-2018
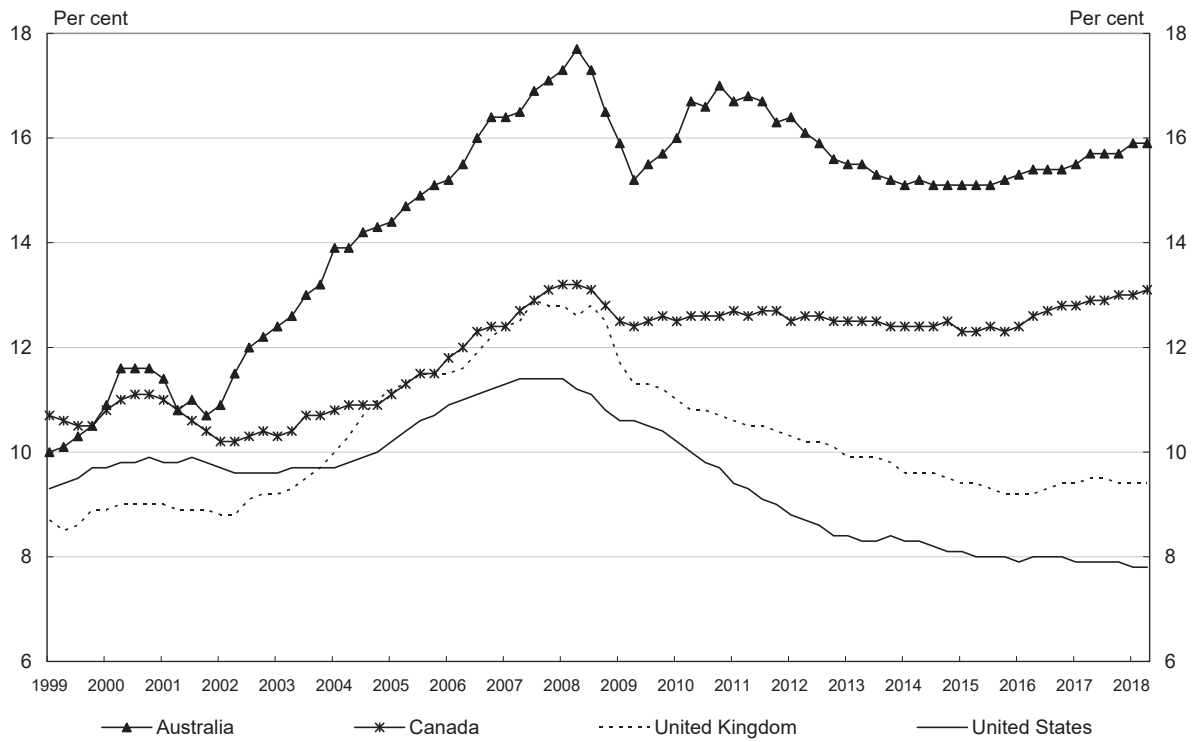
Source: RBA (2019)

FIGURE 4

Household Debt Service Ratio, 1998-2018
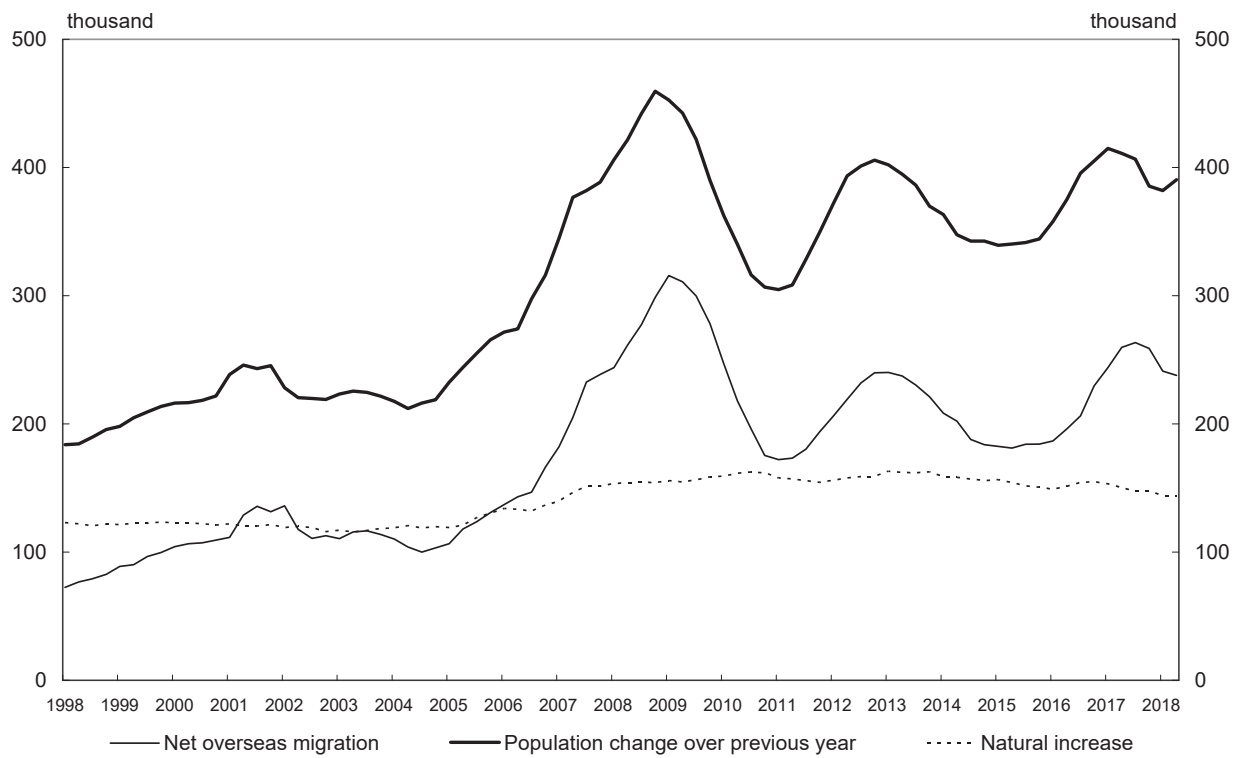
Source: Bank of International Settlements (2019)

FIGURE 5

Estimated Population, change over previous year, Australia, 1998-2018

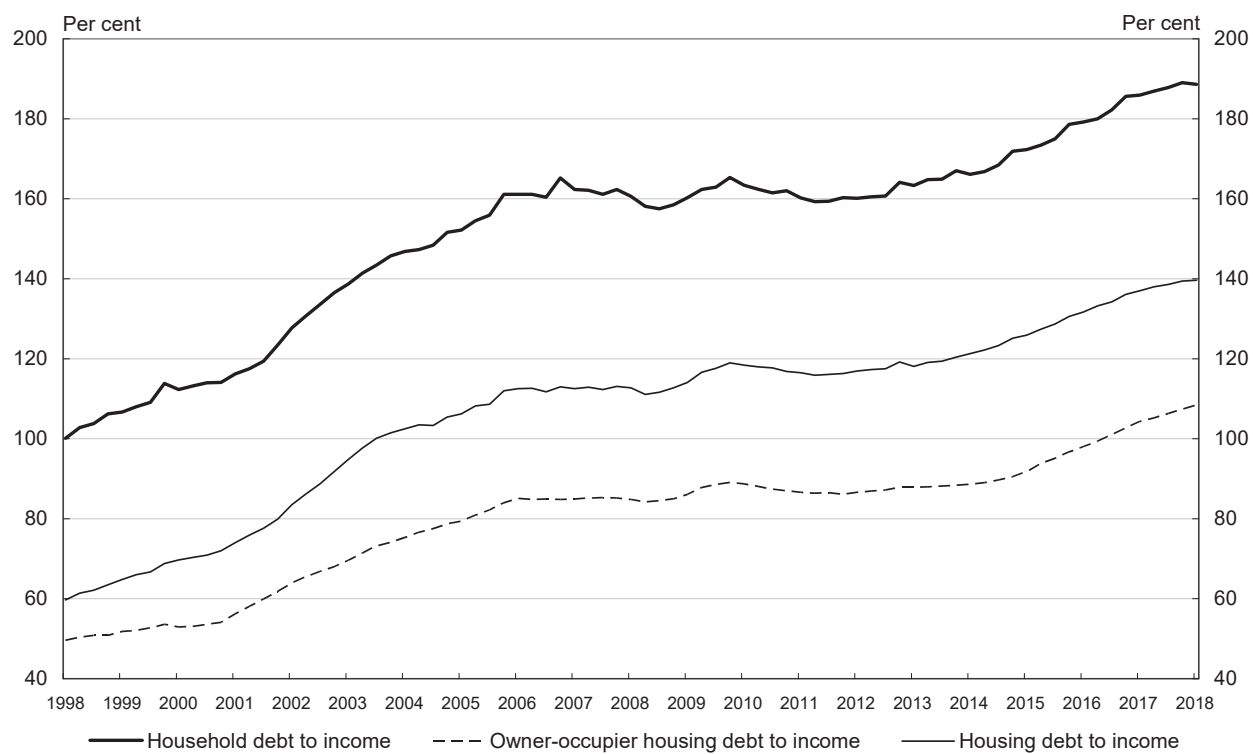Source: Australian Bureau of Statistics (2019)

FIGURE 6

Household and housing debt to income, Australia, 1998-2018

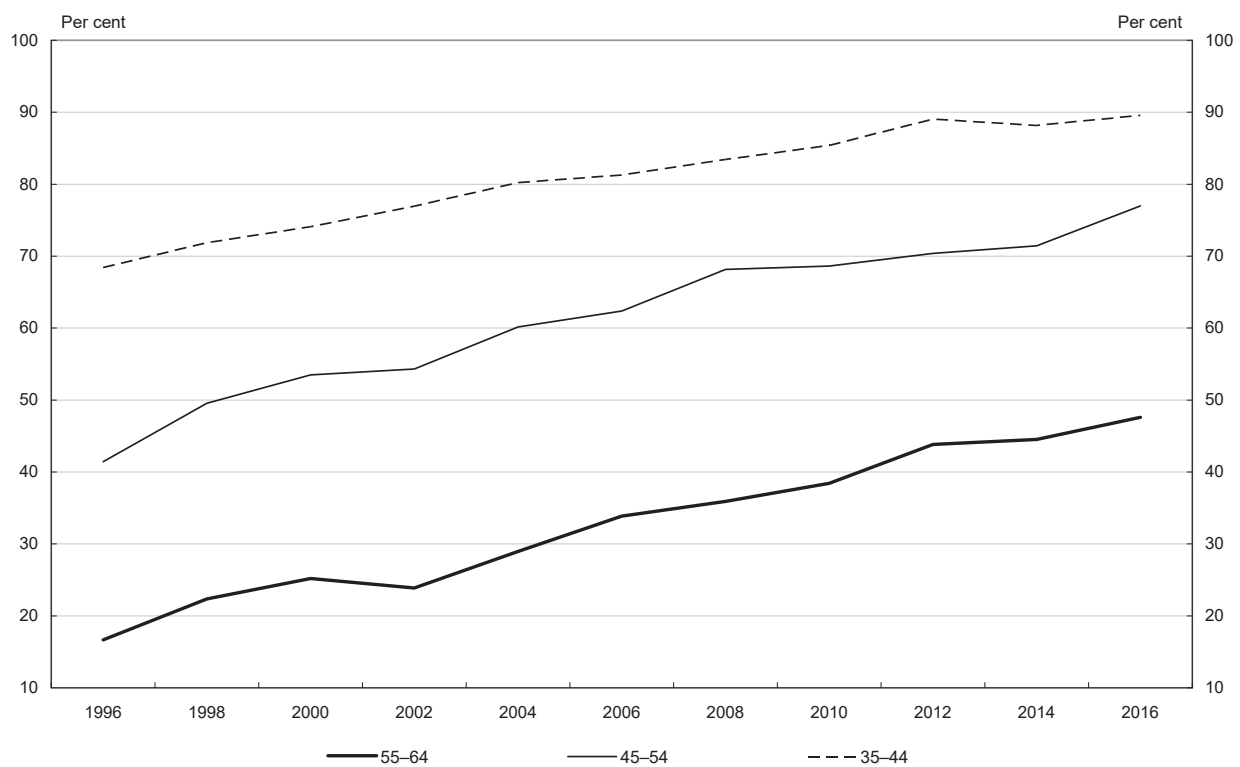Source: Reserve Bank of Australia (2019)

FIGURE 7

Owner occupier households with mortgage debt, by age of head

Australia, 1998-2016

Source: Author calculations, ABS 6523.0 (various issues)

| | OF HOUSEHOLDS WITH HOUSING DEBT | MEAN PRINCIPAL OUTSTANDING | | |
|---|---|---|---|---|
| | | Owner occupied dwelling | Other property | Total |
| Age of household head | Per cent | $'000 | $'000 | $'000 |
| 25–34 | 62 | 323.2 | 117.4 | 439.2 |
| 35–44 | 51.3 | 375.2 | 169.4 | 546.8 |
| 45–54 | 44.6 | 325.9 | 221.9 | 548.5 |
| 55–64 | 36.6 | 227.9 | 335.4 | 567.3 |
| Total | 48.1 | 318.2 | 223 | 541.1 |

TABLE 1

Over-indebted households with housing debt, incidence and outstanding debt

Australia, 2015-2016

Source: ABS (2017b)

## APPENDIX

*Household optimisation problem*

For a representative household in period $t$, lifetime utility is

$$U = (1 - \gamma - \delta) \ln c_{1t} + \gamma \ln h_t + \delta \ln (1 - l_t) + \beta \ln c_{2t+1} \qquad \text{(A1)}$$

where $c_{1t}$ is consumption when a household in period $t$, $c_{2t+1}$ is consumption when elderly in period $t+1$, $h_t$ is the amount of housing purchased in period $t$ and $(1 - l_t)$ is leisure time in period $t$, and $\beta = 1/(1 + \rho)$ is the discount rate with a constant time preference parameter, $\rho$.

The first period budget constraint is

$$c_{1t} + (q(1 - b) + b) p_t h_t + s_t = w_t l_t \qquad \text{(A2)}$$

where $p_t$ is the price of housing purchased in period $t$, $b$ is the required deposit ratio for a housing loan, $s_t$ is savings and $w_t$ is the real wage.

The second period budget constraint is

$$c_{2t+1} = (1 + r_{t+1}) s_t + p_{t+1} h_t \qquad \text{(A3)}$$

where $p_{t+1}$ is the price of housing sold in period $t+1$ and $r_{t+1}$ is the real interest rate on first period savings. Equations (A2) and (A3) give the lifetime budget constraint

$$w_t = c_{1t} + \frac{c_{2t+1}}{(1 + r_{t+1})} + \pi_t h_t + w_t (1 - l_t) \qquad \text{(A4)}$$

where $\pi_t = (q(1 - b) + b) p_t - p_{t+1} / (1 + r_{t+1})$ is the user cost of housing.

The maximisation of (A1) subject to (A4) gives

$$c_{1t}^* = (1 - \gamma - \delta) \frac{(1 + \rho)}{(2 + \rho)} w_t \qquad (\text{A5.1})$$

$$c_{2t+1}^* = \frac{(1 + r_{t+1})}{(2 + \rho)} w_t \qquad (\text{A5.2})$$

$$h_t^* = \frac{\gamma}{\pi_t} \frac{(1 + \rho)}{(2 + \rho)} w_t \qquad (\text{A5.3})$$

$$l_t^* = l^* = 1 - \delta \frac{(1 + \rho)}{(2 + \rho)} \qquad (\text{A5.4})$$

where the user cost of real estate, $\pi_t$, is endogenous as the housing price is determined by the market for housing so that market demand coincides with supply.

*Derivation of equation (5)*

Under rational expectations, equation (4) implies

$$p_t = \frac{1}{q(1 - b) + b} \left[ \frac{E p_{t+1}}{(1 + E r_{t+1})} + \gamma \frac{(1 + \rho)}{(2 + \rho)} \frac{(1 + n)}{\bar{h}(1 + x)} w_t \right] \qquad (\text{A6})$$

Let $C_0 = q(1 - b) + b$, $C_1 = \gamma [(1 + \rho) / (2 + \rho)] / [(1 + n)/\bar{h}(1 + x)]$ and $E_t a_{t+1} = (1 + E_t r_{t+1})$. Equation (A6) can be expressed as

$$p_t = \frac{1}{C_0} \left[ \frac{1}{E_t a_{t+1}} E p_{t+1} + C_1 w_t \right] \qquad (\text{A7})$$

and iterating equation (A7) forward over time horizon $T$ gives

$$p_t = \frac{1}{C_0} \prod_{i=0}^{T} \frac{1}{E_t a_{t+i}} p_{t+T} + \frac{C_1}{C_0} \sum_{i=0}^{T-1} \prod_{i=0}^{T-1} E_t w_{t+i} \frac{a_t}{E_t a_{t+i}} \qquad (\text{A8})$$