PROPERTY OWNERS IN AUSTRALIA: A SNAPSHOT

Marion Kohler and Anthony Rossiter

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Economic Research Department
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Abstract

Property represents more than half of all household assets in Australia and its share has been rising in recent years. Since most property purchases require debt financing because of the size of the purchase, property makes up a large part of both sides of households' balance sheets. This paper uses household-level data to examine what determines the ownership of residential property and the holding of property debt by households in Australia. We examine these decisions for both owner-occupied and investment property.

The results suggest that the household's age, composition, income and wealth are important factors determining property ownership and gearing decisions. Income and wealth are found to be more influential in determining the value of property owned, while the household's age is more influential in determining the gearing. Household composition is important for decisions on owner-occupied property, but has a limited influence on investment property decisions.

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1. Introduction

Australia has a strong tradition of home ownership, with rates reaching the current level of close to 70 per cent in the early 1960s, at the time a high level by international standards. Over the past decade, there has also been an increasing interest in owning other residential property, particularly for investment purposes. In 2002, 17 per cent of Australian households owned residential property which was not their main home. This is considerably higher than in other countries, such as Canada, the United Kingdom or the United States.

Australian households' interest in property is also strongly reflected in their balance sheets. While housing has always been an important component of the household balance sheet, recent house price appreciation has led to residential property now accounting for more than 60 per cent of total household assets. At the same time, since most purchases require mortgage financing, property debt accounts for 84 per cent of all household debt and the debt-to-asset ratio amounts to 23 per cent.

This paper examines who owns property in Australia and the gearing choices of property owners using a cross section of 7 245 households from the 2002 Household, Income and Labour Dynamics in Australia (HILDA) Survey. In addition to considering the choices of owning and holding debt on property, the decisions regarding the value of assets held in property and the loan-to-valuation ratio are also modelled.

While there are many previous studies which consider the tenure choice of households and some that consider household debt choices, relatively few examine both perspectives of home ownership. Generally, this is considered explicitly within a portfolio system, such as King and Leape (1998) or Arrondel and Lefebvre (2001), though some studies also consider it separately (see, for instance Curcuru 2003 and Ellis, Lawson and Roberts-Thomson 2003). Our study is closely related to that of Ellis *et al* (2003), who analyse the leverage of home owners in Australia using the 2001 HILDA survey. The 2002 survey provides

more comprehensive data on household assets and debt, which allowed us – unlike Ellis *et al* (2003) – to include household wealth as an explanatory variable and to extend the analysis to all residential property owned by households. Specification tests also suggested that a different modelling approach to that used by Ellis *et al* (2003) is more appropriate for our data set.

Most of the existing literature focuses only on owner-occupied property and neglects the important role of other property ownership. A few studies consider both types. Manrique and Ojah (2003) examine both primary and secondary property ownership for Spain by modelling expenditure on the various types of housing, similar to Ioannides and Rosenthal's (1994) treatment for the US. Arrondel and Lefebvre (2001) further decompose other residential property into secondary residences and dwellings rented out to others in France, while also examining housing loans over all property types.

Like Arrondel and Lefebvre (2001), this paper examines the cross-sectional microeconomic aspects of households' decisions regarding owner-occupied and investment property, which we describe as any other residential property owned by a household. In addition, we also consider mortgages for owner-occupiers and investment property owners separately. In Section 2, we discuss some factors affecting property ownership in the light of previous studies. Section 3 establishes the modelling framework used in the paper and discusses the results from the econometric models. We conclude in Section 4.

2. Factors Influencing Property Ownership and Gearing

In this section, we highlight theoretical considerations that underlie models of households' property ownership decisions, and their empirical importance in previous studies. This also provides us with a basis for the choice of our own empirical model in Section 3.

Households decide to purchase the home they live in for a number of reasons. One important reason is to provide a stream of housing services, for which they would otherwise have to pay rent. Owner-occupied housing may also be used as a place for investing household savings to provide an investment return on savings through capital gains. This might be especially important if government policy provides incentives for home ownership through the tax system. Moreover, there are lifestyle aspects to the choice of owner-occupation over renting, with the

former potentially providing greater stability for the household and, depending on the availability of affordable rental properties, more choice over the area in which the household can live. Some households may also value the greater freedom to decide on physical aspects of their home associated with owning the home.

Similarly, properties that are not owner-occupied can be owned for a variety of reasons. Some households may consider it mainly as an investment that provides an ongoing source of income by letting it to others. Other households may own a property primarily as a holiday home or secondary residence, that is for lifestyle reasons, but may also decide to let it during part of the year. In both cases capital gains on their property may be part of the expected return on their investment. As we cannot distinguish which of these motives is the driver for an investment decision – and often all of them will play some role – we include all residential property that is not owner-occupied in the definition of investment property used here. Overall, however, the emphasis on ownership motives for investment property may differ substantially from those for owner-occupied property and thus warrant analysing the two types of property separately.[1]

Since property purchases are lumpy, households often incur debt in order to finance the purchase. This means that factors affecting the ability to repay a mortgage are also important for the decision whether and when to buy a property. Income is likely to be the most important factor in determining whether a household can afford to repay a mortgage of a certain size. Of course, households' current choices for property gearing may also reflect the lagged effects of past household choices (Painter 2000), based on past income rather than current income. However, to the extent that current variables, such as income or education, proxy for past values, we can control for such effects.

The life cycle of a household is an important factor affecting the relative importance of the different motives for property ownership. Affordability and household composition have also been identified in the literature as important factors. We will discuss each of these three in turn.

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[1] There is also empirical evidence to suggest that consumption and investment demand are determined by different household characteristics. Ioannides and Rosenthal (1994) highlight that investment demand is more sensitive to income and wealth while consumption demand is more sensitive to demographic characteristics such as education, age and family size.

2.1 Life Cycle

Life-cycle considerations represent an important link between saving, income and consumption. The life-cycle hypothesis posits that households will smooth their consumption over time, implying that they will save part of their income and accumulate assets during their working lives and draw down on these assets once entering retirement. It would be expected that the level of saving and asset accumulation would peak late in their working life in line with peak income. In principle, this should also be true for the ownership of property assets.

Thus, on the basis of the life cycle, we would expect that the ownership of owner-occupied housing and other residential property would increase across households of working age and start to decline once households enter retirement. This is confirmed in Figure 1 which shows the proportion of property owners in each age group, based on the 2002 HILDA data set used in this paper.[2] In fact, age seems to be a standard explanatory variable included in models of home ownership (see, for example, Henderson and Ioannides 1986, Gyourko and Linneman 1996 or King and Leape 1998).

Because property is lumpy, its ownership generally requires households to acquire debt to enable its purchase. Thus, while purchases of property may occur in the early stages of the working life of households, these households will generally take on debt which will thereafter be repaid up until the latter stages of their working life. For housing debt, both the propensity to hold debt and the gearing ratio on property would be expected to fall for households in the prime working-age groups and in retirement.[3]

2.2 Affordability

An important consideration for property ownership is the ability to make financial commitments towards purchasing property and to meet any repayment obligations if debt is taken out to acquire the property. This encompasses earning capacity,

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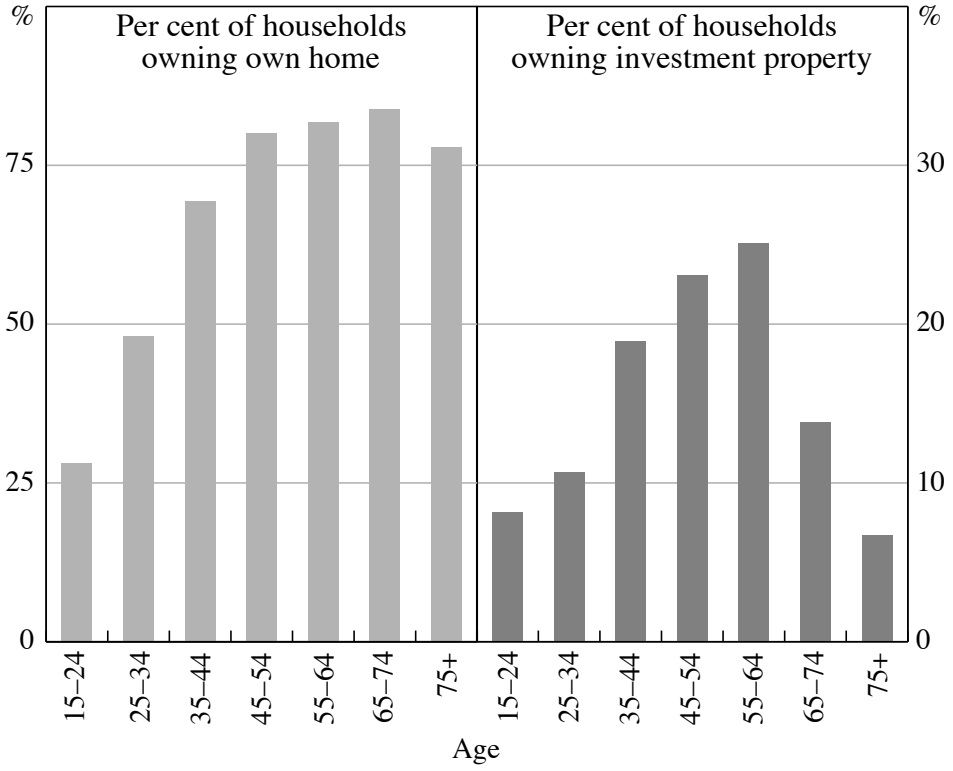
2 For more detail concerning the data and variables used here and in the models of Section 3, see Appendix A.

3 Of course tax treatment, such as mortgage interest deductibility on owner-occupied housing, or financial products that allow households to draw down housing assets gradually, such as reverse mortgages, may increase the willingness to hold housing debt when in retirement.

Figure 1: Property Ownership by Age Group



Source: HILDA 2002, Release 2.0

reflected in current income, educational attainment and labour force status, as well as wealth held in sources other than property, particularly in liquid assets.[4] Variables such as these have been included in many previous tenure choice studies. As noted by Yates (2000), income, like age, is standard in the specification of these models. Data limitations have meant fewer studies have examined the role of wealth in real estate portfolio decisions, though it forms a central part of some studies (for example, Curcuru 2003).

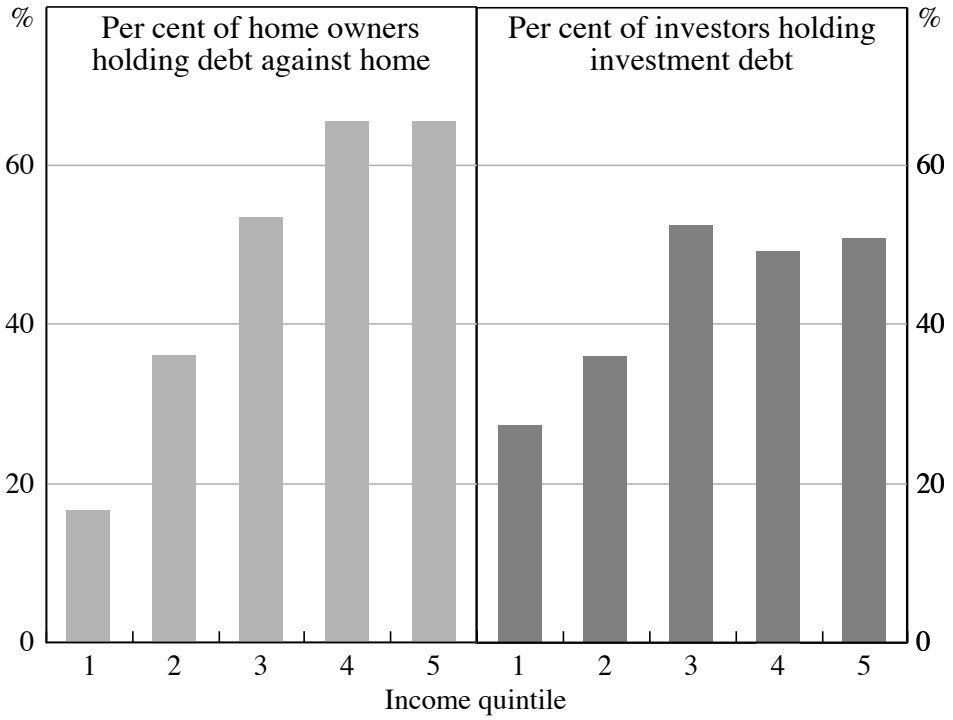
We expect that those with higher incomes and wealth would have a higher propensity for property ownership and would also tend to purchase higher valued property. This is in part due to the requirements for downpayment and ongoing servicing of mortgages, as identified in the study of Canada by Jones (1989) and of the US by Linneman and Wachter (1989), among others. Both these papers

4 For the purpose of modelling, the wealth measure used in this paper excludes property wealth to correct for the endogeneity of wealth and property ownership. Wealth from business sources is treated separately, in line with Arrondel and Lefebvre (2001), reflecting the different motives underlying the accumulation of business assets compared with other assets.

note that the income and wealth required to obtain mortgages have a significant influence on the attainment of home ownership, with Jones (1989) noting that the wealth required for downpayment appears to be more important than income in the transition from renting to home ownership. The impact of borrowing constraints was also examined for Australia by Bourassa (1995a), who similarly found that the wealth constraint is binding for most young renter households.

Not only would we expect higher-income households to be more likely to own property, but we would also expect them to be more likely to hold debt on their properties, since they are in a better position to service debt. Lower-income households often either do not own property, or – in the case of retiree households – have already paid off their debt. Figure 2 confirms this for our data set, with a higher share of property owners in the higher income quintiles owing debt on their property.

Figure 2: Property Gearing by Income Quintile



Source: HILDA 2002, Release 2.0

In addition to wealth and income, labour force status, employment history and educational attainment are also important because they influence past and future income and wealth. As noted by Arrondel and Lefebvre (2001), these factors are important influences on the risks associated with employment and income. They

can also proxy influences on property ownership arising from the lagged effects of past choices (see Painter 2000).

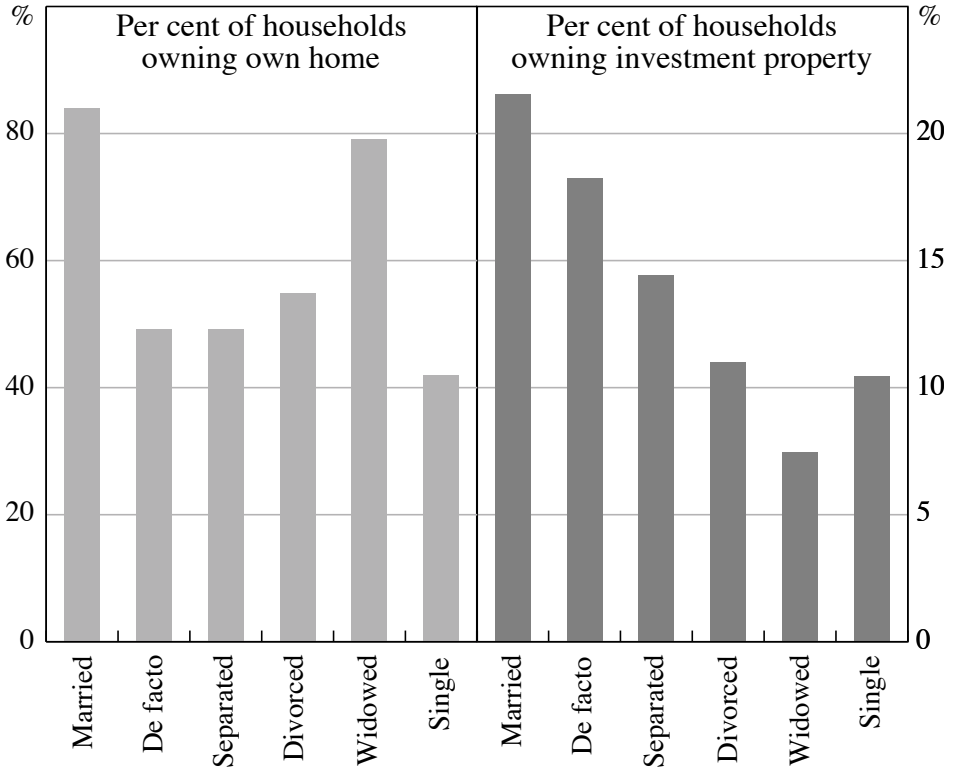
2.3 Household Composition

Another aspect that could be important for home ownership and is also partly related to the life cycle is the composition of households. Some previous studies, including Asberg (1999), Haurin, Hendershott and Kim (1994) and Mok (2004), pay particular attention to how the tenure choice of young adults is influenced by household formation. Households may be expected to trade up their housing to cater for children and trade down once children leave the home and the parents enter retirement. With the demand for larger houses associated with larger families, households may be more interested in owning their own home, since the benefits of owner-occupation, such as benefits from capital gains tax exemptions, will be larger. The number of children in a household should be a good predictor of this effect. To the extent that households' tenure choice precedes the arrival of children, marital status might be a good indicator of plans to have children and the desire for the security that owner-occupation brings.

The marital status of the household reference person could also be influential in property ownership and gearing decisions. Different marital status types reflect different degrees of stability in household financial arrangements and the ability to pool resources, which makes it easier to acquire a lumpy asset such as property. Thus, it would be expected that married households who have the ability to pool resources would be more likely to own their own home and purchase investment property. This is also suggested by the data shown in Figure 3. Interestingly, widowed households are also more likely to own their own home, reflecting the benefit of pooling resources in the past in these households. This concords with Bourassa (1995b) who finds that widowed households are more similar to married persons in their tenure choice than to separated, divorced or never married households.

In this section we have analysed a range of factors that are likely to affect a household's decision to own property and to hold debt against it. The bivariate relationships graphed in this section give us a snapshot of the relevance of these factors for our data set of Australian households, but we should bear in mind that these factors are likely to be interrelated. For example, households in the peak

Figure 3: Property Ownership by Marital Status



Source: HILDA 2002, Release 2.0

of the life cycle are often also at the peak of their income capacity; both are factors that suggest a higher incidence of property ownership. On the other hand, households with children may have the highest demand for housing services, but may also face stricter affordability constraints than childless households. In order to disentangle the various influences, it is necessary to estimate the relationships using econometric models to determine the relative importance of different factors for property ownership and debt decisions of households.

3. Estimating Property Ownership for Australia

In this section we present the results of an econometric model for property ownership and gearing decisions, taking the factors identified in Section 2 into account. We estimate the model using a new household-level data set for Australia, the Household, Income and Labour Dynamics in Australia (HILDA) Survey. In 2002, this survey included a wealth module that provides data from 7 245 households on home ownership, other residential property ownership, the values invested and property debt associated with these assets.

Before presenting the results of our estimation in Section 3.2 we will discuss our modelling framework.

3.1 Modelling Framework

Property ownership decisions of households involve two dimensions. First, the household has to decide whether to buy an asset or not, which is a binary decision. Second, if the household decides to invest in an asset, it must decide how much to invest in it. Similar decisions are involved for the gearing of a property asset.

For home owners, the ownership decisions amounts to the choice of tenure. How much is invested in their home is partly related to the minimum amount of housing services that the household demands, and partly to the availability of finance and desired investment portfolio decisions. We therefore model home ownership as:

$$\Pr(Own^H) = f(age,\ income,\ wealth,\ demographic\ variables) \quad (1)$$

$$Value^H = \tilde{f}(age,\ income,\ wealth,\ demographic\ variables) \quad (2)$$

Equation (1) describes the probability of being a home owner as a function of the age, income and wealth of the household and a number of other demographic variables, such as the number of children, whether a household is based on a married couple, or the employment status of the household reference person. In order to account for possible non-linearities in the relationship, we also include squared terms of age, income and wealth. Equation (2) describes the value of the home as a function of similar variables, for those that own a home (obviously, all others have a value of zero).

The gearing of the home – the ratio of home debt to home value – is also modelled in two stages:

$$\Pr(Gear^H) = g(age,\ income,\ wealth,\ demographic\ variables) \quad (3)$$

$$Gearing^H = \tilde{g}(age,\ income,\ wealth,\ demographic\ variables) \quad (4)$$

where Equation (3) describes the probability of a home owner owing debt on their home, and Equation (4) describes the gearing ratio for home owners with debt.[5]

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[5] The decision sequence underlying our gearing model follows Ellis *et al* (2003). They argue that the home ownership decision should precede the mortgage decision rather than being a joint decision, since only home owners can choose to have a mortgage on the home.

The model for home gearing is estimated for households that own their home, but do not own other residential property. The reason is that owners of investment property may make decisions about total property gearing rather than gearing of the home alone. This is discussed in more detail below.

Similarly, for investment property, households decide whether to invest in the asset at all, and, if so, how much to invest:

$$\Pr(Own^I) = h(age,\ income,\ wealth,\ demographic\ variables,\ Own^H) \quad (5)$$
$$Value^I = \tilde{h}(age,\ income,\ wealth,\ demographic\ variables,\ Own^H) \quad (6)$$

Equations (5) and (6) are functions of the variables discussed in the home ownership model and a variable that indicates whether a household is already a home owner.

For the gearing decisions of investment property owners we consider total property gearing of the household. The reason for this is that home owners may use a mortgage secured against their own home to finance the purchase of an investment property.[6] In Australia, the interest costs associated with having a debt-financed rental investment property is tax-deductible, irrespective of whether the debt has been secured against the investment property or their home.

$$\Pr(Gear^{TP}) = i(age,\ income,\ wealth,\ demographic\ variables) \quad (7)$$
$$Gearing^{TP} = \tilde{i}(age,\ income,\ wealth,\ demographic\ variables) \quad (8)$$

where Equation (7) describes the probability of an investor owing debt on his or her properties, and Equation (8) models the total property gearing ratio for investment property owners with property debt.

In the literature, the Heckman selection model is widely used to estimate models of the type outlined here. However, despite its popularity, some deficiencies have been identified in its application. As noted by Leung and Yu (1996) and Puhani (2000) (and discussed in more detail in Appendix B), the Heckman selection model is susceptible to collinearity problems between the explanatory variables in the value equation and the inverse Mills ratio. A test based on

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6 In our data set, 47 per cent of investor households owed debt on their investment property, while 21 per cent owed no debt on their investment property but did have debt secured against their home.

the condition number suggests that our models face such collinearity problems, leading to unstable estimates from the Heckman selection model. In this case, the two-part model is preferred.

Consequently, we model the two-stage decisions in the four models using a two-part model (originally proposed by Cragg 1971). The first stage involves modelling the binary choice of whether a household owns a particular type of property or holds debt using a probit model. The value of the property (or gearing ratio on the property) is then modelled over those households owning property (or holding debt on that property) using sub-sample OLS estimation. Our preferred models were obtained by using a general-to-specific modelling approach, whereby insignificant variables are excluded sequentially. However, we decided to keep insignificant variables if they were of specific theoretical interest. For a more extensive discussion of the issues surrounding the choice of the econometric framework, see Appendix B.

3.2 Estimation Results

3.2.1 Home ownership and home values

Our first model analyses the tenure choice of households and the value of owner-occupied houses. The results from this two-part model are shown in Table 1; more detailed results are available in Appendix C.

Columns 2 to 4 show the results of the probit equation. The coefficients in the second column allow us to gauge whether a variable has a significant effect on predicting whether a household is a home owner. Since the coefficients in a probit model do not have an intuitive economic interpretation, we also report the marginal effect on the implied probabilities of a change of the variable, evaluated at sample means, in the fourth column. The last column represents the coefficients of the regression for the value of the own home. As this is an OLS regression, the coefficients allow a straightforward interpretation as the marginal effect of the independent variable on the value of the home.

As Table 1 illustrates, the life-cycle stage of the household, as measured by the age, influences its propensity to own its primary residence. The first panel in Figure 4 shows the change in the implied probabilities across the different age groups. The propensity to own the home increases for working-age cohorts up until

Table 1: Home Ownership and Value of Property Holdings

Ownership				Value ($'000)	
Variable	Coefficient	Sample mean	Marginal effect	Variable	Coefficient
Age	0.042***	47.2 years	1.72	Age	0.568
Age $^2/100$	–0.029***			Age $^2/100$	–0.824
Income	0.004***	$57 875	1.93	Income	0.406***
Income$^2/1000$	–0.004***			Net wealth	0.184***
Net wealth	0.001***	$160 049	1.40	Business wealth	0.162***
Net wealth$^2/10000$	–0.002***			Business	
Own business	0.130**	13.3%	3.54	wealth$^2/10000$	–0.224***
Number of adults	0.200***	1.9	6.08	Previous owner	58.663***
Marital status				Number of adults	21.370***
Married	0.480***	48.1%	13.93	Number of children	8.741***
De facto	–0.106*	9.5%	–3.74	Marital status	
Widowed	0.589***	8.4%	16.34	De facto	–16.799*
Labour force status				Separated	–41.057***
Part-time employee	0.111*	10.5%	3.00	Labour force status	
Unemployed	–0.257***	3.2%	–7.98	Part-time employee	23.096**
Not in labour force	–0.183***	7.2%	–5.55	Not in labour force	42.229***
Casual worker	–0.189***	10.5%	–5.69	Retired	28.697*
Time employed	0.035***	23.1 years	1.65	Self-employed	59.574***
Time employed $^2/100$	–0.044***			Ever unemployed	–21.522***
Ever unemployed	–0.138***	27.9%	–4.02	Post-secondary	
Time unemployed	–0.025**	0.6 years	–0.72	educated	30.860***
Post-secondary				Region (12 dummies)	***
educated	0.122***	59.8%	3.30		

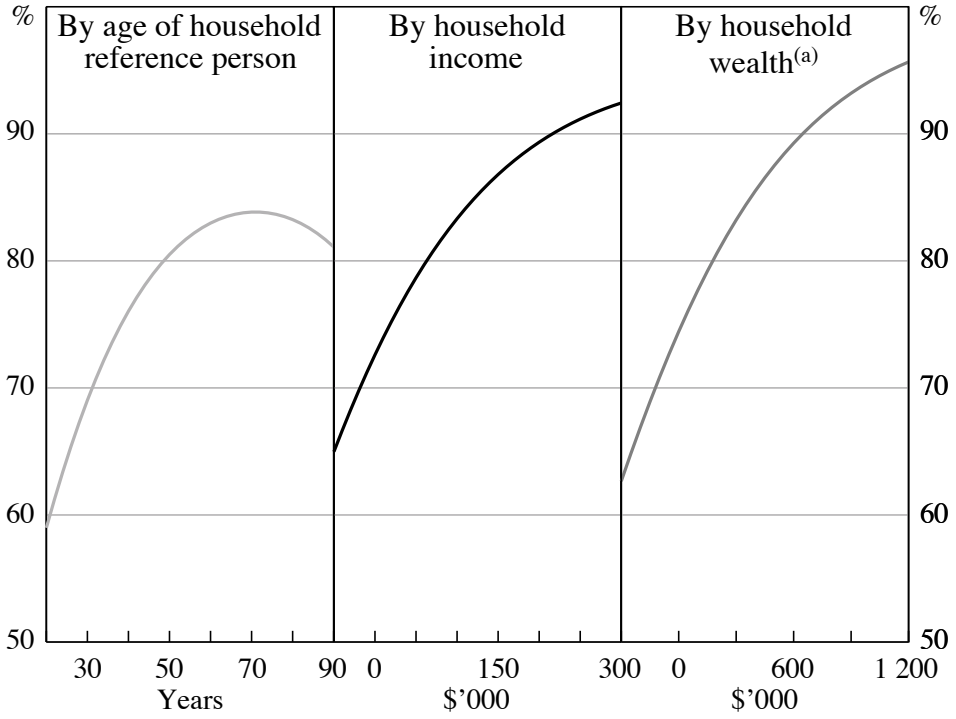
Number of observations = 7 227 (Probit) and 4 947 (OLS)

Pseudo-R^2 = 0.235 (Probit) and R^2 = 0.339 (OLS)

Wald test = 1566.7 (Probit) and F-test = 54.7 (OLS)

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively, using robust standard errors. Net wealth is defined as non-housing, non-business wealth. The selected increments for the marginal effects are: 5 years for 'Age', $20 000 for 'Income' and $50 000 for 'Wealth', 1 to 2 for 'Number of adults', 5 years for 'Time employed', 1 year for 'Time unemployed', and 0 to 1 for all dummy variables.

Figure 4: Implied Probabilities of Home Ownership



Note: (a) Excludes housing and business wealth

retirement age, but then flattens out, possibly with a slight decline.[7] Moreover, the last column of Table 1 shows that age does not significantly influence the value of the home once we account for other factors such as a lower income in retirement. This finding contrasts with the life-cycle model, which suggests that older households draw down their assets towards the end of their life cycle. This difference may in part be explained by bequest motives or a general reluctance of older households to sell their own home. It is supported by other studies, such as Kennickel, Starr-McCluer and Surette (2000) and Venti and Wise (2000), who find that older households do not draw down on their housing equity to pay for non-housing consumption, as would be expected by the life-cycle theory. They also find that these households are unlikely to move, except when there is a change in the household structure such as the death of a spouse.

As would be expected, affordability characteristics, such as income and wealth, are important for home ownership. The second and third panels in Figure 4

[7] The exact turning point of 70 years and the steepness of the decline could be partly a result of our choice of functional form. Since most of our observations lie in the age groups below 70 years, there is a higher uncertainty around the exact coefficient for these older age groups.

show that the propensity to own a home increases with household income and net wealth, though the marginal influence of higher income and wealth on ownership is smaller at higher levels of these variables. This is consistent with the downpayment and debt servicing constraints being more binding at the lowest income levels. Furthermore, those who have previously owned another home tend to have higher-valued current homes, possibly reflecting that they have actively 'traded-up' to better properties in a more valued location. The importance of affordability for home ownership is consistent with the findings of Gyourko and Linneman (1996) who argue that tenure choice is influenced more by affordability characteristics than the demographic characteristics of households.

Our results suggest that household structure is another important factor that influences home ownership and the value of the primary residence. Households with more adult members are more likely to own their own home, while more adults and children in a household are associated with a higher value for the primary residence. This finding is likely to reflect the greater demand for housing services by larger households.[8] Married and widowed households are also more likely to own their own home than other households, reflecting the greater stability of current (and past) financial arrangements in the household. This is in accordance with Bourassa (1995b), who finds that widowed households tend to have higher propensities for home ownership than other 'not married' households.

Employment status, employment history and educational attainment are other important determinants of home ownership. The propensity for households to own their home rises with the length of employment of the household reference person, while households where the reference person has been unemployed or is a casual worker are less likely to own their home. This could reflect the fact that households looking to own their own home have to credibly demonstrate that they can meet the debt servicing constraints placed on them. Those households where the reference person has completed post-secondary education are also more likely to own their primary residence and have higher-valued property – a reflection of their past (or future) capacity to generate income and build wealth.

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8 Despite the possible relationship between the household formation and tenure choice decisions discussed by Asberg (1999) and Haurin *et al* (1994), independent estimation of tenure choice models is possible. As noted by Yates (2000), if the household formation decision is made prior to the tenure choice decision, then estimating the tenure choice relationship using a single equation will yield unbiased and consistent estimates.

3.2.2 Owner-occupier gearing decisions

Buying a home is a large investment, which usually requires debt financing. Due to its size, mortgage debt stays with households for many years. In this section we discuss what determines the gearing choices of owner-occupiers, which partly reflects the financing required at the time of purchase and partly the speed with which home owners decide to pay off that debt.

Table 2 summarises the model estimated for gearing choice – whether to gear and which level, as measured by the current loan-to-valuation ratio – of households which own their own home but have no other residential property assets.

As with home ownership, the decision to hold debt against the own home is strongly influenced by the age, income and wealth of the household. Figure 5 shows, as would be expected, that the sign of the relationship with gearing is different to that with home ownership for age and wealth. Like home ownership, households with higher income are more likely to hold debt, possibly since they are in a better position to service the debt (and therefore to obtain the mortgage in the first instance). In contrast, the likelihood of holding debt falls with wealth, a reflection of past accumulation of savings (and thus of past possibilities to pay off debt). Similarly, gearing ratios among households with debt tends to rise with income and fall with higher wealth, consistent with the findings by Curcuru (2003) for the United States.

Consistent with the life-cycle hypothesis, we find that the likelihood of owner-occupier households holding debt and the loan-to-valuation ratio of those with debt falls steeply as households get older. Similar results have been shown in recent work for Australia by Ellis *et al* (2003) as well as Curcuru (2003) for the United States.

Household structure is also relevant to the gearing choices of households. Households with more children are more likely to hold debt on their home. This could simply reflect the demand for larger houses associated with larger families and, therefore, the increased need for purchasing a home with debt. However, households with more adults are less likely to gear their homes, in turn reflecting a greater (current or past) ability to finance the increased demand for housing.

Table 2: Gearing Decisions of Owner-occupier Households

Hold debt				Gearing ratio (per cent)	
Variable	Coefficient	Sample mean	Marginal effect	Variable	Coefficient
Age	–0.048***	50.8 years	–9.53	Age	–1.334***
Income	0.007***	$58 584	4.41	$Age^2/100$	0.774**
$Income^2/1000$	–0.008***			Income	0.028**
Net wealth	–0.001***	$169 508	–2.78	Net wealth	–0.012***
$Net\ wealth^2/10000$	0.002***			Business wealth	0.005**
Business wealth	–0.001***	$34 689	–2.12	Home value	–0.031***
$Business\ wealth^2/10000$	0.004***			Number of adults	–2.414***
Number of adults	–0.156***	2.0	–6.19	Marital status	
Number of children	0.053*	0.6	2.12	Married	3.673**
Marital status				De facto	9.045***
Married	0.736***	57.5%	27.78	Separated	7.824**
De facto	0.734***	6.4%	27.70	Labour force status	
Separated	0.785***	4.3%	29.73	Part-time employee	–8.302***
Divorced	0.596***	8.4%	22.18	Retired	–11.078***
Widowed	0.451***	11.1%	16.46	Self-employed	–3.497**
Labour force status					
Not in labour force	–0.405***	5.1%	–16.01		
Retired	–0.527***	28.3%	–20.63		
Casual worker	–0.250***	8.1%	–9.85		
Time employed	0.031***	25.9 years	–0.17		
$Time\ employed^2/100$	–0.057***				
Post-secondary educated	0.107 **	60.6%	4.25		

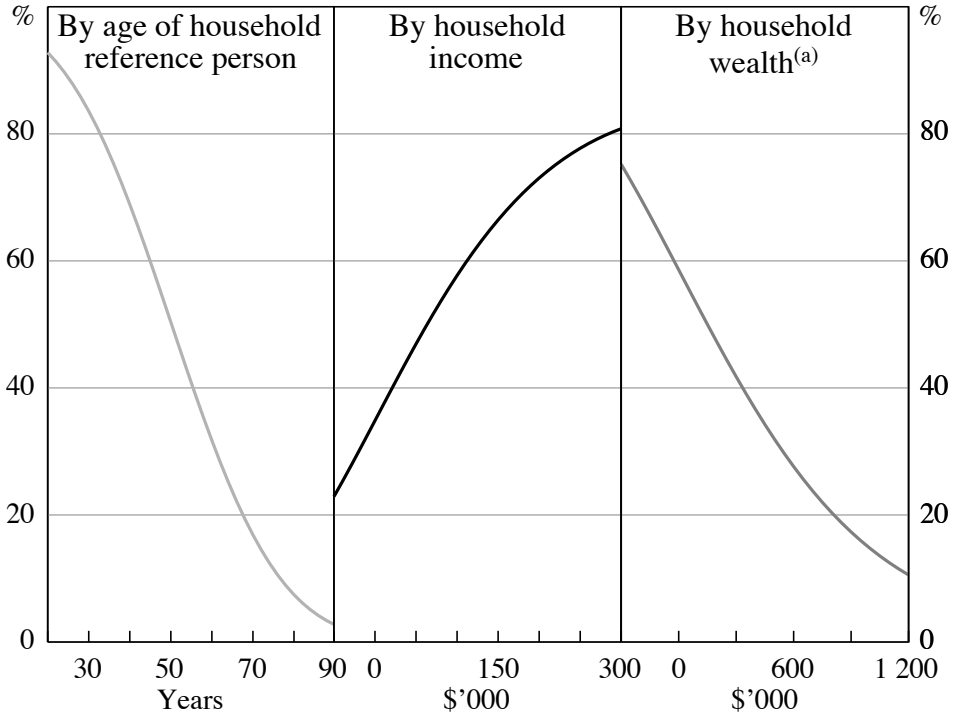
Number of observations = 3 953 (Probit) and 1 952 (OLS)

Pseudo-R^2 = 0.375 (Probit) and R^2 = 0.201 (OLS)

Wald test = 1202.2 (Probit) and F-test = 37.5 (OLS)

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively, using robust standard errors. Owner-occupier households exclude those who also own other residential property. Net wealth is defined as non-housing, non-business wealth. The selected increments for the marginal effects are: 5 years for 'Age', $20 000 for 'Income' and $50 000 for 'Wealth', 1 to 2 for 'Number of adults', 0 to 1 for 'Number of children', and 0 to 1 for all dummy variables.

Figure 5: Implied Probabilities of Home Gearing



Note: (a) Excludes housing and business wealth

Labour force status is also a significant determinant of gearing choices, with households less likely to hold debt on their home if the reference person is not in the labour force, retired or a casual worker. This could perhaps reflect a more uncertain income stream, and potentially greater difficulty in meeting regular repayments (making it harder to qualify for a mortgage).

3.2.3 Investment property ownership and gearing

In our sample 17 per cent of households own other residential property. Table 3 presents the preferred specifications of the models for the ownership and value held in other residential property.

Both investment property and home ownership choices reflect broader motives to invest in property, and therefore it is not surprising that our results for the investment property model are broadly similar to those of the home ownership model. However, there are also some differences, reflecting the fact that the investment motive plays a larger role relative to consumption motives for this type of property.

Table 3: Investment Property Ownership and Value of Holdings

Ownership				Value ($'000)	
Variable	Coefficient	Sample mean	Marginal effect	Variable	Coefficient
Age	0.042***	47.2 years	1.20	Age	1.742
Age^2/100	–0.033***			Age^2/100	–1.614
Income	0.006***	$57 875	2.51	Income	0.766***
Income^2/1000	–0.008***			Net wealth	–0.030
Net wealth	0.001***	$160 049	0.76	Net wealth^2/10000	0.614***
Net wealth^2/10000	–0.001***			Business wealth	0.278***
Own business	0.195***	13.3%	5.29	Business	
Business wealth/1000	0.137**	$41 010	0.17	wealth^2/10000	–0.325***
Previous owner	0.230***	43.1%	5.93	Own home	–137.382***
Marital status				Home value	0.511***
Married	–0.090*	48.1%	–2.40	Number of children	–15.087**
De facto	–0.261***	9.2%	–6.40	Ever unemployed	–27.540*
Widowed	–0.324***	8.4%	–7.68		
Labour force status					
Retired	–0.300***	22.9%	–7.03		
Ever unemployed	–0.093*	27.9%	–2.30		
Time unemployed	–0.059***	0.6 years	–1.45		
Post-secondary educated	0.095**	59.8%	2.53		

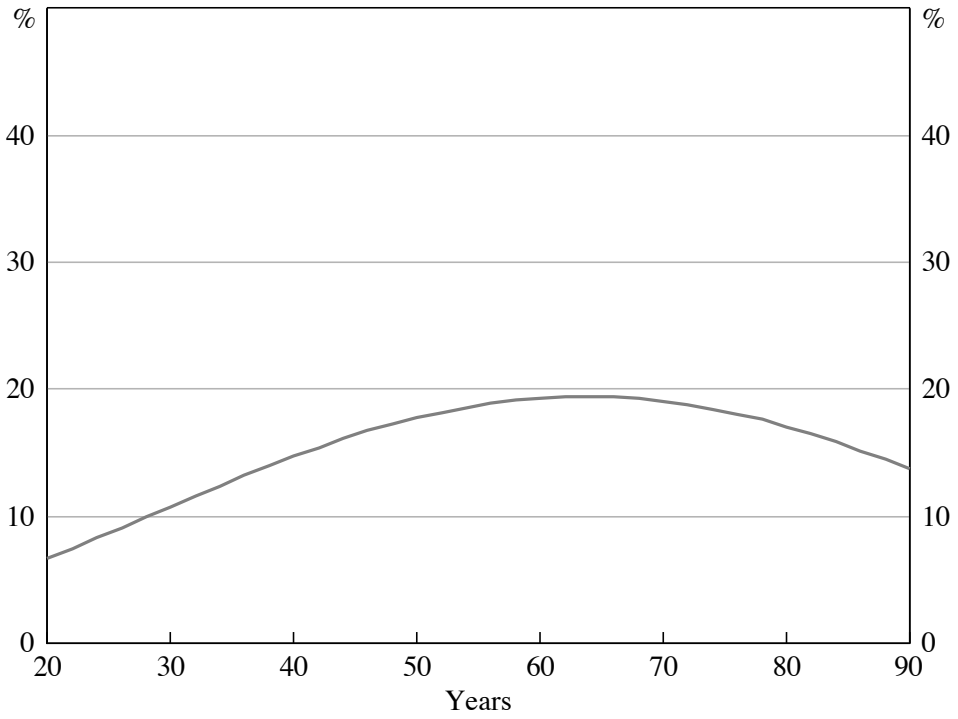
Number of observations = 7 227 (Probit) and 1 225 (OLS)
Pseudo-R^2 = 0.124 (Probit) and R^2 = 0.400 (OLS)
Wald test = 725.8 (Probit) and F-test = 9.6 (OLS)

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively, using robust standard errors. Net wealth is defined as non-housing, non-business wealth. The selected increments for the marginal effects are: 5 years for 'Age', $20 000 for 'Income' and $50 000 for 'Wealth', 1 year for 'Time unemployed', and 0 to 1 for all dummy variables.

The life-cycle hypothesis is relatively pronounced when looking at the impact of age on investment property ownership. While the coefficients on the age variables are the same sign as those for home ownership, Figure 6 shows a truly hump-shaped profile across age groups, with a peak at 64 years. This suggests that households, as they enter retirement, sell their holdings in investment property. It is not surprising that this effect shows up in the propensity to hold this asset, rather than the value, as property is a lumpy, illiquid asset.

Figure 6: Implied Probabilities of Investment Ownership

By age



As would be anticipated for assets driven by investment motives, affordability characteristics, such as income, appear to be relatively more important for the ownership of investment property than for owner-occupied property. Like the case of owner-occupied property, the propensity to own other residential property and the value held increases monotonically with income and wealth.[9] However, the marginal impact of income on the probability to own property is higher for investment property, consistent with investment property being more concentrated within those groups that have higher income.

Business owners are also more likely to own other residential property, and those with higher business wealth tend to have more invested in it. This might reflect more sophisticated asset management or higher awareness of tax incentives in that group. Also notable is that home owners that are not first-home buyers are more likely to own other property. This is in line with the expectation that households will generally purchase their own home before looking to invest in other property. Not surprisingly, the value of the household's own home (which is not in our

9 The squared terms for these variables mainly account for non-linearities in these monotonic relationships with the turning points lying outside the sample range.

measure of wealth) and their investment property assets appear to be closely related, as shown in Table 3.

One would expect that the decision to invest in other residential property is closely related to the decision to gear the investment. Gearing provides a financing option that may seem particularly attractive during a time of rising property prices, as has been witnessed in Australia over the past decade. Moreover, it may be an attractive option for middle- or high-income earners since in Australia the mortgage-related costs of owning investment properties can be tax-deducted. Due to the fungibility of mortgage debt to finance property purchases of either type, we have modelled total property gearing for investor households rather than just the gearing of the investment property.

The results of the gearing model in Table 4 suggests some differences between the factors influencing the gearing decisions of households which only own their own home and those who own investment property. As previously, the propensity to hold property debt increases with income and decreases with wealth. However, comparing Figure 7 with Figure 5 suggests that the probability of property gearing is higher at all levels of income and flattens out at higher incomes. This might suggest that the different ability to service debt repayments is less closely tied to income for investors. It may also suggest that tax incentives of interest deductibility play a uniform role across a large spectrum of middle- and high-income earners.

A different way to look at this result is to ask whether investment property owners are more likely to hold property debt.[10] We addressed this question by re-estimating the total property gearing model over all property owners, whether they own a home or an investment property or both, and adding a variable indicating whether they are investment property owners.[11] The results suggest that investment property owners are not only more likely to hold property debt, but they are also more likely to hold more of it relative to their property asset value. This finding is consistent with an earlier result by Ellis *et al* (2003) who looked at home

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[10] Strictly speaking, Figures 7 and 5 cannot be directly compared because the underlying samples have different characteristics.

[11] Detailed results are available on request from the authors.

Table 4: Gearing Decisions of Investment Property Owners

Hold debt				Gearing ratio (per cent)	
Variable	Coefficient	Sample mean	Marginal effect	Variable	Coefficient
Age	–0.032***	48.1 years	–5.20	Age	–0.681***
Income/1000	5.536***	$86 157	2.27	Income/1000	–0.211
Income^2/1000	–0.009***			Income^2/1000	0.028
Net wealth	–0.001***	$315 946	–0.53	Net wealth	–0.009***
Net wealth^2/10000	0.001***			Net wealth^2/10000	0.013***
Previous owner	0.271***	60.7%	8.38	Own home	–13.428***
Total property value/1000	0.159*	$604 050	0.24	Total property value/1000	–7.727***
Number of adults	–0.101**	2.2	–2.90	Marital status	
Marital status				Married	6.95***
Married	0.489***	62.6%	16.47	De facto	7.661**
De facto	0.616***	10.9%	19.92	Divorced	11.085***
Separated	0.422*	4.9%	14.51	Labour force status	
Divorced	0.378*	6.0%	13.15	Not in labour force	–9.684***
Labour force status					
Part-time employee	–0.266*	9.0%	–7.79		
Unemployed	–0.744**	1.1%	–25.17		
Not in labour force	–0.403**	4.4%	–12.40		
Retired	–0.935***	13.4%	–32.73		
Time employed	0.052***	26.4 years	–0.59		
Time employed ^{2}/100	–0.097***				

Number of observations = 1 225 (Probit) and 840 (OLS)

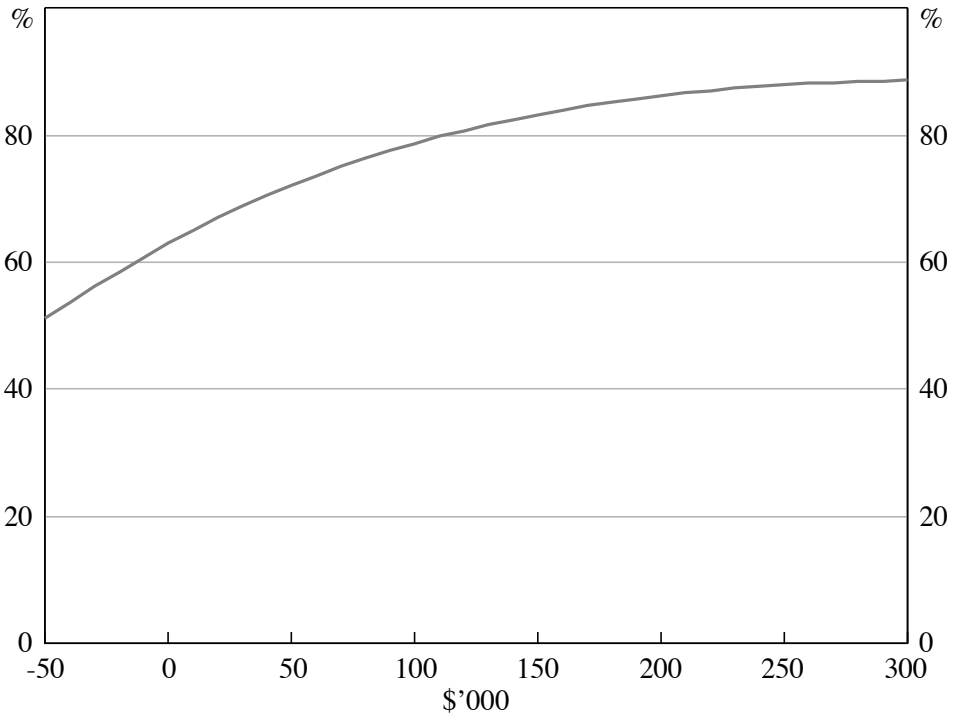
Pseudo-R^2 = 0.280 (Probit) and R^2 = 0.213 (OLS)

Wald test = 262.7 (Probit) and F-test = 28.5 (OLS)

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively, using robust standard errors. The holding of debt in this model refers to owner-occupied debt, other property debt or both. Net wealth is defined as non-housing, non-business wealth. The selected increments for the marginal effects are: 5 years for 'Age', $20 000 for 'Income' and $50 000 for 'Wealth', 1 to 2 for 'Number of adults', and 0 to 1 for all dummy variables.

Figure 7: Implied Probabilities of Property Gearing for Investors

By income



gearing only and used rental income as an indicator of whether a household owned other residential property.

Unlike the propensity to hold property debt, the gearing ratio for investor households with property debt does not appear to be significantly influenced by income. However, among the set of property investors, the sub-sample which also have debt have less variation in income. This will make it unlikely that income can explain differences in gearing ratios within that sub-sample.

The role of age, on the other hand, is very similar in both the model of gearing for investor households and for home owners. In both models, the propensity to hold debt on property and the gearing ratio declines with the age of the household reference person and are also lower for retired households.

Table 4 shows that there is some limited role for household structure and labour force status in explaining household gearing choices. However, age, income and wealth clearly dominate in the model determining household gearing decisions for investor households.

4. Conclusions

This paper has examined empirically the role of household characteristics for property ownership and gearing choices in Australia. Three main groups of characteristics were considered, relating to the life cycle, affordability and household composition. The results for Australia presented in this paper concord with previous studies on the influence of these factors on households' real estate decisions both in Australia and in other countries.

Overall, the models for ownership and gearing choices suggest that life-cycle considerations, especially those measured by age, are very important explanatory factors. The decision to hold debt appears heavily influenced by the life cycle. The same is true for the current extent of gearing, reflecting the importance of the passive progression of the household's mortgage contract towards repayment as households get older. While the life cycle also plays an important role in the choice to own owner-occupied or other residential property, the value stored in these forms of property is largely independent of age.

Affordability characteristics, especially those that affect access to mortgage finance, such as income, wealth and employment status, are also clearly important factors in the ownership and gearing choices of households. The results highlight that affordability characteristics are at least as important as life-cycle considerations for the ownership and value decisions for the household's property portfolio. This is particularly the case for the value of property owned, which is largely determined by the income and non-housing wealth held by the household. While the propensity to hold debt is influenced by income and wealth in line with the results found for other countries, these factors are not as important for the gearing ratio chosen by the household, which is dictated more by the stage of the life cycle.

Household composition appears to be of significant influence in the choices made regarding owner-occupied housing. The results of this study concur with previous evidence from Australia on the importance of marital status and household-type considerations in the tenure choice of households. While some factors related to household composition influence choices concerning investment property, they are far less important than either life-cycle or affordability characteristics.

Appendix A: Data and Variable Definitions

Data description

This paper uses data from Wave 2 (Release 2.0, unconfidentialised) of the Department of Family and Community Services' Household, Income and Labour Dynamics in Australia (HILDA) Survey, managed by the Melbourne Institute of Applied Economic and Social Research. It provides unit record data for 7 245 households and 13 041 individuals.

All net wealth and income data used in this paper are based on actual responses, and imputed data where some response components were missing, as provided by the Melbourne Institute.

Variable definitions

Mnemonics in brackets refer to the HILDA codes.

Age: of the household reference person in years;[12] linear and quadratic terms. (BHGAGE)

Business wealth: net equity held in a business (in $'000s); linear and quadratic terms. (BHWBEIP–BHWBEIN)

Casual worker: a dummy variable which takes the value 1 if the household reference person is employed on a casual basis and 0 otherwise. (BJBCASAB)

Ever unemployed: a dummy variable which takes the value 1 if the household reference person has ever been unemployed and 0 otherwise. (BEHTUJ)

Income: household income (in $'000s); linear and quadratic terms. (BHIFEFP–BHIFEFN)

Labour force status: dummy variables for the household reference person's employment status being part-time employee, unemployed, not in the labour force but not retired, retired, or self-employed. The reference category varies between models, as insignificant categories were excluded. (BESDTL and BESEMPST)

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[12] The household reference person was chosen from the household members as the person with the highest income, highest salary, labour force status, age and respondent number, in that order.

Marital status: dummy variables for the marital status of the household reference person being married, separated, divorced, de facto, widowed, or never married and not de facto (referred to as 'single'). The reference category varies between models, as insignificant categories were excluded.[13] (BMRCURR)

Net wealth: household net wealth, less housing and business equity,[14] (in $'000s); linear and quadratic terms. (BHWNWIP–BHWNWIN+BHWTPEIP–BHWTPEIN+BHWBEIP–BHWBEIN)

Number of adults: number of persons aged 15 years or over in the household. (BHHADULT)

Number of children: number of children aged 14 years or under in the household. (BHH0_4+BHH5_9+BHH10_14)

Own business: a dummy variable which takes the value 1 if a household member owns business assets (with a positive value) and 0 otherwise. (BHWBUSVI)

Own home: a dummy variable that takes the value 1 if the household owns their own home or is in a rent-buy arrangement and 0 if they rent it or have life tenure. (BHSTENR)

Post-secondary educated: a dummy variable which takes the value 1 if the household reference person has completed a post-secondary school qualification and 0 otherwise. (BEDHIGH)

Previous owner: a dummy variable that takes the value 1 if a household which currently owns their own home had previously owned another home and 0 otherwise.[15] (BHSPOWN)

Region: dummy variables for different states/territories of residence and for the major statistical regions of the capital cities for the five largest states. The reference category is the Sydney statistical region. (BHHMSR)

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[13] Alternatively, the variable indicating household type (couples with and without children, single parent, or lone person) could be used (BHHRIH). However, it is highly collinear with the variable on marital status in combination with the number of children in the household.

[14] See Footnote 4 for justification for this treatment.

[15] One 'refused/not stated' case was assigned the value 1.

Time employed: total time spent employed by the household reference person (in years); linear and quadratic terms.[16] (BEHTJB)

Time unemployed: total time spent unemployed by the household reference person (in years).[17] (BEHTUJ)

Total property value: self-reported value of total property assets (in $'000s). This is set to 0 if the household does not own any property. (BHWTPVI)

Value of own home: self-reported value of home (in $'000s). This is set to 0 if the household is renting. (BHWHMVAI)

Figures 1 to 3 were created using data weighted by the household population weights (BHHWTH). However, the estimation of the econometric models and Figures 4 to 7 used unweighted data, since it is not clear whether the weights, which are derived to ensure representativeness for the total population in a number of demographic dimensions, would be appropriate for our specific econometric model.

[16] Of the 37 responses that were recoded as zero, 35 were 'not asked', 1 'don't know' and 1 'implausible value'.

[17] Of the 74 responses that were recoded as zero, 71 were 'not asked', 1 'don't know', 1 'refused/not stated' and 1 'implausible value'.

Appendix B: Econometric Methodology

In Section 3.1, the two-part model was briefly introduced. Here, this framework is introduced more formally and the reasons for its choice are discussed.

As noted in Puhani (2000), the two-part model can be formally represented by

$$y_{1i}^* \mid y_{2i}^* > 0 = \mathbf{x}_{1i}'\beta_1 + u_{1i} \tag{B1}$$

$$y_{2i}^* = \mathbf{x}_{2i}'\beta_2 + u_{2i} \tag{B2}$$

$$y_{1i} = \begin{cases} y_{1i}^* & \text{if } y_{2i}^* > 0 \\ 0 & \text{if } y_{2i}^* \leq 0 \end{cases} \tag{B3}$$

In principle, y_1 is the observed variable, while y_1^* and y_2^* are unobserved. Equations (B2) and (B3) together are a model of a binary choice as to whether the observed variable is positive or zero, which can be estimated using a probit model. Equation (B2) represents the modelling of the latent variable for y_1, namely y_1^*, *conditional on* y_1 *being positive*. As such, this part of the model can be estimated by applying OLS estimation to the sub-sample over which the observed variable is positive.

The conditioning in the second part of the model specification distinguishes the two-part model from the widely-used selection model due to Heckman (1976, 1979). The latter allows the whole population's behaviour to be assessed, rather than just the sub-sample. However, since it is actual behaviour that this paper seeks to model, it can be argued that the conditional expectation is of more interest than the unconditional expectation.[18] While marginal effects are able to be determined from the Heckman model, the two-part model provides these in a more direct manner.

Apart from the interpretation arguments in favour of the two-part model, there are some technical grounds on which it is preferable to the selection model. Despite the Heckman selection model's popularity in the literature, some deficiencies have been identified in its application. As noted by Leung and Yu (1996) and Puhani (2000), the Heckman selection model is susceptible to collinearity problems between the explanatory variables in the value equation and the inverse

[18] This is an argument similar to that made in Duan *et al* (1983) with regard to health care expenditures.

Mills ratio. Leung and Yu (1996) suggested, on the basis of Monte Carlo simulations, that serious collinearity problems may exist if the condition number of the matrix of explanatory variables (including the constant) and the inverse Mills ratio exceeds 20.[19] If this is the case, the two-part model would be preferred to the Heckman selection model, since the Heckman model estimates tended to be unstable and performed much worse than the two-part model. This holds even in the case where the Heckman selection model is the 'true' model for the data. It also accords with Puhani's (2000) suggestion that if collinearity problems are present, the two-part model may be the most robust and simple-to-calculate estimator.

To confirm the validity of the two-part modelling approach, the condition number test was applied to the four groups of models after using the variables from the preferred two-part model specifications to estimate selection models.[20] For all four models, the condition number exceeded 20, thus supporting the decision to use the two-part model. It was surprising, however, that, when estimating the selection models using full information maximum likelihood, only the ownership-value models showed significant selection effects, while the gearing-leverage models suggested there was no selection effect.

Puhani (2000) also documents that the estimated coefficients of the Heckman selection model are sensitive to violations of the assumption of bivariate normality of the error terms.[21] While semi-parametric and non-parametric procedures have been developed for estimating selection models without the need for strong distributional assumptions, the two-part model has the advantages of interpretability and simplicity of estimation.

Other techniques could also be used to examine the questions addressed in this paper. Manrique and Ojah (2003) use an endogenous switching regression model to examine primary and secondary home ownership and expenditure. Although the ownership decisions may be linked, the motives for holding other residential

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[19] This condition number test is based on the test developed for OLS regressions by Belsley, Kuh and Welsch (1980).

[20] For the purposes of the condition number test, the selection models were estimated using Heckman's two-step procedure, in line with Leung and Yu (1996).

[21] This was another reason cited by Duan, Manning Jr, Morris and Newhouse (1983) for preferring the two-part modelling strategy for examining health care expenditures.

property appear to differ between Spain and Australia. The authors note that for Spain the ownership of second residences is likely to be for consumption purposes as holiday homes. For Australia, other residential property appears to be more widely used for investment purposes. Because of these differences, and due to the greater simplicity of the framework, the choices of owning the different types of property were estimated separately.

Appendix C: Detailed Econometric Results

This Appendix contains the more detailed results of the regressions underlying Tables 1 to 4 and are presented in Tables C1 to C4. We considered all variables listed in Appendix A as potential explanatory variables in all the models, except for 'Region', 'Own home', 'Previous owner', 'Value of own home' and 'Total property value'. These were only considered in some of the models based on economic reasoning.

Other factors were considered as potential explanators, such as the structure of the household, the remoteness of the location where the household lives, the country of birth of the household reference person, the first language spoken by the household reference person, the occupation of the household reference person and the health status of the household reference person. But they either were statistically not significant or were highly collinear with other variables of major economic interest.

We also examined the robustness of the models to alternative specifications. The results seem to be robust to the inclusion of insignificant variables in the model. As would be anticipated, some coefficients change slightly with changes to the model, such as linear terms when a quadratic term of the same variable is removed or when the reference base for a set of dummy variables changes. Of the other substantial changes in the results, the magnitudes of the coefficients of the age terms in the models where they are insignificant – the two property value equations – appear to be influenced by the removal of the time employed and marital status variables. For the home value equation, the exclusion of the (insignificant) squared wealth term also results in the linear age term halving. Also for the home value model, the part-time employee coefficient doubles with the exclusion of the casual worker variable. This reflects that around half of all reference persons who are casual workers also work part-time.

In terms of the model reduction process, we used a general-to-specific modelling approach where variables were dropped sequentially if they were insignificant at the 10 per cent level of significance. There were some modifications to the basic rule, whereby an insignificant linear term was retained if the quadratic term was significant. We also retained both the linear and quadratic terms even if both were insignificant so long as they were for a variable of special interest, such as age, income or net wealth. Control variables, such as the region dummy variables, were

only included if they substantially improved the fit of the model. For instance, the region dummy variables were only included in the home value model, because they seemed to capture the effect of house prices being much higher in the Sydney region than elsewhere in the country.

Table C1: Home Ownership and Value of Property Holdings

	Ownership		Value ($'000)	
Variable	Coefficient	Z-score	Coefficient	t-ratio
Age	0.042***	4.92	0.568	0.42
Age^2/100	–0.029***	–3.63	–0.824	–0.63
Income	0.004***	5.73	0.406***	3.48
Income^2/1000	–0.004***	–4.83		
Net wealth	0.001***	6.31	0.184***	5.50
Net wealth^2/10000	–0.002***	–4.91		
Own business	0.130**	2.20		
Business wealth			0.162***	3.55
Business wealth^2/10000			–0.224***	–4.15
Previous owner			58.663***	9.07
Number of adults	0.200***	7.03	21.370***	4.34
Number of children			8.741***	2.75
Marital status				
Married	0.480***	10.49		
De facto	–0.106*	–1.70	–16.799*	–1.81
Separated			–41.057***	–3.43
Widowed	0.589***	7.07		
Labour force status				
Part-time employee	0.111*	1.69	23.096**	2.42
Unemployed	–0.257***	–2.63		
Not in labour force	–0.183***	–2.69	42.229**	2.49
Retired			28.697*	1.79
Self-employed			59.574***	5.31
Casual worker	–0.189***	–2.89		
Time employed	0.035***	6.05		
Time employed^2/100	–0.044***	–4.49		
Ever unemployed	–0.138***	–3.04	–21.522***	–3.38
Time unemployed	–0.025**	–2.21		
Post-secondary educated	0.122***	3.28	30.860***	4.59
Region (12 dummies)			***	75.44
	Number of observations	7 227	Number of observations	4 947
	Pseudo-R^2	0.24	R^2	0.34
	Wald test	1 566.67	F-test	54.72

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively. Test statistics shown are calculated using robust standard errors (by the Huber-White method) and are for tests of individual coefficients, except for the 'Region' variables where the joint significance of the 12 dummies is tested using an F-test. Net wealth in these models is non-housing, non-business wealth.

Table C2: Gearing Decisions of Owner-occupier Households

	Hold debt		Gearing ratio (per cent)	
Variable	Coefficient	Z-score	Coefficient	t-ratio
Age	–0.048***	–12.29	–1.334***	–4.14
Age^2/100			0.774**	2.03
Income	0.007***	5.49	0.028**	2.13
Income^2/1000	–0.008***	–2.62		
Net wealth	–0.001***	–8.95	–0.012***	–3.21
Net wealth^2/10000	0.002***	6.25		
Business wealth	–0.001***	–3.54	0.005**	2.10
Business wealth^2/10000	0.004***	2.64		
Home value			–0.031***	–8.07
Number of adults	–0.156***	–4.67	–2.414***	–3.21
Number of children	0.053*	1.75		
Marital status				
Married	0.736***	8.11	3.673**	2.26
De facto	0.734***	5.95	9.045***	4.12
Separated	0.785***	5.87	7.824**	2.35
Divorced	0.596***	5.42		
Widowed	0.451***	3.12		
Labour force status				
Part-time employee			–8.302***	–4.18
Not in labour force	–0.405***	–3.97		
Retired	–0.527***	–5.52	–11.078***	–3.38
Self-employed			–3.497*	–1.95
Casual worker	–0.250***	–2.92		
Time employed	0.031***	3.40		
Time employed^2/100	–0.057***	–3.28		
Post-secondary educated	0.107**	2.02		
	Number of observations	3 953	Number of observations	1 952
	Pseudo-R^2	0.38	R^2	0.20
	Wald test	1 202.16	F-test	37.45

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively. Test statistics shown are calculated using robust standard errors (by the Huber-White method) and are for tests of individual coefficients. Owner-occupier households exclude those who also own other residential property. Net wealth in these models is non-housing, non-business wealth.

Table C3: Investment Property Ownership and Value of Holdings

	Ownership		Value ($'000)	
Variable	Coefficient	Z-score	Coefficient	t-ratio
Age	0.042***	5.10	1.742	0.54
Age^2/100	–0.033***	–3.90	–1.614	–0.51
Income	0.006***	6.80	0.766***	2.62
Income^2/1000	–0.008***	–3.91		
Net wealth	0.001***	6.77	–0.030	–0.43
Net wealth^2/10000	–0.001***	–3.58	0.614***	2.69
Own business	0.195***	3.54		
Business wealth/1000	0.137**	1.99	278.450***	2.90
Business wealth^2/1000			–0.032***	–3.35
Own home			–137.382***	–3.89
Value of own home			0.511***	4.73
Previous owner	0.230***	5.44		
Number of children			–15.087**	–2.02
Marital status				
Married	–0.090*	–1.89		
Divorced	–0.261***	–3.27		
Widowed	–0.324***	–3.24		
Retired	–0.300***	–3.89		
Ever unemployed	–0.093*	–1.68	–27.540*	–1.71
Time unemployed	–0.059***	–2.88		
Post-secondary educated	0.095**	2.31		
	Number of observations	7 227	Number of observations	1 225
	Pseudo-R^2	0.12	R^2	0.40
	Wald test	725.77	F-test	9.63

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively. Test statistics shown are calculated using robust standard errors (by the Huber-White method) and are for tests of individual coefficients. Net wealth in these models is non-housing, non-business wealth.

Table C4: Gearing Decisions of Investment Property Owners

	Ownership		Value ($'000)	
Variable	Coefficient	Z-score	Coefficient	t-ratio
Age	–0.032***	–4.63	–0.681***	–8.07
Income/1000	5.536***	3.93	–0.211	–0.01
Income^2/1000	–0.009***	–3.43	0.028	0.31
Net wealth	–0.001***	–5.29	–0.009***	–3.02
Net wealth^2/10000	0.001***	3.18	0.013***	3.43
Previous owner	0.271***	2.90		
Own home			–13.428***	–4.96
Total property value/1000	0.159*	1.84	–7.727***	–4.78
Number of adults	–1.101***	–1.95		
Marital status				
Married	0.489***	3.53	6.950***	2.79
De facto	0.616***	3.14	7.661**	2.39
Separated	0.422*	1.87		
Divorced	0.378*	1.82	11.085**	2.56
Labour force status				
Part-time employee	–0.266*	–1.85		
Unemployed	–0.744**	–2.21		
Not in labour force	–0.403**	–2.00	–9.684***	–2.78
Retired	–0.935**	–5.42		
Time employed	0.052***	3.24		
Time unemployed^2/100	–0.097***	–3.52		
	Number of observations	1 225	Number of observations	840
	Pseudo-R^2	0.28	R^2	0.21
	Wald test	262.67	F-test	28.46

Notes: ***, ** and * denote significance of the coefficient at the 1, 5 and 10 per cent levels respectively. Test statistics shown are calculated using robust standard errors (by the Huber-White method) and are for tests of individual coefficients. The holding of debt in this model refers to owner-occupied debt, other property debt or both. Net wealth in these models is non-housing, non-business wealth.

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