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Factors shaping the decision to become a landlord and retain rental investments

authored by

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ACRONYMS

AHURI-3M	Australian Housing and Urban Research Institute Housing Market Microsimulation Model
DCLG	Department of Communities and Local Government
FaHCSIA	Department of Families, Housing, Community Services, and Indigenous Affairs
HILDA	Household, Income and Labour Dynamics in Australia Survey
MCP	Market Conditions and Portfolio
MIAESR	Melbourne Institute of Applied Economic and Social Research
NRAS	National Rental Affordability Scheme
PCA	Personal Characteristics and Attitudes

EXECUTIVE SUMMARY

The key research question addressed in this report is:

> What are the factors that help shape whether a person will become a landlord and, once a person has decided to become a landlord, the duration of their investment in the private rental housing market?

The supply of private rental housing has become more prominent in the debates around affordable housing as house prices have increasingly gotten out of the reach of prospective home owners, and rents have spiralled in rental housing. There is a concern that private rental markets are failing on the supply side due to principal-agent problems, taxation measures and regulations. In this project, we explore the role of different variables in shaping the supply decisions of private rental investors. This exploration will shed insights on how policy initiatives such as tax measures will impact on the economic costs of landlords, and how this will in turn affect their propensity to hold onto property investments.

The analysis is conducted using waves 1 to 6 of the Household, Income and Labour Dynamics in Australia (HILDA) Survey, covering the period 2001 to 2006. The HILDA Survey tracks a nationally representative sample of Australian households over time, allowing us to observe Australians who become landlords and the duration of their rental investments (holding periods). The sample comprises adult individuals with complete records from waves 1 to 6. Our approach involves the construction of measures of landlord after-tax economic costs (their user cost of capital) that are then used in one panel model and two cross section models to explore the role of various variables in shaping the supply decisions of rental investors.

We first track the sample of rental investors from the start of their first spell of rental investment, through to the end of the data collection period. We find that:

- One in four investors exit within a year. For the tenant that places a high value on a secure residential address, there appears to be a worryingly high probability (25%) that they will need to search for alternative housing opportunities within 12 months.
- After year one there is a steep decline in the rate of exit from the rental property market. Hence, there appears to be a second group of investors that 'stay the course', and are a source of secure accommodation.
- The evidence suggests that younger, negatively geared investors, with relatively low levels of income and human capital are more likely to realise property investments at any point in a spell of rental investment.

We employ regression modelling techniques to help us to unravel causal links. First, we estimate a probit model of whether 2002 investors survive or exit the market by 2006 as a function of their personal characteristics and financial variables. We find that, in general, the personal characteristics and attitudes of investors do not influence decisions about when and whether to realise property investments. Retirement status is an important exception. However, financial variables do matter:

- The gross rental yield has a statistically significant negative effect; since properties with higher gross rental yields typically have lower expected rates of capital gain, it would seem these expectations persuade some investors to realise their property investments.

- → An after-tax economic cost (user cost) variable is even more influential; its negative impact implies that higher after-tax economic costs eat into returns and persuade many investors to exit the market.
- → Negatively geared investors are more likely to exit the market. These investors might be churning in and out of rental properties. While this can adversely impact on tenants because their housing circumstances become more precarious, the supply of rental housing may be more responsive to changing market conditions with potential efficiency gains.

The propensity of investors to hold on to their rental properties is one dimension of the supply of rental housing. A second equally important dimension is the decision to invest in rental property. All the financial variables other than inheritance are statistically significant in an unordered probit model of the propensity to invest:

- → The most important driver of rental investment behaviour is a person's after-tax economic costs (user cost of capital).
- → Superannuation and rental housing are substitutes in wealth portfolios, but the substitution effect is weak, so that growing superannuation balances in the future are unlikely to threaten rental housing supply. There are important caveats to this conclusion (see below).
- → Unsecured debt restrains plans to invest in rental housing as lending criteria become more difficult to meet, but again this variable has modest effects.
- → In summary, our findings portray the typical investor as a middle aged high tax bracket individual with modest superannuation, little unsecured debt and a continuous employment record.

We estimate a sub-tenure choice model which postulates that we all have a consumption demand for housing, to meet shelter and comfort needs, and an investment demand for housing as an asset that forms part of a balanced wealth portfolio. Australians with a consumption demand that is high relative to their investment demand for housing will rent, and continue to do so as long as the consumption demand exceeds investment demand. As their investment demand converges on the consumption demand for housing, as might eventuate when more wealth is accumulated over the life course, so households reach a threshold that tips them into home ownership. When investment demand exceeds consumption demand by a large margin, households will have more than satiated their consumption demand, and meet their additional investment demand by investing in rental properties. This theoretical model prompts estimation of an ordered probit model. Once again we find that financial variables, and in particular the user cost of capital, are statistically significant and in the case of the user cost variable, quantitatively large. The key difference with the non-ordered probit model is the new evidence that demographics, attitudes and saving behaviour do matter. These findings largely confirm the hypotheses put forward in Seelig et al (2009).

The results presented in this report prompt some important questions for future research. First, the importance of user cost of capital is an important policy finding because it is clear that changes to policy that impact on the user cost measure could have major effects on the propensity to invest, and the willingness of landlords to remain in the market. Monetary policy will therefore have potentially significant impacts and hence strong cyclical patterns to rental investment can be expected. But we should also note that both federal and state governments set tax parameters that will determine landlord user costs. Confidence in these policy implications would be further strengthened if corroborated by alternative methods of estimation such as time

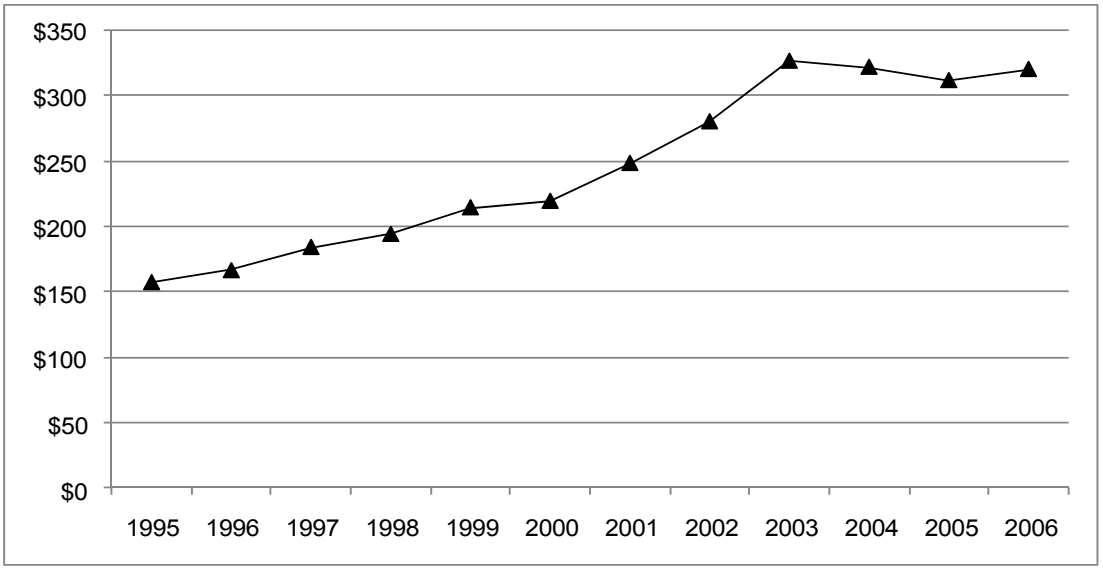
series models. Second, retirement status is evidently an important influence shaping decisions about the propensity to invest as well as the timing of (dis-) investments. There is some evidence to support the proposition that pension asset tests are prompting retired investors' realisation of rental property investments. But future research needs to 'unpack' this finding if we are to arrive at a richer interpretation. The charting of portfolio decisions and changing spending patterns that older Australian landlords choose as they make transitions into retirement, would help us to unravel these hypotheses. Third, we detect only weak substitution effects between superannuation and rental housing wealth. However, further research is desirable because our study timeframe is not contemporary enough to capture more recent policy changes, a problem that is exacerbated by lagging our financial variables to address endogeneity issues in the modelling. Finally, the sub-tenure choice model is a promising approach to household portfolio decisions about property, but it is derived from a theoretical framework that explains the circumstances motivating individuals to invest in property other than their primary residence. It offers no insights into whether these additions will be in the form of rental housing or holiday homes that might be periodically leased to other holiday makers, but are primarily used by the owners for vacation purposes. We know little about these types of decisions. The increasing numbers of Australians investing in holidays homes, and the potentially important adverse impacts on affordable housing in regional markets, warrant further investigation.

1 INTRODUCTION

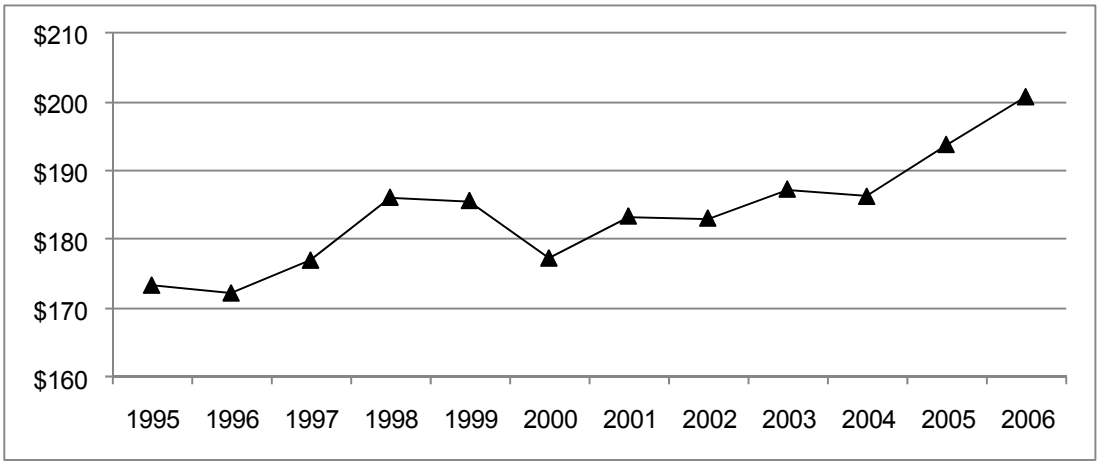
The supply of private rental housing has become a more prominent dimension of the debate around affordable housing as house prices have spiralled out of the reach of prospective home owners and the rents tenants pay have surged. Figure 1 shows how the real median house prices and rents faced by Australians have risen over the period from 1995 till 2006. Real house prices rose gradually from $150,000 to around $210,000 between 1995 and 2000, but accelerated between 2000 and 2003, breaking through and remaining at over $300,000 from 2003. In 2006, the real median house price of $320,000 was about double its level in 1996 ($167,000). The real median weekly rents of three-bedroom houses (which make up the majority of Australia's housing stock), showed two distinct periods of inflation, the first from 1995 till 1998, and the second from 2000 to 2006. Nonetheless, on average, real weekly rents have been creeping upwards from around $170 to $200 over the period as illustrated in figure 1.

Figure 1: Real house prices and rents, 1995–2006, all capital cities

(a) Real median house prices, 1995 thousands of dollars



(b) Real median weekly rents of three-bedroom houses, 1995 dollars



Source: Australian Bureau of Statistics (2008), Real Estate Institute of Australia (2008a; 2008b)

There is a concern that private rental markets are failing on the supply side (Yates and Wulff, 2000; Wulff et al., 2009), due to principal-agent problems, taxation measures and regulations. These market imperfections are believed to be particularly influential in the low cost (low rent) segment of private rental housing markets:

- Asymmetric information such that landlords must incur non-trivial costs to screen prospective tenants has uneven market consequences if agency problems (payment default, property damage and so on) are more severe in low rent segments. [1]
- Tax preferences are well known as a pervasive influence in housing markets. The asymmetric tax treatment of rental income and capital gains can be the source of investor clienteles in rental housing. In clientele models, market equilibrium produces a cluster of investors by tax characteristics. Low tax bracket investors are concentrated in low value rental housing, which attract rents that are high in relation to property values. On the other hand, only high tax bracket investors will be observed in high value rental housing, and they charge rents that are low in relation to property values (Wood and Tu, 2004). The tax treatment of individual landlords will also impede the entry of corporate investment into private rental housing.
- In recent years, booming house prices (and to a lesser degree rents) have fuelled an interest in how land and building regulations and urban infrastructure charges may be responsible for shortages of affordable housing. From this perspective, government regulation and charges inflate land and construction costs, and push up house prices and rents to levels beyond the reach of low-income households (Glaeser and Gyourko, 2003; Glaeser and Ward, 2006; Ihlanfeldt, 2004).

In this project, we explore the role of different variables in shaping the supply decisions of private rental investors.[2] This exploration will shed insights on how policy initiatives such as tax measures will impact on the economic costs of landlords, and how this will in turn affect their propensity to invest and hold property investments. The entry and exit decisions of landlords is critically important to understand if we are to shed light on the reasons why shortages of affordable private rental housing have become so acute. The approach has particular relevance to the role of taxes (and government charges) in shaping the supply decisions of landlords.

There is a second important motivation. Our data set allows a rare opportunity to study the duration of investment spells—that is the length of time a landlord continues to lease their property before either selling up or moving in. Commentators express concern about the insecurity of tenure in private rental housing; this is of particular

[1] Consider a market setting in which landlord's asking rent is fixed and tenants differ in terms of the level of care exercised in relation to a landlord's property, and the probability of default on rent payments. This is commonly referred to as 'tenant quality'. The variance in tenant quality is higher in the low rent segment because high rents screen out tenants with low levels of human capital, and marginal attachment to the labour force. The value of expected tenant quality will rise with time on the market, and the rate of increase will be a positive function of the variance in expected tenant quality. Low rent apartments will be likely to register the greatest gains in tenant quality from time on the market. Low rent landlords will then employ more stringent screening mechanisms, and be prepared to sample more tenant offers in the search for higher tenant quality. Here we have one potential explanation for the puzzling coexistence of high vacancy rates among low rent properties (see Wood, Yates and Reynold, 2006), high and rising waiting lists for public housing and evidence of increasingly severe shortages of affordable rental housing. Models that explore similar ideas can be found in Miceli (1989), Benjamin, Lusht and Shilling (1998).

2 An important limitation of the data set is its focus on individuals. Thus corporate landlords are not examined, though the large majority of landlords are private individuals. We return to the issue of corporate investment in the concluding section of the report.

concern to the elderly, who often wish to 'age in place', and families, where stability with respect to child care and schooling arrangements is thought to be especially important. These concerns may be exaggerated if landlords typically hold on to their investments for many years. Perhaps private rental housing offers a more secure form of accommodation than is commonly thought to be the case? Maybe the higher mobility patterns that we observe among tenants are the product of their relative youth and other personal characteristics, rather than the termination of leases as temporary landlords exit their investments? We explore these ideas by modelling the investment spells of a sample of landlords.

1.1 Key Research Question and Method Overview

The key research question addressed in this report is:

> What are the factors that help shape whether a person will become a landlord and, once a person has decided to become a landlord, the duration of their investment in the private rental housing market?

We are particularly interested in the role that tax factors and retirement play in these decisions. Negative gearing has been a controversial topic for many years, but quantitative estimates of its impact on the supply side of the housing market are rare (see Babcock and Browett 1991 for one example). The approach of retirement and withdrawal from the labour force is also believed to be important (see Seelig et al., 2009). This is in part thought to be because rental investments are included in the asset test used for determining eligibility and entitlement to the Age Pension, but might alternatively reflect consumption smoothing motives, as well as concerns about portfolio balance, especially the proportion of wealth that is held in liquid assets.

Our approach involves the construction of measures of landlord after-tax economic costs (constructed using AHURI-3M) that are then used in one panel model and two cross section models to explore the role of various variables in shaping the supply decisions of rental investors. This cost measure, commonly referred to in the economics literature as 'user cost', is an important variable in determining Australians' housing decisions (Bourassa, 1995 and 1996; Bourassa and Yin, 2006; Hendershott et al., 2009). It includes both the operating costs associated with supplying rental housing—that is maintenance, repairs, management and so forth—as well as capital costs where these are defined on an after-tax basis and include the costs of servicing debt and the opportunity cost (income foregone) associated with the equity stake held in the rental property.[3]

The panel model uses a sample of landlords drawn from the HILDA Survey, to estimate the probability of landlords retaining their investments between 2002 and 2006 as a function of their personal characteristics and financial variables, including their after-tax economic costs (user costs) as investors. Changes to policy settings will alter landlords' economic costs. A cross-section model of the probability of being a landlord is also estimated using a similar set of variables. It can also be used to explore whether variables that can be influenced by fiscal and monetary policy instruments have supply side impacts in the private rental housing market (see section 4). Finally a sub-tenure choice model is estimated that extends a research program originally led by Gavin Wood [4] for the Department of Communities and Local Government (DCLG) in the United Kingdom, on factors shaping the decision to own property as well as the decision to become an investor (Wood, Fry and Mihajilo,

[3] A detailed discussion of the user cost concept in the Australian context can be found in Wood and Watson (2001).

[4] RMIT University colleagues Tim Fry and Sandra Mihajilo were also involved in this project.

2007). A sub-tenure choice model overcomes the limitations of traditional tenure choice models where the decision to own a home is usually analysed independently of decisions to invest, that is, the sample is traditionally divided into either homeowners and renters only. In a sub-tenure choice model, the sample is divided into three categories—homeowners with no other property, homeowners with other property (investors) and renters. This allows housing consumption and investment decisions to be analysed simultaneously.

1.2 What Do We Already Know?

Our knowledge of the motives prompting investment in rental housing in Australia has been substantially augmented by the qualitative research conducted by Seelig et al. (2009) for the Australian Housing and Urban Research Institute. This is one of the few studies to have investigated non-financial motives in a rigorous fashion. Their survey findings confirm those of Kemp and Rhodes (1997), who found from a survey of landlords in Scotland that they are typically very different from the rational profit maximising investors depicted in conventional microeconomic theory. Landlords do not see their properties as a commercial investment on which they wish to obtain an economic return. The qualitative evidence reported in Seelig et al. (2009) suggests that the following personal circumstances and attitudes feature as factors of importance in shaping decisions to invest and/or decisions to realise investments in rental property.

1.2.1 Personal Characteristics and Attitudes

Children

A motive can be the prospect of a future home for parents' children. The rationale here is that investors with children are less likely to continue to invest because, as their children reach adulthood, they transfer their property to them, or sell up and use the equity to assist their children into homeownership. Our modelling captures this reasoning by including a variable representing number of children in one of four age bands, so that the omitted category is investors with no children. The variable includes children regardless of whether they are dependents.[5]

Age and Retirement

In interviews with researchers, numerous investors claim that they are embarking on a plan of wealth creation, developing long-term financial security and building an asset base through capital gains or rental return, and thereby securing future retirement income. This thinking is formalised in the life cycle model of consumption and saving. It posits that households will seek to smooth consumption in old age by saving and accumulating assets during their working lives, and drawing down on these assets once retired (Kohler and Rossiter, 2005).

Throughout the Seelig et al. (2009) report, retirement is cited as an important factor. The following are some of the responses voiced during the course of in-depth interviews:

– Those 'at' retirement age are reluctant to invest in shares because returns would not be received in the time frame they wanted. That is, dividends are not received weekly, while rent income is, and so rental income is suitable to meet weekly expenses. It might also be the case that regular receipt of rental income is needed in order to meet payments on a mortgage (Seelig et al. 2009, p.37). If borrowing is also needed to invest an equivalent amount in shares, the half yearly receipt of dividends would make

[5] A detailed description of variable measures can be found in table 2 below.

such an investment choice impractical for those needing a regular income in order to meet loan payments. It is worth noting here that very few investors leverage shares, yet leverage of property is common. We might then expect that *among those with wealth that is sufficient to allow investment in a range of assets*, high income individuals are more prepared to invest in shares, while low-income people are more likely to invest in property. These are considerations relevant to models explaining who becomes an investor, and we capture them by including variables that measure wealth and its composition in our model specifications.

– Some investors are very specific that rental income would be financing their retirement, and we would expect such people to hold on to rental investments. Note, however, that rental investments are not exempt under the pension assets test. If, as retirement approaches,or the investor has retired, the asset test is binding, there will be an incentive to realise investments and put the proceeds into an exempt asset such as owner-occupied housing or superannuation (Seelig et al, 2009, p.65). On the other hand, some investors are holding on to rental investments to move into on retirement.

The imminence of and transition into retirement is clearly important, but it is going to be difficult to disentangle the various causal channels. Age and retirement are included in our models via two variables. A continuous age variable and a retirement age dummy variable that equals 1 if the person is aged 65 years or older, zero otherwise.

Windfall Gains and Changing Personal Circumstances

According to respondents, windfall receipts (e.g. bequests, inheritance/gifts) and changes in personal circumstances (e.g. divorce and re-partnering) can be closely associated with investment and disinvestment. Inheritance can result in the 'accidental' landlord, who inherits property and leases that property without ever having considered rental investment as part of a deliberate wealth accumulation strategy. In Kemp and Rhodes' (1997) survey of Scottish landlords, 40 per cent are found to have inherited their property.[6] Another type of accidental landlord arises when a home buyer purchases from a landlord and the property is occupied by a sitting tenant, and the purchaser allows the tenant to 'see out' the term of the lease. In both cases we might expect accidental landlords to be temporary investors because they will have a preferred level and composition of wealth that they wish to hold, and this preferred choice can only be reached by selling up.

Abrupt changes in personal circumstances can also be associated with major changes in the size and composition of wealth portfolios. Divorce, for example, requires the division of assets, and this might well require couples to sell a rental investment. Furthermore, couples are perhaps more likely to own investment property because they can pool resources—two income streams are less risky than one (Kohler and Rossiter, 2005). Our HILDA data source allows measurement of marital status, and the sources of income data identify income from inheritance as a source.

Attitudes to Risk and Saving

Property investment appeals to the risk averse because it is perceived as a low risk tangible asset that can be consumed by moving in and using it as a principal residence. The appeal of housing as a secure asset might be buttressed by a belief

[6] O'Dwyer (1999, table 1) shows that 63.5 per cent of a 723 dwelling sample of properties inherited by Australians are sold immediately by beneficiaries; 175 or 24.2 per cent of these beneficiaries become 'accidental' or unintentional landlords. She had expected a higher proportion of immediate sales because beneficiaries' are exempt from capital gains tax provided they sell within 12 months.

that housing assets are a hedge against inflation (Shroder, 2001). Property's real returns are also believed to have lower mean and variance than stock and bond returns (Norman et al., 1995), a feature that is attractive to the cautious investor.

Property investment also attracts the 'unsophisticated investor' as it is familiar, 'bricks and mortar' that does not require the economic or financial knowledge that shares, bonds and more sophisticated financial investments might require. We use possession of a life insurance policy as a proxy for risk aversion, but also employ attitude variables in the HILDA survey that elicit attitudes to saving and investment risk. There are also education qualification variables that might distinguish between the sophisticated and unsophisticated investor, but they have another interpretation as they reflect human capital and therefore the long run earnings potential of the person, as well as the riskiness of their employment and income (Kohler and Rossiter, 2005). King and Leape (1998) find that the probability of ownership of an asset type group that includes real estate is increased by human capital (education, occupation) variables.

1.2.2 Financial Drivers and Market Conditions

Economic models of personal investment decisions tend to emphasis the after-tax returns to alternative investments and the composition and size of personal net wealth (Shroder, 2001). This 'view of the world' assumes that there are essentially three motives governing investment decisions. First, whether the net return from rental investments is higher than alternatives; second, the liquidity of the asset that is the vehicle for investment and accumulation of savings, and third, the perceived risk. The Seelig et al. (2009) study uncovers important information about key parameters closely related to these motives:

Capital Gain

The expectation of capital gains is an important influence or attraction for investors—those expecting healthy capital gains are more likely to retain investment properties. Capital gain is found to be one of the strongest motivating factors in the Seelig et al. research report. There is reported to be an almost 'universal' belief that if you hang on to the property long enough, a capital gain will eventuate; 'Capital gain will double (the value of your property) in ten years' is a common expectation.

Properties that have low current gross rental yields will tend to have higher expected capital gains (Clark, 1995). The rationale here is that market competition will equalise rates of return across market segments; if there are segments with relatively low gross rental yields, this must reflect high expected capital gains and a healthy interest from investors who forced down yields as they competed to acquire properties in these market segments. Capital gains are particularly attractive to investors because they are lightly taxed by comparison to rental yields. Our models of investor survival in rental property markets include gross rental yield and it is expected to have a negative impact—investors are less likely to hold on to properties where relatively low capital gains are expected.

Negative Gearing

Negative gearing is 'an added bonus' but respondents in the qualitative evidence cited by Seelig et al. (2009) seemed evenly divided on whether they would have invested in the absence of negative gearing. The research report notes that negative gearing is a deliberate strategy of some investors, who therefore re-purchase on a regular basis to remain negatively geared. We might therefore expect churning by negatively-geared

investors as they refinance in order to preserve tax shelter benefits.[7] Models of investor survival incorporate a variable identifying the negatively-geared status of rental investors.

High tax bracket investors gain more from negative gearing in terms of tax shelter benefits, and we can therefore expect rental investments to be a more attractive proposition for the high bracket person who is prepared to leverage their investment. There is little empirical evidence on the impacts of negative gearing; an exception in Australia is Babcock and Browett (1991).[8] They argue that the downturn following the 1985 tax reforms quarantining negative gearing, and the upturn following their reversal in 1987, was due to 'other' factors. In other words, negative gearing is a marginal influence on private rental supply. Our models of propensity to invest include a measure of user cost that will reflect the tax bracket of an investor, and it serves as a critical test of the hypothesis that propensities to invest will be higher among high tax bracket investors.

User Cost

The returns to an investment will help determine whether an investor acquires an asset to add to wealth portfolios, and will help determine future investment intentions. The investor's user cost of capital is the hurdle rate that gross rental yields must at least equal if a competitive return is to be achieved, and will therefore be a potentially critical variable. Considerable care has been taken to estimate this variable for each adult person in the HILDA sample. It is a key variable in both survivor models of the duration of rental investments, and propensity to invest models that strive to uncover the motives that drive some Australians to become landlords.

Wealth Portfolio and Debt Considerations

Shroder (2001) emphasises the fixed cost of participation in property investment—these are costs that must be met if one is to become a rental investor, and do not vary or vary very little with the amount of investment. Typical examples might be deposits, and transaction costs, such as stamp duty. The implication is that there is some size threshold that wealth portfolios must reach if rental investments are to be an asset in portfolios that command competitive returns. Also relevant is the indivisible nature of property investment that also suggests threshold effects.

The need to diversify investments or spread financial risks is mentioned by some in Seelig et al. (2009) as a motive for investment in property. Those who hold life insurance and have large amounts of wealth tied up in superannuation may therefore be more likely to invest in rental property to balance their portfolios, and be more likely to hang on to their property investments. An alternative possibility, reported in the qualitative research (see p.37, Seelig et al. 2009), is that property investment can be motivated by some Australians' fears that they have insufficient superannuation and private pension balances.

The need to eliminate or pay off debt could be a factor influencing both the capacity to leverage acquisitions of rental property, as well as future intentions. The level of debt that is unsecured or secured to other assets (e.g. business) is then a potentially important variable. Those with high levels of other debt will find it more difficult to raise the capital necessary to acquire rental property investments, and investors with high

[7] But a formal economic analysis offers no rationale for churning. As Wood (2002) demonstrates, the investor's user cost of capital (and hence return) is independent of the loan-to-value ratio.

[8] In the USA, Sanger, Sirmans and Turnbull (1990) used an event history modeling framework and the returns to Real Estate Investment Trusts pre- and post the 1986 tax reforms to explore the impact of similar measures in the USA.

levels of other debt are in more precarious circumstances in the event of unanticipated adverse shocks (e.g. loss of job, business failure); their survival as investors is more threatened as compared to the more conservative investor with little if any other debt to repay.

The models of survival and propensity to invest that we estimate both include measures of gross wealth, superannuation balances and unsecured debt.

2 METHOD AND DESCRIPTIVE STATISTICS

2.1 Sample Design

The analysis is conducted using waves 1 to 6 of the HILDA Survey, covering the period 2001 to 2006. The HILDA Survey tracks a nationally representative sample of Australian households over time, allowing us to observe Australians who become landlords and the duration of their rental investments (holding periods).

The sample comprises adult individuals with complete records from waves 1 to 6. Certain groups of individuals are excluded from the analysis. These include persons belonging to income units with zero or negative gross or disposable incomes, as these outcomes are typically the result of tax minimisation strategies or temporary losses from self-employment that disguise underlying financial positions, residents of non-private dwellings, e.g. nursing homes, boarders and the homeless (for more details on inclusion/exclusion rules, refer to Wood and Ong, 2009).

2.1.1 Identification of Landlord and Rental Property Values

HILDA has a wealth module that is critical to identification of landlords and the values of their properties. While it is possible to identify landlords in every wave of the survey by whether or not they receive rental income, it is only possible to identify rental property values in waves 2 and 6 of the HILDA Survey, which contain special wealth modules that record wealth values held in the form of various asset classes, e.g. primary home, other property, investments etc, as well as debt secured against these assets. Hence, where rental property values are required for the analysis, we utilise only waves 2 and 6 of the Survey.

In waves 2 and 6, individuals are identified as investors if in that wave they are the legal owner of a property other than their principal place of residence, and they earned rental income during the last financial year. 'Other' properties can include holiday homes that are rented out for part of the year. These landlords would have very low rental income to capital value ratios. There are 34 (86) landlords in wave 2 (wave 6) identified as outliers due to extremely low or high rental incomes to capital value ratios. They are deleted from the sample.

The 2002 and 2006 sample numbers are presented in table 1; we also cross tabulate 2002 investor status against 2006 investor status. Among the 6,968 Australians in the sample, 518 (or 7.4%) were investors in 2002. The number of investors increased slightly to 584 (or 8.4%) in 2006.[9] The table also gives an overview of the propensity of landlords to retain their investment; among Australians who were investors in 2002, 255 (49.2%) remained as investors in 2006 There were 263 (51.8%) investors that exited the market by 2006, but 329 Australians became investors between 2002 and 2006; hence there was a net increase of 63 investors. The 329 new entrant investors were the 5.1 per cent of Australians who held no rental property investments in 2002.

[9] Note that this is the number of persons who invested in rental property. Thus, both partners in a couple that jointly own a rental property are classified as investors. The 6,968 sample form 4,103 income units; 412 income units (or 9.1 per cent of all income units) are investors in 2002.

Table 1: Investors sample, 2002 and 2006

Investor status/year	*2006 investors*	*2006 non-investors*	*All*
2002 investors			
N	255	263	518
Row %	49.2	50.8	100.0
2002 non-investors			
N	329	6121	6450
Row %	5.1	94.9	100.0
All			
N	584	6384	6968
Row %	8.4	91.6	100.0

Source: Authors' own calculations from the HILDA Survey waves 2 and 6.

We cannot identify the value of individual properties; investors only report the aggregate value of rental property portfolios. Our measures of rental yield, economic costs, and so on, are based on the rental property portfolio.

2.1.2 Unit of Analysis and Unit of Measurement

The unit of analysis for the presentation of sample characteristics (e.g .table 1) and key findings is the individual. We could use the income unit or household as the unit of analysis, but household formation and dissolution is a complication when conducting panel analysis that can be unhelpful. With no attrition, the number of individuals in a balanced panel will remain the same; the denominator in a measure such as the propensity to invest (in rental property) will be unchanged. If we use income units or households, the denominator will change from year to year as a result of marriage, divorce etc. These household events can then prompt a change in the household propensity to invest in rental property, even though the individual based measure of the propensity to investment is unchanged.

The unit of measurement depends on the nature of the variable. For example, age is measured on an individual basis. However, wealth, a potentially important financial driver of the decision to hold rental investments, is reported on a household basis. We could have divided household wealth by the number of persons living in the household, or used some other formula to arrive at each individual's share of household wealth. But surely household wealth helps determine investment decisions, and so the wealth measure assigned to each individual in the sample is household wealth.[10]

2.2 Variable Measurement

We are particularly keen to discover what motivates landlords to retain their investments and enter or exit the market. The HILDA Survey gives us the opportunity to examine the detailed personal characteristics of investors as well as the financial drivers that might shape their decisions. Table 2 lists the variables that we experiment with in the analyses and describes their measurement. These variables capture the motives that our literature review suggests are important in driving rental investments.

[10] Application of income and asset eligibility tests for benefits, allowances and pensions is an important dimension of the analysis. These are applied on an income unit rather than household basis, so in fact wealth is measured on an income unit basis. See table 2 for details.

Table 2: List of variables/motivators prompting rental investment and duration of rental investment

Personal Characteristics and Financial Drivers	*Variable*[a]	*Continuous or Dummy*	*'Propensity' or 'Survival' Model*[b]
Socio-demographic			
Marital status	Whether a person is continuously married, defacto, separated, divorced, widowed, single never married, or remarried. Separated, divorced and widowed persons are grouped together due to small sample numbers in each group.	Dummy	Both
Number of children	Number of children (resident and non-resident) by the following age bands: 0–4 years, 5–14 years, 15–24 years, 25+ years	Continuous	Both
Human capital			
Education	Bachelor degree or higher, other post-school qualifications and no post-school qualifications	Dummy	Both
Labour market history[c]	Proportion of time in paid work since leaving full-time education Proportion of time unemployed since leaving full-time education	Continuous	Both
Retirement-related factors			
Age	In years	Continuous	Both
Retirement status	Whether a person has already retired	Dummy	Both
Attitude towards risk			
Life insurance	Whether own life insurance	Dummy	Both
Financial risk-taking	Whether unwilling to take financial risks	Dummy	Both
Savings time horizon	Whether savings time horizon is less than one year	Dummy	Both
Saving habit	Whether save regularly each month	Dummy	Both
Financial drivers			
Gross wealth	2002 level of gross wealth/$10,000. The 2002 level is used to address endogeneity problems. In the HILDA Survey, wealth is typically reported on a household basis. Hence, household wealth is apportioned among the income units within the household as follows: → Wealth stored in the primary home is assigned to the income unit owning the home. → Other property wealth is shared equally among non-dependent adults in the household owning property other than the primary home. For a couple income unit, the other	Continuous	Decision

Personal Characteristics and Financial Drivers	*Variable*[a]	*Continuous or Dummy*	*'Propensity' or 'Survival' Model*[b]
	property wealth of the two income unit members are summed to derive income unit other property wealth. → Non-property wealth is shared equally among non-dependent adults in the household. For a couple income unit, the non-property wealth of the two income unit members are summed to derive income unit non-property wealth.		
Superannuation wealth	2002 level of superannuation wealth/$10,000. The 2002 level is used to address endogeneity problems.	Continuous	Both
Non-property secured debt	2002 level of debt not secured by property/$10,000. The 2002 level is used to address endogeneity problems. Debt is assigned to income units using the same rules as wealth.	Continuous	Both
Level of inheritance	Amount of inheritance income received last financial year/$10,000	Continuous	Propensity
Negatively geared status	Whether negatively geared in all waves	Dummy	Survival
User cost[d]	Landlord's after-tax economic costs as a per cent of property value, taking into account after-tax interest on debt, the after-tax return sacrificed on the investor's equity stake in the rental property investment, after-tax capital gains, operating costs of providing accommodation such as meeting rates and utility charges, repairs, property management fees and land taxes, and transaction costs. This is computed using the AHURI-3M housing market microsimulation model (see Wood and Ong 2008 for details). In the survival models, we estimate the impact of landlords' user cost in 2002 on the probability of retaining their rental investment in 2006. In the propensity models, we estimate the impact of user cost in 2006 on the propensity to invest in rental housing in the same year, assuming that operating and stamp duties are zero as these cannot be observed for non-investors.	Continuous	Both
Expectation of capital gains	Gross rental yield in per cent (landlords are prepared to accept lower gross rental yield if they are expecting higher capital gains)	Continuous	Survival

Notes:

a. Other variables that were experimented with but proved to be highly insignificant include:

- the need to diversity the wealth portfolio using the Herfindal index (the sum of the squared values of each asset's share in the total wealth portfolio)
- whether there is an incentive to realise rental investments and put proceeds into an exempt asset as one approaches retirement by estimating whether the Age Pension test would be binding if a person aged 55 or over but under 65 years held onto his/her rental investment
- recent capital gain, measured by the lagged change in rental property value
- ethnicity.

b. The propensity model is a model of the probability of becoming a landlord. The survival model is a model of the probability of a landlord retaining his/her investment.
c. For most of the sample, these variables sum to less than one because of time spent not in the labour force. In the survival (propensity) model, 63 per cent (76%) of the sample spent time not in the labour force since leaving full-time education.
d. A formal analysis of investors' user costs of capital can be found in appendix 1.

2.3 Descriptive Statistics

In this section we compare the personal characteristics of Australian investors with the rest of the Australian population. We ask whether they are old or young, asset rich or poor, heavily indebted or debt free, married or single, highly or poorly educated, continuously or intermittently employed, high tax or low tax bracket investors. These comparisons help to paint a portrait of the typical rental investor in the Australian housing market.

Table 3 below shows that investors are more likely to be concentrated in the middle age range of 35–54 years old in both 2002 and 2006. In both years, over 55 per cent of investors are aged 35–54 years, while around one-third are aged 55 years and over. Not surprisingly, those aged under 35 years are least likely to own rental properties. This is a panel, hence the decline between 2002 and 2006 in the proportion in the under 35 age group. Investors are also more likely to be married and have dependent children than non-investors. They are more likely to already own their own homes; in both years approximately 85 per cent of investors were home owners, compared to under three-quarters of non-investors. [11]

Investors are more highly educated, and more likely to be employed full-time and to have spent a larger proportion of their lives in paid work; over half of investors were employed full-time in both 2002 and 2006, compared to around 40 per cent of non-investors. Investors are then typically concentrated in the higher-income quartiles while other Australians are more or less equally distributed across the income quartiles, with a slightly higher proportion in lower quartiles. Over half of Australian investors belong to the highest income quintile.

There are no discernible differences by country of origin or location of residence; and so we have not listed descriptives for these variables in table 3.

Table 3: Characteristics of investors and other Australians, 2002 and 2006

Characteristic	*Investors in 2002*	*Other Australians in 2002*	*Investors in 2006*	*Other Australians in 2006*
Age band				
Under 35 years	10.6	24.4	9.8	14.9
35–54 years	58.1	42.7	55.0	44.5
55 years and over	31.3	32.9	35.2	40.6
Marital status				
Married	73.6	61.2	73.5	61.9
Defacto	10.2	9.6	8.7	8.5
Separated	3.3	3.7	2.1	3.6
Divorced	4.4	7.1	6.2	8.2
Widowed	2.3	6.2	3.3	8.0
Single, never married	6.2	12.1	6.3	9.9
Presence of dependent children				
Have dependent children	41.9	38.3	46.4	37.6

[11] The 15 per cent of rental investors that do not own their primary place of residence are typically high income earners, with over half of these investors in the top gross income quintile, and around three-quarters employed full-time, and two-thirds being managers, professionals or associate professionals. The data suggests that these investors are mobile individuals in high status occupations; over 29 per cent have moved into their home within the last year, and half of these are likely or very likely to move again in the next 12 months.

Characteristic	*Investors in 2002*	*Other Australians in 2002*	*Investors in 2006*	*Other Australians in 2006*
No dependent children	58.1	61.7	53.6	62.4
Housing tenure				
Outright owner	41.5	35.4	33.9	37.7
Owner purchaser	44.4	36.5	50.9	36.0
Private renter	8.9	19.8	11.6	18.5
Public renter	0.4	4.1	0.0	3.9
Rent-free	4.8	4.2	3.6	3.9
Highest educational qualification			1.0	0.0
Bachelor degree or higher	32.4	20.0	33.9	21.0
Other post-school qualification	34.9	30.4	35.4	32.7
No post-school qualification	32.6	49.6	30.7	46.3
Labour force status				
Employed full-time	58.1	42.4	61.1	41.0
Employed part-time	20.5	18.4	22.4	18.2
Unemployed	1.5	2.7	0.5	1.6
Not in the labour force	19.9	36.5	15.9	39.1
Labour market history[a]				
Per cent time in paid work	84.4	75.1	85.1	74.1
Per cent time unemployed	1.0	2.7	0.9	2.6
Per cent time NILF	14.6	22.2	14.0	23.3
Sample	518	6450	584	6384
Income quartile[b]				
Lowest	6.6	25.2	5.7	27.2
Second	15.4	26.1	15.8	26.2
Third	26.6	25.8	28.3	24.8
Highest	51.4	23.0	50.3	21.8

Source: Authors' own calculations from the HILDA Survey waves 2 and 6.

Note:

a. refers to labour market history since left full-time education.

b. incomes are disposable income unit income equivalised using the OECD equivalence scale. The OECD scale assigns a weight of 1 to the first adult, 0.7 to the second adult and 0.5 to each additional dependent child. A couple with two children is assumed to be the standard income unit, that is, for couples with two children, their equivalised income is simply equal to their reported unequivalised income.

Table 4 compares wealth and debt profiles in 2006. Similar patterns are found in 2002; only the 2006 estimates are reported here (see Appendix 2 for detailed 2002 estimates). The table indicates that investors have higher levels of virtually all assets. Mean gross wealth is more than twice that of other home owners. However, investors also have higher levels of debt than non-investors; the net wealth of the typical investor is approximately 1.9 times the mean net wealth of other home owners. Renters are asset poor with net wealth of less than $139,000, well below the equivalent $710,000 ($1,363,000) net wealth level for home owners (investors).

For investors and home owners the bulk of wealth is held in property, and most of their debt is secured against property. Over three-quarters of investors and home owners have superannuation, but despite tax concessions superannuation balances

are relatively small and less than 20 per cent of their gross wealth. On the other hand, renters hold nearly one-third of their wealth in superannuation, typical balances being $46,500.

Investors generally have diversified portfolios. All by definition hold property investments, but most also invest in superannuation and bank accounts, approaching two-thirds have shares (equity investment) and almost one-quarter own business assets. Investor wealth held in each of these assets is always greater than the comparable holding of home owners. The asset poor position of renters is illustrated by low wealth holdings in all assets other than superannuation, vehicles, equity investments and bank accounts.

Assets, and property in particular, can be used by individuals as collateral for debt. The average investor is repaying debts in excess of $313,000, and just over 80 per cent is typically secured against property. But gearing is modest, with total debts less than 20 per cent of (gross) wealth (the gearing ratio). Home owners also secure around 80 per cent of debt against their home, but typical debt levels are low with a mean of $75,000, and a lower gearing ratio of 12 per cent. Typical investors and home owners are not particularly exposed to price and liquidity risk—plummeting prices and market slumps would still leave most investors and home owners with asset values comfortably in excess of debts.

The average renter has little wealth that can leverage debt and so mean debt levels are only $13,800. Much of that debt is unsecured; a third of renters have credit card balances and they account for 11 per cent of all debts. Only 3 per cent secure debt against business assets, but business loans account for nearly one-quarter of all debt, so a few renters run businesses that are heavily indebted. More than 40 per cent of renters have debt in other forms, such as car loans and overdrafts, and they are renters' most important debt obligations.

Table 4: Income unit wealth and debt of investors and other Australians, 2006

	Mean ($'000)			*Composition of wealth based on means (%)*			*Per cent that have non-zero levels of wealth and debt, by wealth and debt type (%)*		
	Investors	***Other home owners***	***Other renters***	***Investors***	***Other home owners***	***Other renters***	***Investors***	***Other home owners***	***Other renters***
Wealth									
Primary home	515.3	437.7	0.0	30.8	54.4	0.0	84.8	100.0	0.0
Other property	563.1	10.3	4.2	33.6	1.3	2.8	100.0	2.1	0.6
Equity investments	100.1	66.4	24.8	6.0	8.2	16.2	64.4	48.2	23.8
Cash investments	3.7	3.3	1.6	0.2	0.4	1.1	3.3	3.4	1.8
Trust funds	32.1	13.0	2.2	1.9	1.6	1.4	8.4	4.3	2.0
Bank accounts	41.2	31.5	20.7	2.5	3.9	13.6	98.1	98.4	97.5
Life insurance	12.3	9.6	3.2	0.7	1.2	2.1	15.1	9.8	5.4
Superannuation	254.6	148.8	46.5	15.2	18.5	30.5	93.5	79.8	72.7
Business	111.2	56.5	34.0	6.6	7.0	22.3	24.7	14.2	7.2
Vehicle	34.8	24.6	12.4	2.1	3.1	8.1	98.5	95.9	84.2
Collectibles	7.3	3.3	2.9	0.4	0.4	1.9	18.8	15.0	13.3
Total wealth	**1675.7**	**805.0**	**152.5**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**99.5**
Debt									
Primary home	131.0	74.7	0.0	41.9	78.9	0.0	50.7	48.7	0.0
Other property	127.0	1.5	1.1	40.6	1.6	7.9	53.6	1.0	0.5
Business	10.0	7.5	3.3	3.2	7.9	24.3	8.0	5.2	3.0
Credit card	1.5	1.2	1.6	0.5	1.3	11.7	25.5	26.8	33.1
HECS	1.2	0.7	1.8	0.4	0.8	13.0	12.5	8.2	14.1
Other	42.2	9.0	5.9	13.5	9.5	43.2	34.2	26.8	42.6
Total debt	**312.9**	**94.7**	**13.8**	**100.0**	**100.0**	**100.0**	**84.1**	**62.2**	**59.6**
Net wealth	**1362.8**	**710.3**	**138.7**						

Source: Authors' own calculations from the HILDA Survey wave 6

Table 5 reports tax and user cost summary statistics for investors in 2002 and 2006. In 2002, the average investor had a marginal income tax rate (MITR) of 33 per cent, that placed him/her somewhere in the middle to higher part of the range. Just over one in five investors paid the highest MITR (47%). Land tax was a quite important factor for nearly two-thirds of investors who paid an annual average liability of $1,150 in 2002. Investors' after-tax economic costs (user cost) was a mean 7.9 per cent—that is, investors sacrificed nearly 8 cents for each dollar of capital value to supply rental housing services from their property investment.

There has been a rise in income thresholds and the MITR in each bracket has also fallen, e.g. the highest MITR fell from 47 per cent to 45 per cent between 2002 and 2006. Hence, there has been a shift in the proportion of investors in the highest tax bracket from 26.5 per cent in 2002 to only 5.9 per cent in 2006. As a consequence of these reforms, a small minority of investors (6%) are now paying income tax at the highest marginal rate, and the average investor is now facing a lower MITR (28%).

There have also been major changes to land tax arrangements. Most state governments increased the threshold beyond which investors begin paying land tax. Hence, land tax snared far fewer investors in 2006. However, those caught paying land tax were paying bills nearly $1,000 higher than in 2002. The boom in land values affected assessed values, pushing some investors into higher brackets. For example, in Victoria, the land tax free threshold was lifted from $125,000 to $200,000 between 2002 and 2006. But the proportion of investors in Victoria whose land value exceeds $200,000 (beyond which the marginal tax rate is 0.2 per cent or higher) shot up from 27.3 per cent to 45.5 per cent. In Queensland, there was no land tax free threshold in 2002; investors started paying land tax on the first dollar of land value, the marginal rate rising from 0.2 per cent to 1.54 per cent for land values beyond $500,000. By 2006, a land tax free threshold of $500,000 had been introduced, but the proportion of Queensland investors whose land values exceeded $500,000 rose steeply from 1.8 per cent to 12.5 per cent. In New South Wales, the land tax free threshold was lifted from $261,000 to $352,000, but the proportion of New South Wales investors whose land values exceeded $352,000 more than doubled from 12.3 per cent to 31.5 per cent.

Higher interest rates, lower tax rates (that increase the after-tax cost of capital) and soaring land tax bills combined to increase investors' after-tax economic costs (user cost) to 9.1 per cent in 2006. They therefore needed just over 9 cents of rental income for every dollar of capital value to meet all after-tax costs (net of capital gains). This contrasts with less than 8 cents in 2002.

About one in five investors were negatively geared in 2002. The average negatively-geared investor obtained tax savings of $1,190. The proportion of negatively-geared investors had risen to over 30 per cent and, despite lower marginal rates, their mean annual tax saving rose to almost $1,450. Higher interest rates (the variable home loan rate was 6.55 per cent (7.95%) in 2002 (2006)) is one factor, but the more important explanation is escalating debt as new investors bought into the market during a house price boom. The mean level of debt rose from $72,000 to $127,000 between 2002 and 2006. Landlords who were negatively geared had a higher likelihood of attrition from the sample. Hence, when the proportion of landlords who are negatively geared is estimated from the sample of landlords who were interviewed in every single wave between waves 2 and 6, the proportion was 13.9 per cent (18.3%) in 2002. [12]

[12] The proportion of negatively-geared investors in 2002 (2006) was, at 27.1 per cent (33.3%,) far below the proportion reported by individuals putting in their tax return to the Australian Tax Office. According to Australian Tax Office estimates (2009b), 67.9 per cent of those with net rental income reported a loss.

Table 5: Tax and user cost of investors, 2002 and 2006

(a) MITR, land tax and user cost

	Investors in 2002	*Investors in 2006*
Mean MITR (%)	31.9%	28.7%
% in MITR bracket		
Lowest (0%)	6.2	5.9
Second (17% in 2002; 15% in 2006)	16.5	16.4
Third (30%)	39.3	51.2
Fourth (42% in 2002; 40% in 2006)	11.5	20.6
Highest (47% in 2002; 45% in 2006)	26.5	5.9
Per cent paid land taxes[a]	62.2%	42.0%
Mean land taxes ($, land tax payers only)[a]	$1150	$2022
Mean user cost of capital (%)[a]	7.91%	9.07%

(b) Negatively gearing

	Investors in 2002	*Investors in 2006*
Sample of landlords with records in wave 2 or 6, regardless of their presence in other waves		
Per cent negatively geared	27.1%	33.3%
Mean value of annual tax savings ($, negatively-geared investors only)	$1190	$1447
Sample of landlords with complete records between waves 1 and 6		
Per cent negatively geared	13.9%	18.3%
Average value of annual tax savings ($, negatively-geared investors only)	$718	$1038

Source: Authors' own calculations from the HILDA Survey waves 2 and 6.

a. The land tax and user cost values are calculated on an income unit basis. So, if both members of a couple income unit are investors, they share the same land tax and user cost values.

However, the proportion of negatively-geared investors estimated from the HILDA Survey is broadly in line with proportions computed from other microdata sources released by the Australian Bureau of Statistics. Further details can be found in Appendix 3.

3 WHAT MOTIVATES INVESTORS TO HOLD ON TO THEIR RENTAL INVESTMENTS?

3.1 Duration of Rental Investment Spells

Little is known about the 'careers' of rental property investments (see literature review in section 1). Much has been made of the illiquidity of housing investments; the transaction costs associated with sale and purchase are commonly thought to be onerous, and so investors need a lengthy holding period over which to amortise transaction costs. If we took a 'snapshot picture' of a sample of investments in property, and then tracked these property investments over time, the illiquid investment story would point to the survival of most property investments over the first few years. But perhaps these 'career' paths are unrepresentative. It could be that many landlords are 'accidental' investors who have (say) inherited property, and rent it out in the short term while they plan what to do with the cash that can be realised on sale. Or might the transaction cost perspective exaggerate their significance as impediments to arbitrage trading? Could there be large numbers of investors continually searching for profitable opportunities in segments of the market where superior returns have been overlooked?

The answers to these questions have policy significance. In principle, the insecure nature of tenancies in private rental housing is a negative attribute for some, if not most, tenants. Precarious housing circumstances can prevent families from cementing a stable residential environment around which child care, education, commuting arrangements and so forth can be secured. This is thought to be particularly damaging for children. In practice, private rental housing might offer secure long-term accommodation because most landlords are committed investors who plan to hold on to their rental properties for many years to come. The ontological security that is thought to be closely correlated with home ownership (and public housing) is then brought into question.

To analyse the duration of rental investments between 2001 and 2006, we identify all persons in the sample who have had at least one episode of rental investment, where an episode is one year (wave). In order to conduct this analysis, we identify a person as a landlord in wave j if he/she receives rental income in wave j. Rental income is reported in all waves, so we can make use of every wave of the HILDA Survey to analyse spells of rental investment, instead of just waves 2 and 6. We take the first rental investment spell and measure the length of spells of rental investment from the first wave rental income that is reported. If that first spell is uninterrupted but ongoing at the end of the data collection period (2006), it is censored, as we do not know when that first spell ended. Our sample comprises 1,570 persons who had at least one spell of rental investment, and did not attrit between waves 1 and 6.

Table 6 is a 'life table' that tracks the event histories of the sample of rental investors from the first year of their spell of rental investment, through to the end of the data collection period. We define the beginning of time as the first wave during which a person is recorded as holding a rental property, and label it year 0; interest focuses on whether, and when, the spell of rental investment ends. Time, measured in intervals of one year, is recorded in column 1. The following information is recorded in subsequent columns:

- the number of landlords holding rental properties during the year (column 2)
- the number of landlords that realised their rental investment during the year. There were, for example, 986 investors at the start of year 2, but 186 of these reported

zero rental income in year 2, and so it is assumed that these 186 investors exited the market in year 2 (column 3)

→ the number of landlords with rental investment spells that were censored because they were still investors when the data collection period ended.

The time intervals are in years, with year 0 indicating the start of the rental investment spell. In Year 0, all 1,570 persons held rental properties and 113 landlords' spells were censored in that year because their spell began in Wave 6, the end of the data collection period. This left 1,457 (1,570–113) to enter the next time interval—Year 1. During Year 1, 375 landlords reported zero rental income and must therefore have sold their rental investment, and 96 landlords' spells are censored because their Year 0 occurred in Wave 5, the second last wave of the data collection period. This left 986 (1,457–375–96) to enter the next time interval, year 2 of the spell. The number of landlords who enter each successive time period is typically referred to as the 'investor risk set'—those who might realise their rental investment during that time interval. By the start of Year 5, there were still 376 landlords in the 'at risk' set, but most were censored cases (344), with only 32 realising their rental investment during that year.

The 'at risk' set declined in each year because of both event occurrence—realisation of rental investments—and censoring. The 'at risk set' ignores repeat spells and so the analysis is limited to the length of first spells. However, reassuringly, most landlords in the sample had only one spell of rental investment (88.5%).

The hazard rate in column 5 is the key measure of the risk of event occurrence—the likelihood of realising a rental investment—in each time period. It is the conditional probability that a landlord will realise his/her rental investment given that (s)he did not realise the rental investment in previous time periods. For example, in Year 2, 186 landlords realised their rental investment, which is 19 per cent of the 986 landlords who constituted the risk set at the beginning of Year 2. Finally, the survival rate is listed in column 6 of table 6. It is a measure of the probability that a randomly selected landlord will retain his/her rental investment in Year t, given that they did not realise their rental investment in time periods preceding Year t.

We observe from table 6 that a quarter of landlords are likely to realise their rental investment during Year 1— the hazard rate being 0.257. But there is a sharp decline in the hazard rate to 0.085 by Year 5, indicating negative duration dependence. The longer a landlord holds the rental property, the less likely s/he is to realise the property. The survival rate in Year 5 is quite high, at over 40 per cent.

So what are these hazard and survival rates telling us? First, we should note that just over one in four investors exit in year 1, evidence favouring the 'accidental' investor and arbitrage investor hypothesis. If the latter provided a convincing explanation, we should observe large numbers of repeat spells, but repeat spells are infrequent (of the 375 that exit in year 1, only one-quarter go on to start a repeat spell), so the 'accidental' investor explanation is favoured by the evidence. But, from Year 2 onwards, there is a steep decline in the hazard rate. An investor who has leased his or her property for four years has a low probability (8.5%) of selling up and hence terminating a tenant's lease in Year 5.

There appears to be a second group of investors that 'stay the course', and are a source of secure accommodation. Because the fall in hazard rates is steep, this second group is a substantial proportion of all investors. If a tenant with low mobility expectations is lucky enough to lease from an investor in this second group, their accommodation will be secure in the medium to long run. Unfortunately, a private

rental housing market where information is incomplete and unevenly distributed may not match immobile tenants with long-term landlords.

Table 6: Rates of exit from first spell of rental investment

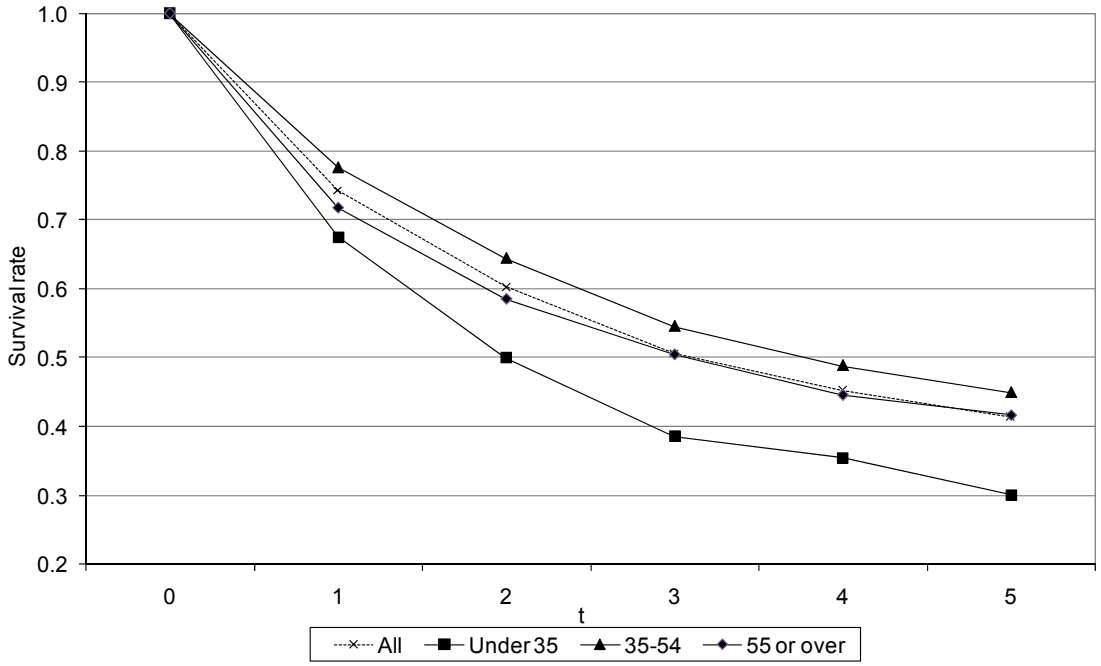
Year[a] (t)	*Number*			*Hazard rate* $H_t = N_t / T_t$	*Survival rate* $S_t = S_{t-1}(1-H_t)$
	Has rental investment at start of year (T)	*Realised rental investment during the year (N)*	*Censored[b] at end of year*		
0	1570	0	113		1.000
1	1457	375	96	0.257	0.743
2	986	186	91	0.189	0.603
3	709	114	80	0.161	0.506
4	515	54	85	0.105	0.453
5	376	32	344	0.085	0.414

Source: Authors' calculations using the HILDA Survey waves 1–6.
Notes:

a. The wave when a person is first recorded as a rental investor is labelled Year 0 because we do not know whether the person realised his/her rental investment until recorded in the following wave, which is then labelled Year 1.
b. Censored means that Year t+1 occurred after the end of the data collection period. For example, a first spell of rental investment that begins in wave 6 will inevitably be censored at the end of Year 0 because wave 6 is the last wave of data collection.

This matching function might be satisfactorily accomplished if the long-term landlords have observable characteristics that can act as a signal that allows tenants to make informed choices. We turn therefore to an analysis of whether certain groups of investors are more likely to survive than others. Figure 2 below compares the survival functions of investors who belong to different age groups. The survival rate is calculated for each age group using the formula listed in the heading to column 6 of Table 6. It is a measure of the probability that a randomly selected landlord in an age group will retain his/her rental investment in Year t, given that they did not realise their rental investment in time periods preceding Year t. For example, in Figure 2, the survival rate is 1 for all age groups in Year 0. In Year 1, the survival rate falls to about 78 per cent for those in the 35–54 age group, but it falls more steeply to 68 per cent for those in the youngest age group. The survival profile by age group shows that young investors are less likely to survive as rental investors. This could be because many are accidental landlords that inherit as a result of death of parents. But it turns out that only 2.6 per cent of young investors benefited from bequests (in the form of income) in one or more years preceding termination of their first rental spell. This is unsurprising given that for most in this age group, their parents would still be living. The group aged 35–54 years are most likely to survive, with about 45 per cent still retaining their investments by Year 5.

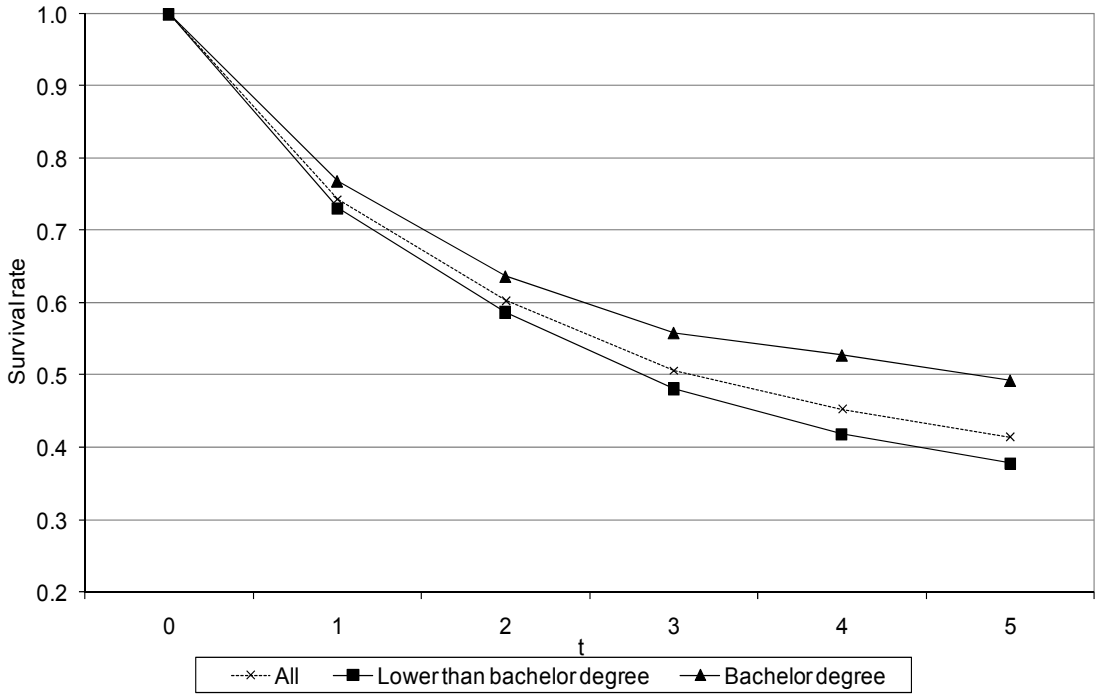
Figure 2: Survival in first spell of rental investment, by age band in first year of spell



Source: Authors' calculations using the HILDA Survey waves 1–6.

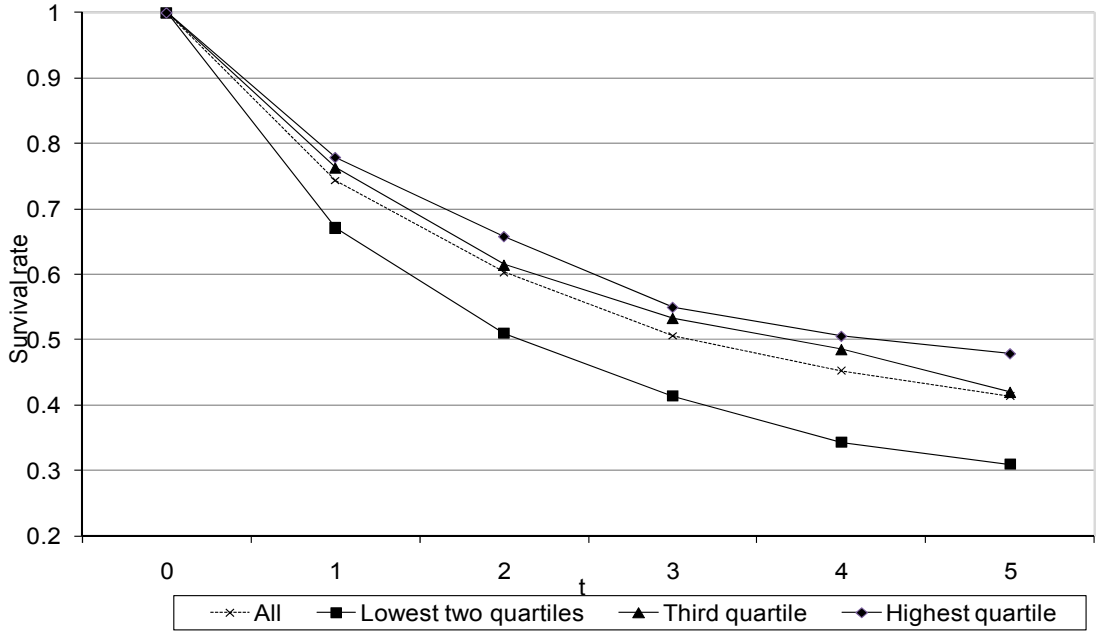
Figures 3 and 4 compare investors with different levels of human capital and income. Low-income investors with low levels of education are more prone to economic shocks, and less able to adapt when shocks eventuate. Their greater vulnerability means that such investors are more likely to realise investments to meet pressing spending needs. The patterns offer some weak evidence in support of this hypothesis, and it is somewhat stronger in relation to income than education.

Figure 3: Survival in first spell of rental investment, by highest educational qualification in first year of spell



Source: Authors' calculations using the HILDA Survey waves 1–6.

Figure 4: Survival in first spell of rental investment, by equivalised income unit disposable income in first year of spell

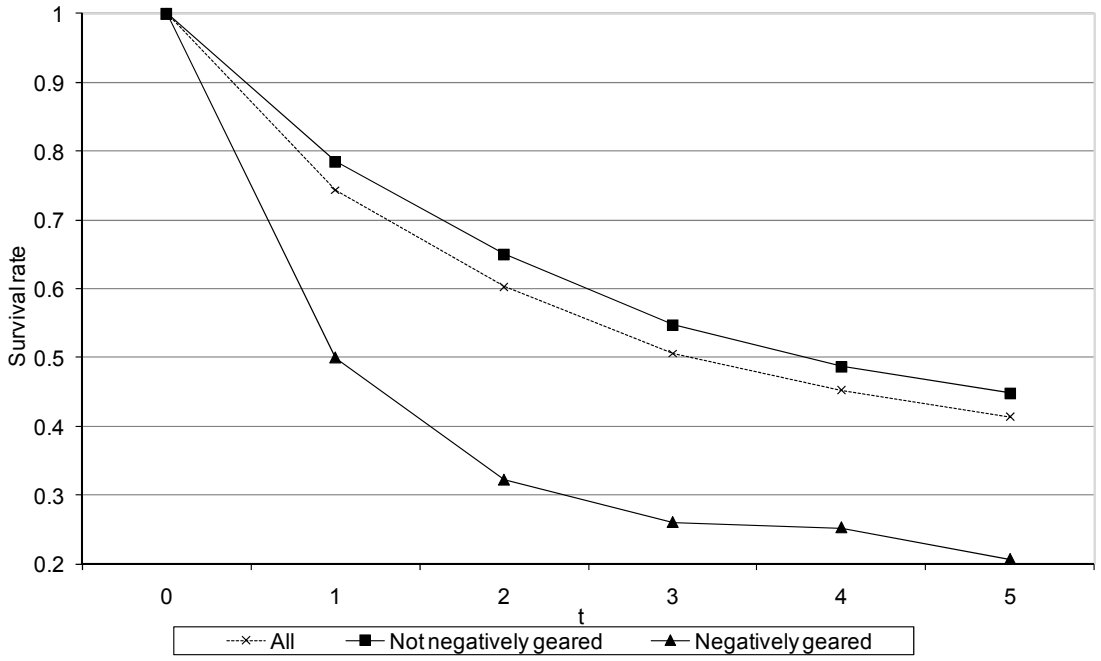


Source: Authors' calculations using the HILDA Survey waves 1–6.

Figure 5 below presents the survival functions for landlords who were negatively geared in each year of their first spell; contrast this with the survival function of those declaring a positive net rental income in each year. Indeed the negatively-geared investors' conditional probability of exit after only one year is about 50 per cent as

compared to 26 per cent for all investors. Seelig et al (2009) report that negative gearing is a deliberate strategy of some investors who churn in and out of rental property to remain negatively geared. However, a minority (13.1%) of negatively-geared investors have repeat spells as investors within the study time frame. [13] However, there is an alternative explanation. Negatively-geared investors are making operating losses and their investments are more vulnerable in the face of economic shocks that prompt realisation of loss making and low return activities.

Figure 5: Survival in first spell of rental investment, by whether negatively geared throughout spell



Source: Authors' calculations using the HILDA Survey waves 1–6.

3.2 Propensity to Retain Rental Investments between 2002 and 2006

3.2.1 Modelling Strategy

The evidence revealed by survival functions suggests that younger, negatively-geared investors, with relatively low levels of income and human capital are more likely to realise property investments at any point in time. We cannot be confident about these hypotheses because the simple comparisons drawn in Figures 2 to 5 could be confounded by other factors correlated with age, negative gearing, income and human capital. Regression modelling techniques can help us to unravel causal links.

A preferred approach is hazard modelling that allows estimation of the hazard rates in table 6 as a function of variables expected to be influential as determinants. The data requirements are quite onerous, the most important in the current context is reported values on all time varying variables in each year of a spell. Unfortunately, property value is a critically important variable that is only reported in the HILDA wealth modules (2002 and 2006). Without it, we cannot include financial variables such as user cost and gross rental yield that are potentially important drivers of investment decisions because they influence the returns an investor can expect.

[13] This is nevertheless higher than the proportion (11.2%) among landlords who are not geared.

Instead, we have estimated a probit model of whether 2002 investors survive or exit the market by 2006 (where the dependent variable is equal to one if a wave 2 landlord retains his/her investment, and zero if the landlord has realised his/her investment by wave 6), and make use of the rental property values available in the wealth modules in these two waves of the HILDA Survey to measure key financial variables such as user cost.

Regression modelling techniques, such as Ordinary Least Squares that are appropriate when dependent variables are continuous, have to be reconsidered when they are dichotomous. Given a dependent variable set up as a 0-1 dummy variable, so that it is equal to 1 if the person is an investor and equal to 0 otherwise, we should expect the predicted values from a regression model to fall within the interval 0 and 1. The predicted values can be interpreted as the probability that an investor in 2002 will remain as an investor in 2006. A 'best fitting' linear regression line estimated by least squares will typically predict values outside the 0–1 range; negative values can be predicted, for instance, and this is a serious drawback as negative probabilities are meaningless. We need a method of estimation that forces the predicted probabilities to lie within the 0–1 range. The probit model is a popular approach and one that we pursue. An accessible introduction to the statistical issues in this context can be found in Kennedy (2003, chapter 15).

There are two kinds of models that we estimate—one is a personal characteristics model that captures the kind of motives emphasised in the qualitative research of Seelig et al. (2009). Age and personal circumstances appear to be the dominant characteristics in decisions to invest according to the qualitative evidence, while market conditions and financial drivers are not so important. So, for example, the age of the investor, whether they have children and changes in personal circumstances such as divorce is expected to be more important than financial drivers as represented by user cost, gross rental yield and negative gearing status. We estimate a second model to test the importance of these financial drivers.

A probit model is a binary choice model that assumes individuals are faced with a choice between two alternatives and the choice is a function of observed characteristics (Pindyck and Rubinfeld 1998). The two choices that an individual is faced with here is the decision to retain or realise one's rental investment, and we model this decision as a function of landlords' observed personal, attitudinal and financial characteristics. The probit model allows us to predict the likelihood that a landlord will make a choice to retain his/her rental investment based on these characteristics.

The significance or otherwise of the financial variables is important because if landlords are 'amateurs' who invest due to personal circumstances and unsophisticated attitudes to wealth accumulation, they will not be influenced by policy levers that impact financial returns, or market fluctuations, including poor short-term returns. Claims that reforms to taxation of land and housing, or other financial parameters that can be influenced by policy, will be effective in stimulating rental investment are questioned by the personal characteristics model.

Alternative specifications are estimated as probit models. The variables included in the financial model include the level of superannuation wealth, level of non-property debt, whether negatively geared, user cost and gross rental yield. Other variables were experimented with, but proved insignificant (see note to Table 2).

3.2.2 Personal Characteristics and Attitudes

Table 7 reports the results of personal characteristics and attitudes (PCA) model of the 'survival' of investors. There is a 543 sample of investors; a slight majority (286 or

52.6%) exit the market by 2006, but a sizeable minority (257 or 47.3%) survive. The PCA model includes demographic variables representing the presence of children (in different age groups), marital status, age, and retirement status. It also includes human capital, labour market history, and attitude to risk variables measured at 2002 values.

It turns out that, with one notable exception, demographics and attitudes to risk are statistically insignificant. The exception, and it confirms evidence from the qualitative work reported in Seelig et al. (2009), is age and retirement status. Younger investors are less attached to rental investments and, as Figure 2 shows, middle-aged investors are more likely to stick with their investments. However, once retired, there is a sharp increase in the likelihood of exit from rental investments; the marginal effect estimates cited in Table 7 indicate that a retired person has a 22 percentage point higher probability of selling up at any point in the investment spell. Retired persons with pressing spending needs, or few alternative investments to meet emergencies could sell up to invest in more liquid assets. Alternatively, pension asset tests could prompt realisation as retired investors cash out accumulated wealth, and enjoy the 'high life' in the knowledge that they can fall back on the Age Pension when their wealth has been spent. There is some evidence to support the asset test hypothesis. Among the retired who realised their investments, almost 40 per cent were eligible for an income support payment by wave 6; the proportion is much lower among the retired who retained their investments (12.8%).

Of the remaining variables, labour market history variables are statistically significant. Continuous spells of employment cushion investors with respect to adverse economic shocks; these investors are better able to ride out the bad times without selling assets. Despite a disappointingly small number of significant variables, the PCA model successfully predicts 60 per cent of outcomes, which is better than the 53 per cent rate that eventuates with random assignment. [14]

3.2.3 Financial Drivers and Market Conditions

Table 7 also reports the results of market conditions and portfolio (MCP) model that adds financial variables to those included in the PCA model specification. These financial variables test the following hypotheses:

- → Superannuation is a substitute asset in wealth portfolios and so investors with larger amounts of superannuation are less likely to survive, as are those with large amounts of unsecured debt, since these investors are more vulnerable when adverse shocks eventuate.
- → Negatively-geared investors are less likely to survive as investors because they are also more vulnerable to adverse shocks.
- → Investors with high after-tax economic costs (as measured by user cost) and/or poor expectations of capital gain are less likely to survive.

The MCP model confirms the second and third hypotheses, but not the first. On adding financial variables, the age variable becomes insignificant, but retirement status and employment history remain statistically significant. The MCP model successfully predicts 61 per cent of outcomes, only slightly higher than the PCA model.

However, the size and statistical significance of a majority of the financial variables suggest that they do matter. The 2002 gross rental yield has a statistically significant

[14] If we randomly assign such that 53 in every 100 investors are predicted to exit and 47 are predicted to survive (the proportions in the sample), we will, on average, correctly predict in 53 per cent of occasions.

negative coefficient; the present value model suggests that returns must be equalised by differential rates of capital gain. So properties with higher gross rental yields have lower expected rates of capital gain, and these expectations persuade some investors to realise their property investments. The marginal effect estimates suggest that a one percentage point higher gross rental yield is associated with a 1.2 percentage point lower probability of survival as an investor in 2006. It turns out that the user cost variable is even more influential in the survivor model—a 1 percentage point increase in user cost has a marginal effect estimate of 10.3 percentage points.[15] Thus, higher after-tax economic costs eat into returns and persuade many investors to exit the market. Finally, the MCP model confirms the importance of negative gearing status. A marginal effect estimate of 11.5 percentage points is very large given that 53 per cent of our sample of investors survived as investors in 2006. [16]

These model estimates have important implications. They suggest that, in general, the personal characteristics and attitudes of investors do not influence decisions about when and whether to realise property investments. Retirement status is an important exception, and a future research agenda should include questions that tease out precisely why retirement matters.

The significance of financial variables suggests that government policy changes will shape decisions about whether to remain an investor. Appendix 5 demonstrates how a grant program similar to the National Rental Affordability Scheme (NRAS) could help retain affordable rental housing opportunities in the housing stock. But broader fiscal and monetary policy choices will also be influential since interest rates and both Federal and state government tax parameters are important in determining investors' after-tax economic costs (user cost) and negative gearing status, variables that quantitatively have both a statistically significant and large impact. Negative gearing has, perhaps, surprising findings. It does not help to secure property investments in rental housing. But we need to be careful before rushing to conclusions. Some negatively-geared investors will be churning in and out of rental properties. While this can adversely impact on tenants because their housing circumstances are more precarious, the supply of rental housing may be more responsive to changing market conditions with potential efficiency gains.

Some rental tenants are highly mobile, others are less so and value the security that lengthy tenancy provides. If we could match tenants with different mobility expectations to investors with corresponding attachments to rental investments, both tenants and landlords would be better off. Our empirical findings suggest that there is no obvious way that tenants can detect whether a rental property is going to remain available for lease in the long run. Some of the variables that are most influential in shaping investment decisions (e.g. user cost, negative gearing) will not be revealed to tenants. Even if they were observable, landlords with strong attachment to their property investments might be wary of entering into long-term leases with tenants whose future behaviour is uncertain. Though our research suggests that there is a substantial number of landlords with strong attachments, there remains the policy problem of matching these two groups. We return to this issue in a concluding chapter.

[15] However, there are few investors that have user costs that differ by as much as one percentage point so this perhaps exaggerates the importance of user cost. A one standard deviation increase in user cost (0.461 percentage points) lowers the probability of survival in 2006 by 4.4 percentage points, a substantial impact, but one that is somewhat smaller than negative gearing.

[16] Appendix 4 reports the results of a simulation of the impact of quarantining negative gearing on rents in the private rental housing market using AHURI-3M.

Table 7: Probability of 2002 investors retaining rental investment in 2006

Explanatory variables		*Personal Characteristics & Attitudes*				*Market Conditions & Portfolio*			
		Coef.	*Std. error*	*Sig.*	*Marg. effect (% pt)*	*Coef.*	*Std. error*	*Sig.*	*Marg. effect (% pt)*
Number of children	Aged 0–4 yrs	-0.088	0.135	0.513	-3.5	-0.061	0.138	0.658	-2.4
	Aged 5–14 yrs	0.030	0.072	0.676	1.2	0.025	0.073	0.735	1.0
	Aged 15–24 yrs	0.010	0.073	0.887	0.4	0.026	0.074	0.727	1.0
	Aged 25+ yrs	-0.032	0.068	0.638	-1.3	-0.003	0.069	0.97	-0.1
Marital status	De facto	0.121	0.180	0.499	4.8	0.063	0.181	0.729	2.5
(Continuously married omitted)	Divorced, separated or widowed	0.095	0.220	0.667	3.8	0.132	0.223	0.552	5.3
	Single never married	0.005	0.276	0.985	0.2	-0.008	0.280	0.978	-0.3
	Remarried	-0.096	0.160	0.550	-3.8	-0.088	0.163	0.591	-3.5
Highest qualification	Bachelor degree or higher	0.085	0.144	0.557	3.4	0.017	0.147	0.906	0.7
(No post-school qual. omitted)	Other post-school qual.	-0.062	0.139	0.658	-2.5	-0.056	0.141	0.695	-2.2
Labour market history since left	% time in paid work	-0.007	0.003	0.020	-0.3	-0.007	0.003	0.026	-0.3
full-time education	% time unemployed	-0.028	0.016	0.083	-1.1	-0.025	0.016	0.134	-1.0
Retirement-related factors	Age (yrs)	0.020	0.008	0.012	0.8	0.015	0.008	0.063	0.6
	Whether retired	-0.587	0.217	0.007	-22.2	-0.596	0.219	0.006	-22.5
Risk preferences	Whether own life insurance	-0.157	0.147	0.284	-6.2	-0.206	0.149	0.167	-8.1
	Whether unwilling to take financial risks	0.031	0.137	0.818	1.3	0.031	0.141	0.825	1.2
	Whether savings time horizons is <1 year	-0.184	0.138	0.184	-7.3	-0.126	0.142	0.376	-5.0
	Whether save regularly each month	0.154	0.124	0.214	6.1	0.210	0.127	0.098	8.4
Financial variables	Level of superannuation wealth/$100,000					0.333	0.270	0.217	13.2
	Level of debt not secured by property/$100,000					0.043	0.050	0.394	1.7

	Whether negatively geared				-0.293	0.146	0.044	-11.5
	User cost (%)				-0.258	0.126	0.04	-10.3
	Gross rental yield (%)				-0.029	0.013	0.023	-1.2
Constant		-0.320	0.463	0.489	1.744	0.946	0.065	
Diagnostics	N	585			543			
	LR Chi2	27.06		0.078	44.78		0.060	
	Log-likelihood	-362.073			-353.214			

Source: Authors' calculations using the HILDA Survey waves 2 and 6.

Table 8: Predictive performance of models of probability of retaining rental investment

	Personal characteristics and attitudes model			***Market conditions and portfolio model***		
Predicted	***Observed***			***Observed***		
	Investor	Non-investor		Investor	Non-investor	
Investor	133	91		144	98	
Non-investor	124	195		113	188	
% correct	51.8	68.2	**60.4**	56.0	65.7	**61.1**

Source: Authors' calculations using the HILDA Survey waves 2 and 6.

4 WHAT MOTIVATES AUSTRALIANS TO BECOME RENTAL INVESTORS?

The propensity of investors to hold on to their rental properties is one dimension of the supply of rental housing, and identifying the drivers enriches our understanding of investors most likely to make an early exit from the market. A second equally important dimension is the decision to invest in rental property. Identification of drivers enriches our understanding of the type of Australians most likely to be the source of rental property investments (and hence private rental housing supply). Once again, there is wider policy significance to our findings. If financial variables heavily influenced by government policy parameters turn out to be significant determinants of the decision to invest, governments can use fiscal policy levers (e.g. tax parameters) to promote the supply of private rental housing. Furthermore, monetary policy will impact on investment decisions because of the importance of interest rates in financial variables such as (potential) investors' user costs of capital.

We estimate two types of models. The first uses personal characteristics and financial variables to analyse the propensity to invest in rental housing. The second postulates that we all have a consumption demand for housing, to meet shelter and comfort needs, and an investment demand for housing as an asset that forms part of a balanced wealth portfolio. Australians with a consumption demand that is high relative to their investment demand for housing will rent, and continue to do so as long as their consumption demand exceeds their investment demand. As their investment demand converges on the consumption demand for housing, as might eventuate as more wealth is accumulated over the life course, so households reach a threshold that tips them into home ownership. When investment demand exceeds consumption demand by a large margin, households will have more than satiated their consumption demand, and will meet their additional investment demand by investing in rental properties. A modelling strategy (a sub-tenure choice model) based on these ideas is outlined in section 4.2 below.

The models are estimated using a sample of 5,233 Australians drawn from the 2006 HILDA wave. This sample has complete records in the 2002 HILDA wave, an important feature because we use 2002 variable measures in some of the models reported below. The majority (3,247, or 62%) are home owners and own no other property. There are 900 renters (17% of the sample) that also own no property, and 883 (16.9%) that are both home owners and investors in property. Finally, there a small number (203 or 3.9%) of renters that also own rental property. These renters are therefore investors who do not own their primary place of residence.

4.1 Cross-section Probit

4.1.1 Modelling Strategy

We begin by modelling the 2006 investment decision as a dichotomous choice between holding rental investments in wealth portfolios, and investing only in alternative assets. As noted in chapter 3, regression modelling techniques such as Ordinary Least Squares that are appropriate when dependent variables are continuous, have to be reconsidered when they are dichotomous. The predicted values can be interpreted as the probability that an individual will become an investor. A 'best fitting' linear regression line estimated by least squares will typically predict values outside the 0–1 range; negative values can be predicted, for instance, and this is a serious drawback as negative probabilities are meaningless. Hence, as before, we pursue the popular probit approach.

As with the survival or duration models reported in chapter 3 we include both personal characteristics and financial variables as explanatory variables. The literature review in section 2 alerted us to the potential importance of children, age, retirement status, windfall gains (e.g. inheritance), household dissolution and attitudes to risk as personal characteristics shaping decisions to invest. On the other hand, human capital, wealth portfolio and tax shelter variables have been emphasised in economic models of the decision to invest in real estate (Shroder, 2001).

Generally the vector of variables in the propensity to invest model is the same as that employed in the survival models. There are, however, three differences that should be remarked on; first, gross rental yields and negative gearing status are not universally observable in the propensity model. Second, gross wealth is a potentially important variable because real estate is illiquid and indivisible. Third, inheritance can result in the 'accidental' investor and so should be captured in propensity models.

A noteworthy omission from the vector of financial variables is income. The absence of an income variable is also a feature of tenure choice econometric models estimated using Australian data (Bourassa, 1995, 1996; Bourassa and Yin, 2006; Hendershott et al., 2009). This is because the person's user cost of capital reflects the tax bracket they belong to, which in turn is determined by income, and economic theory tells us that the user cost variable will be an important determinant of investment decisions. Expectations of future income might also be relevant, but we expect such expectations to be captured by the human capital variables in the model. There is, however, an important caveat. Current income can be the source of binding borrowing constraints and so it is possible that our user cost variable will pick up the impact of these constraints and bias findings. We return to this point in section 5 below.

The estimation sample is all Australian adults with complete records from 2001 to 2006. The sample size is 5,233; only 503 (9.6%) are investors so it is an unbalanced sample. It is deployed to estimate the cross section propensity to invest in rental housing in 2006. However, wealth and debt variables are measured at 2002 values rather than their contemporaneous 2006 values. Suppose that the year of observation (2006) is the peak of a property price boom that was not accompanied by a peak in other asset prices. There will then be spurious correlation between landlord status, wealth and the composition of wealth portfolios. This endogeneity problem can be addressed by lagging the wealth variable. A similar argument justifies lagging debt variables.

4.1.2 Findings

Table 9 lists estimated coefficients and their statistical significance. Marginal effect estimates are also presented in the final column; for a zero-one dummy variable, these aid interpretation because they show the percentage point change in predicted probabilities as the status of persons' change. So, for example, a retired person is *ceteris paribus* 4.8 percentage points less likely to be a rental investor. The importance of the marginal estimates can be benchmarked against the proportion of investors in the sample (9.6%).

The predicted investor status of each individual is commonly assigned using the rule that when predicted probabilities exceed 50 per cent, the individual is assigned investor status. Only 40 individuals are predicted to be investors using this algorithm (see table 10). On the other hand, 4,707 (or 99.5%) are correctly predicted to have no rental investments. The sample prediction error rate is low at 9.7 per cent (see Table 10). However, had we randomly assigned persons so that 9 in every 10 sample members were designated investors (their incidence in the sample), the prediction

error rate would be more or less the same (10%). From this perspective, the model's explanatory variables are adding very little.[17]

Demographics turn out to be unimportant, with the exception of retirement status that negatively impacts propensities to invest. This finding suggests that a reliance on sources of income other than wages and salaries motivates a preference for more liquid assets. It might be noted that on retirement superannuation balances that had previously been illiquid, are now accessible, and so could prompt realisation of rental properties. A healthy employment record is associated with higher propensities to invest, perhaps because borrowing constraints are less likely to bind. From the savings and attitudes to risk variables, we learn that the risk averse (those unwilling to take on risk) are in fact less likely to become landlords. The marginal effect estimate is 3.6 percentage points. This result is unexpected as the conventional wisdom is that 'bricks and mortar' investments appeal to the conservatively inclined investor. But this view ignores financial investments such as term deposits that offer guaranteed (nominal) returns and less onerous management demands on investors' time. These alternative low risk investment options will surely appeal to the conservative investor.

Table 9: Probability of being an investor in 2006 (cross section probit)

Explanatory variables		***Coef.***	***Std. error***	***Sig.***	***Marg. effect (% pt)***
Number of children	Aged 0–4 years	0.010	0.056	0.861	0.1
	Aged 5–14 years	-0.050	0.036	0.169	-0.7
	Aged 15–24 years	-0.016	0.034	0.644	-0.2
	Aged 25 years or over	-0.010	0.030	0.750	-0.1
Marital status	De facto	0.071	0.095	0.455	1.0
(married omitted)	Divorced, separated or widowed	-0.010	0.096	0.917	-0.1
	Single never married	-0.148	0.115	0.199	-1.8
	Remarried	0.090	0.076	0.239	1.2
Highest qualification	Bachelor degree or higher	0.038	0.069	0.578	0.5
(No post-school qual. omitted)	Other post-school qual.	0.112	0.064	0.078	1.5
Labour market history since left	% time in paid work	0.003	0.001	0.018	0.0
full-time education	% time unemployed	-0.023	0.009	0.009	-0.3
Retirement-related	Age (years)	0.002	0.004	0.564	0.0
factors	Whether retired	-0.429	0.100	0.000	-4.8
Savings behaviour and attitudes to risk	Whether own life insurance	0.116	0.077	0.135	1.6
	Whether unwilling to take financial risks	-0.276	0.058	0.000	-3.6
	Whether savings time horizons is <1 year	-0.080	0.061	0.190	-1.0
	Whether save regularly each month	0.010	0.058	0.858	0.1

[17] This outcome is not altogether surprising given such an unbalanced sample where the overwhelming majority belong to one of the two possible categories.

Explanatory variables		*Coef.*	*Std. error*	*Sig.*	*Marg. effect (% pt)*
Financial variables	2002 level of gross wealth/$100,000	0.044	0.004	0.000	0.6
	2002 level of superannuation wealth/$100,000	-0.046	0.016	0.005	-0.6
	2002 level of unsecured debt/$100,000	-0.086	0.028	0.002	-1.1
	Level of income from inheritance in last financial year/$100,000	-1.177	0.781	0.132	-15.4
	User cost 2006 (%)	-2.605	0.454	0.000	-34.1
Constant		15.630	3.003	0.000	
Diagnostics	Observations	5233			
	LR Chi^2	439.08		0.000	
	Pseudo R^2	0.133			

Source: Authors' calculations using the HILDA Survey waves 2 and 6

Table 10: Predictive performance of cross section probit

Predicted	*Observed*		
	Investor	Non-investor	
Investor	17	23	
Non-investor	486	4707	
% correct	**3.4**	**99.5**	**90.3**

Source: Authors' calculations using the HILDA Survey waves 2 and 6.

All the financial variables other than inheritance are statistically significant. But the most important driver of rental investment behaviour is a person's user cost of capital. Two individuals with the same demographics and wealth portfolios, but user costs that differ by 1 percentage point, will have probabilities of investor status that are 34 percentage points in favour of the person with a lower user cost. Two investors with user costs that differ by one standard deviation (0.08 percentage points) will ceteris paribus have probabilities of investor status that differ by 2.6 percentage points.

This is a most important finding. A parameter important in shaping user cost is the personal marginal income tax rate; it is critical because the after-tax cost of (equity and debt) capital is typically the most important component of user cost (see Wood and Watson, 2001).[18] Post-tax capital gains, land taxes and local government rates can also make significant contributions. Changes to Federal and to a lesser extent state and local government tax arrangements will have powerful impacts on private rental housing supply.

Wealth and debt have more modest though statistically significant effects. Because housing is indivisible and (or) lenders require investors to 'put down' a deposit, wealthy individuals are more likely to be rental investors. However, the effect is small.

[18]The sample average user cost of capital in 2006 (assuming zero operating and transaction costs) was 6.7 per cent. But in the lowest tax bracket investors had an average user cost of 6.9 per cent, and falls to 6.5 per cent in the highest tax bracket. At higher interest rates and rates of inflation the variation in user cost across tax brackets widens. The importance of user cost in shaping Australians' housing decisions has been confirmed in a series of studies using different data sources and conducted in different time periods (Bourassa, 1995, 1996; Bourassa and Yin, 2006; Hendershott et al., 2009).

Between two people with wealth that differs by $100,000, there is only a 0.6 percentage point difference in the chances of becoming an investor. There is confirmation that superannuation and rental housing are substitutes in wealth portfolios, but the rate of substitution is small, so that growing superannuation balances in the future are unlikely to threaten rental housing supply.[19] As expected unsecured debt restrains plans to invest in rental housing as lending criteria become more difficult to meet, but again this variable has modest effects.

In summary, our findings portray the typical investor as a middle-aged high tax bracket individual with modest superannuation, little unsecured debt and a continuous employment record. As is evident from this description, personal characteristics, savings behaviour and attitudes are generally unimportant. But there are caveats. The sample is unbalanced; despite the statistical significance of a number of explanatory variables, and a few such as user cost and retirement status achieving a substantial influence, the model is unsuccessful when it comes to predicting investor status. As table 10 shows, there are 503 rental investors in the sample, yet only 17 (3.4%) are successfully predicted by the probit model. A second modelling approach has therefore been tried.

4.2 Sub-tenure Choice Model of Investor Status

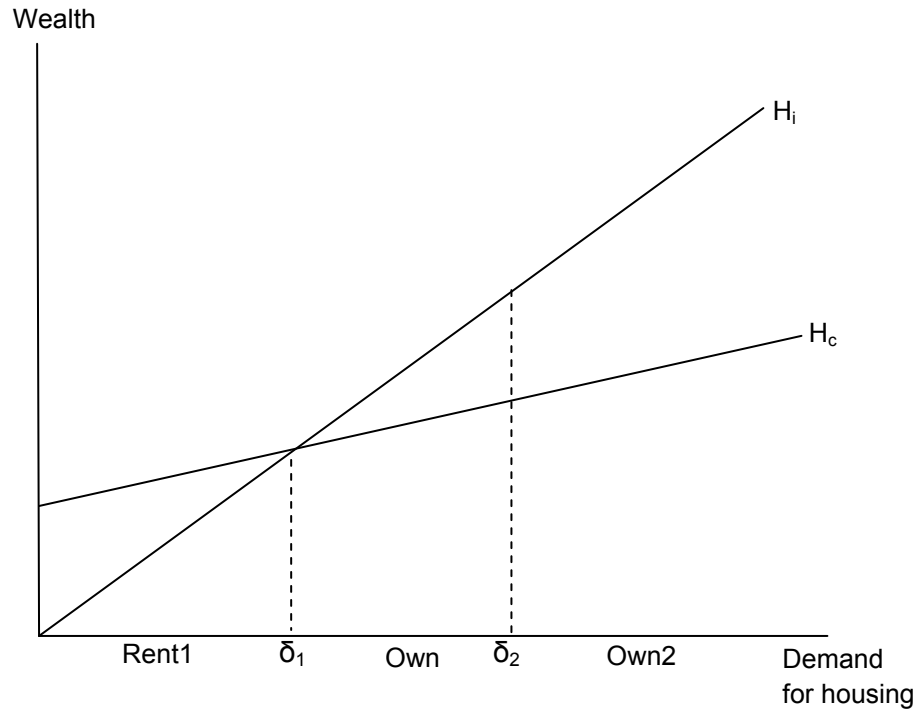
Households can rent housing in order to secure the housing services of shelter, comfort and so forth, or alternatively purchase housing to supply themselves with these services. This is a consumption demand for housing. Economists typically argue that people also have an investment demand for housing as an asset in wealth portfolios. The value of a housing asset can increase, thus offering owners a capital gain, and if leasing the property to a tenant yields a rental income. The owner of a primary residence occupies that home and consumes the service it yields, but it is also an investment because capital gains accrue. Multiple property owners occupy one house as a primary residence, and hold other properties as 'pure' investment assets[20] in wealth portfolios. Finally, renters only satisfy their consumption demand for housing

Ioannides and Rosenthal (1994) put forward a theoretical framework in which the decision to own a home is driven by the divergence (measured by index J) between the investment and consumption demands for housing. Figure 6 below illustrates—with the demand for housing measured along the horizontal and (gross) wealth on the vertical axis. The H_i and H_c schedules identify the investment and consumption demands for housing respectively.

[19] There is a qualification here. The retirement status variable could be picking up effects associated with superannuation.

[20] Some second property owners retain their real estate investment as holiday homes and will not necessarily earn a rental income.

Figure 6: Sub-tenure choice model



As J exceeds a succession of thresholds (δ_1 and δ_2 in figure 6), households progressively change sub-tenures from Rent1 to Own2. In Rent1, households rent without owning property; in this region consumption demand exceeds investment demand, and the latter is sufficiently low that households do not choose to hold real estate in their wealth portfolios, in part because transaction costs outweigh the benefits of holding property, but also because of borrowing constraints. Moreover, the level of housing required to satisfy consumption needs would, given low levels of wealth, constitute a bad investment in terms of portfolio balance and liquidity. In Own1, households purchase their own home without owning other properties; in this region investment demand is such that households find it worthwhile to own. Housing consumption demand may still exceed their investment demand, and this is most likely for those good at maintaining their property. By owning, they avoid the externality associated with good tenants cross-subsidising the rental costs of tenants that are poor at maintenance (Henderson and Ioannides, 1983). In Own2, households own their own home in addition to other properties. They own and occupy as principal residence a home that meets their consumption demand and hold an additional amount of real estate that equals the difference between consumption and investment demand.

There is a natural order or hierarchy to the sub-tenures that reflect a ranking (from Rent1 to Own2) with reference to ownership of property. Standard regression model techniques are inappropriate; for example, if we assigned values rent1=1, Own1=2 and Own2=3 and applied Ordinary Least Squares, the estimation would treat the difference between 1 and 2 as equivalent to the difference between 2 and 3, which is clearly invalid.

An ordered probit model is a natural extension of the dichotomous dependant variable probit model we used to estimate the propensity to invest specification. In the context of sub-tenure choice, the unobservable index J is specified to be a linear function of the explanatory variables comprising consumption and investment demand for housing, plus as error term. Each sub-tenure choice corresponds to a specific range

of the J index values, as illustrated in Figure 6. The estimation method is explained formally in appendix 6[21]; the method yields unbiased estimates of the explanatory variable coefficients as well as the unknown threshold values (δ_1 and δ_2) defining the boundaries between RENT1 and OWN1 and OWN1 and OWN2. Thus, for example, a negative value for the first threshold δ_1 suggests that consumption demand exceeds investment demand at the threshold defining the boundary between Rent1 and Own1. Renters will then always have a consumption demand that exceeds their investment demand, as suggested by the underlying theory.

The sub-tenure choice model is estimated using a 5,233 sample of persons that is the same as that designed for estimation of our propensity to invest model. Table 11 offers a breakdown by sub-tenure. There are 1,103 renters, 21.1 per cent of all persons[22]. The owners of residential property are split between two categories; there are 3,247 (62%) home owners that own no other property. A smaller 883 (16.9%) persons own their primary residence as well as other property. This is larger than the number of rental investors reported in section 4.1 and used in modelling propensities to invest. Here we are seeking to explain whether people hold residential properties other than their primary residence in wealth portfolios, not their landlord status. Our sample therefore includes multiple property owners that have holiday homes. However, the vector of explanatory variable is the same as those listed in Table 10.

Table 11: Number and proportion in each sub-tenure choice category, 2006

Sub-tenure category	*N*	*%*
Rent1	900	17.2
Rent2	203	3.9
Own1	3247	62.0
Own2	883	16.9
All	5233	100.0

Source: Authors' calculations using the HILDA Survey wave 6.

4.2.1 Findings

Table 12 below lists estimated coefficients while Table 13 offers evidence of the 'goodness of fit' as gauged by the accuracy of predictions. Estimated coefficients must be interpreted with care. The impact of a variable on the likelihood of renting (Rent1) is in a direction opposite to that of the sign of the coefficient. So, for example, wealth has a positive coefficient and so increases in wealth are associated with a declining probability of renting. On the other hand, the impact of a variable on chances of owning property other than a primary residence (Own2) is in the same direction as the sign of a variable. Once again consider the wealth variable; its coefficient is positive and so increases in wealth have a positive impact on the probability of Own2. The intermediate category (Own1) is indeterminate; that is, we cannot infer the direction of change from the coefficient sign.

[21] Appendix 6 draws on Borooah (2002). A non-technical exposition is Kennedy (2003, chapter 15).

[22] A small number (203) of this group rent their primary residence, but own other property.

Table 12: Probability of being an investor in 2006 (sub-tenure choice ordered probit)

Explanatory variables		*Coef.*	*Std. error*	*Sig.*
Number of children	Aged 0–4 years	-0.051	0.038	0.172
	Aged 5–14 years	0.080	0.023	0.001
	Aged 15–24 years	0.047	0.023	0.037
	Aged 25 years or over	-0.030	0.017	0.074
Marital status	De facto	-0.417	0.064	0.000
(married omitted)	Divorced, separated or widowed	-0.684	0.059	0.000
	Single never married	-0.862	0.070	0.000
	Remarried	-0.066	0.050	0.186
Highest qualification	Bachelor degree or higher	-0.019	0.046	0.675
(no post-school qual. omitted)	Other post-school qual.	0.079	0.040	0.046
Labour market history since	% time in paid work	0.005	0.001	0.000
leaving full-time education	% time unemployed	-0.014	0.003	0.000
Retirement-related factors	Age (years)	0.014	0.002	0.000
	Whether retired	-0.117	0.060	0.051
Whether risk-averse	Whether own life insurance	0.034	0.056	0.538
	Whether unwilling to take financial risks	-0.133	0.036	0.000
	Whether savings time horizons is <1 year	-0.129	0.037	0.000
	Whether save regularly each month	0.003	0.038	0.937
Financial variables	2002 level of gross wealth/$100,000	0.066	0.004	0.000
	2002 level of superannuation wealth/$100,000	-0.039	0.013	0.002
	2002 level of debt not secured by property/$100,000	-0.135	0.025	0.000
	Level of income from inheritance in last financial year/$100,000	0.056	0.231	0.810
	User cost (%)	-1.139	0.275	0.000
δ_1		-7.454	1.823	
δ_2		-5.371	1.822	
Diagnostics	Observations	5233		
	LR Chi^2	1397.55		0.000
	Pseudo R^2	0.144		

Source: Authors' calculations using the HILDA Survey waves 2 and 6.

Table 13 reveals a prediction error that is 33.3 per cent; getting one-third of predictions wrong would seem inferior as compared to the propensity to invest model. However we have a more balanced sample (see Table 11), and the benchmark is the prediction error rate if we randomly assigned persons according to each sub-tenure's share in the total sample. [23] Random assignment results in a prediction error rate of 54.3 per cent, over half of the sample; so the explanatory variables add to the

[23] For every 100 investors, 21 would be assigned to Rent1, 62 to Own1, and 17 to Own2.

predictive power of the model. Note also that just under 12 per cent of the minority Own2 category are successfully predicted, a performance that is much better than the comparable 3.9 per cent achieved by the non-ordered probit model of the propensity to invest.

Financial variables, and in particular the user cost of capital, are once again statistically significant and results are intuitively appealing. The key difference with the non-ordered probit model is the new evidence that demographics, attitudes and saving behaviour do matter. These findings largely confirm the hypotheses put forward in Seelig et al. (2009). It seems that young singles, whether never married or due to marriage break up, with no post-school qualifications are less likely to progress up the property ladder. On the other hand, middle-aged, married couples, particularly those with children aged 5–24 are more likely to climb up the property ladder. Once again those unwilling to take risks are less likely to hold multiple property portfolios, but we have a new result—those with short time horizons for savings are also less likely to hold multiple property portfolios.

The estimated thresholds ($\hat{\delta}_1, \hat{\delta}_2$) defining boundaries between sub-tenures indicate that renters always have a consumption demand that exceeds their investment demand. This is an expected result. But it is surprising to find that individuals begin acquiring second properties even though consumption demand still exceeds investment demand ($\hat{\delta}_2$ is negative). Perhaps households find the tax advantages of housing so attractive that they acquire second homes for vacation purposes, and so become multiple property owners even though investment demand is less than consumption demand. It seems that there is a considerable appetite for property, despite the more generous tax concessions to superannuation that might reduce the appeal of residential housing as a vehicle for accumulating savings. It is conceivable that under 65-year-old individuals view superannuation as locking up savings that cannot be accessed either for consumption purposes, or as precautionary savings to meet unexpected pressing spending requirements. Housing, on the other hand, can be accessed and flexible mortgage products have largely eliminated the transaction costs associated with housing equity withdrawal. Further research is required into these wealth portfolio decisions.

Table 13: Predictive performance of sub-tenure choice ordered probit

Predicted	***Observed***			
	Rent	Own1	Own2	
Rent	323	100	5	
Own1	773	3066	775	
Own2	7	81	103	
% correct	29.3	94.4	11.7	**66.7**

Source: Authors' calculations using the HILDA Survey waves 2 and 6.

5 POLICY IMPLICATIONS AND FUTURE DIRECTIONS FOR RESEARCH

This is the latest in a series of studies that have documented the importance of after-tax economic costs (user cost) to the housing decisions of Australians. These studies use different methods, alternative data sets, and have been conducted at different times in economic cycles. This is the first instance of panel data being used, and it is also novel because the investment decisions of Australian landlords have not been the subject of econometric modelling before this study. The finding is important because it is clear that changes to policy that impact on the user cost measure could have major effects on the propensity to invest, and the willingness of landlords to remain in the market. Monetary policy will therefore have potentially significant impacts and hence strong cyclical patterns to rental investment can be expected. But we should also note that both Federal and state governments set tax parameters that will determine landlord user costs. These range from negative gearing provisions through capital gains tax arrangements to stamp duties and land tax. While these tax provisions are largely influenced by other tax policy considerations, our findings suggest that their potential impact on the supply side of the rental housing market should be carefully taken into account.

There are caveats that should be addressed in a future program of research. Corporate landlords are not examined due to data limitations, though the large majority of landlords are private individuals. Econometric models of rental investment decisions are at a rudimentary stage of development as compared to the econometric modelling of tenure choice. More accessible sources of data have helped researchers develop relatively sophisticated tenure choice models, and a better understanding of the variables that should be included in specifications. In rental investor models, researchers have yet to explore how borrowing constraints can be incorporated into model specifications. Moreover, the dichotomous and ordered probit models estimated in this project are not the only possible modelling strategies. A nested logit modelling approach is one alternative that deserves consideration in a future research agenda.[24] Time series models and methods of estimation are yet another option that could also strengthen confidence in the empirics. This sort of approach has been used to model the response of private industrial investment in plant and machinery to policy parameters and in North America there is a literature that has analysed time series data on private residential investment (see Green, 1997, for example). In view of the supply side concerns that are attracting increasing attention from commentators and policy analysts as they grapple with housing affordability issues, this is a priority topic for future research.

There are other relevant policy parameters that have hitherto been given little consideration. Retirement status is evidently an important influence shaping decisions about the propensity to invest as well as the timing of (dis-) investments. There is some evidence to support the proposition that pension asset tests are prompting retired investors' realisation of rental property investments. But future research needs

[24] A nested logit groups alternatives into nests of similar options, where each option within a nest is correlated with all other options within the nest. However, options within the nest are not correlated with options outside the nest. In our case, the options are renting, owning one's home with no other property and owning one's home with other properties. Hence, one could group the latter two options into a nest while leaving the option of renting outside the nest. The choice would first be made between renting and the 'nest'. If a choice is made in favour of the latter, the model then allows a further choice to be made between options within the nest, that is, owning one's home with another property or without another property.

to ‘unpack’ this finding if we are to arrive at a richer interpretation. Are we witnessing retired investors ‘cashing up’ to go on spending sprees that ‘game’ the rules governing eligibility to pensions? Alternatively, is the observed spike in exit rates from rental investments the result of retirees rebalancing wealth portfolios in favour of more liquid investments? The charting of portfolio decisions and changing spending patterns that older Australian landlords choose as they make transitions into retirement, would help us to unravel these hypotheses.

The precarious nature of private rental housing is a disadvantage to immobile tenant households, particularly couples and sole parents with school-age children who have child care and schooling arrangements that benefit from residential stability. There are mutual gains to be realised if markets match such households with investors that are committed long-term landlords. Unfortunately, our findings suggest that there is no easy way to ensure such matches in a market setting, since the variables that distinguish short and longer term landlords are often unobservable. One of these unobservables is negative gearing status. It turns out that negatively-geared rental investors are more likely to terminate leases at any point in an investment spell (because they sell up, or move in), and they also appear to churn in and out of rental investments. Policy measures to deter churning could include making tax shelter benefits conditional on obligations to continue as a landlord. But such obligations will not necessarily generate a net welfare gain; they introduce rigidity into housing supply that could be the source of efficiency losses if supply becomes less responsive to changing market conditions.

There are some unexpected findings. The conventional wisdom is that investment in ‘bricks and mortar’ appeal to the more cautious investor, but we find that landlords are not more risk averse than others who hold assets other than property. It may be that caution ebbs away following successful property investment decisions; landlords might develop an appetite for risk, particularly if they have chosen property that has benefited from the house price boom that blossomed in most Australian housing markets since 1996.

We might have expected those with healthy superannuation balances to be unlikely property investors, as very attractive tax preferences and temporarily high limits on concessionary contributions encourage realisation of real estate investments in favour of adding to superannuation balances. But we only detect weak substitution effects; perhaps residential housing investment has retained its appeal to younger Australians because superannuation balances are illiquid, while innovation in mortgage markets allows investors to accumulate savings in housing that can be released to meet spending needs at virtually zero transaction cost. However, further research is desirable because our study timeframe is not contemporary enough to capture more recent policy changes, a problem that is exacerbated by lagging our financial variables to address endogeneity issues in the modelling.

The sub-tenure choice model is a promising approach to household portfolio decisions about property. It performs better than a model purporting to discriminate between landlords and other Australians who choose not to become landlords. But it is derived from a theoretical framework that explains the circumstances motivating individuals to invest in property other than their primary residence. It offers no insights into whether these additions will be in the form of rental housing or holiday homes that might be periodically leased to other holiday makers, but are primarily used by the owners for vacation purposes.

This investor’s choice about the form in which to hold other property investments is a potentially important one; agency problems may deter some investors from becoming a landlord (Henderson and Ioannides, 1983; Wood, 2001). They choose to acquire

holiday homes instead. But this phenomenon has impacts on housing supply. There are indirect effects because the acquisition of holiday homes—typically in rural areas—can push prices up and contribute to housing affordability problems for local residents. There are direct effects because potential additions to the stock of private rental housing are lost. We know little about these decisions, even though we estimate that 55 per cent of Australians who own one or more properties other than their principal place of residence report no rental income.[25] Their policy relevance warrants further investigation. This high proportion of holiday homes might offer an explanation for the relatively low percentage of negatively-geared investors in our sample as compared to that reported by the Australian Taxation Office. It could be that many of these holiday home owners receive small amounts of income by leasing out their properties for short periods to holiday makers, but because these amounts are so small they do not report them in the HILDA Survey. On the other hand, there are tax shelter advantages from reporting the rental income when the second property owners have purchased using mortgages.

[25] This includes a small number of people who rent their principal place of residence as tenants but who own another property.

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APPENDIX

Appendix 1: Formal Description of Investors' User Cost of Capital

A rental investor's user cost of capital is the investor's after-tax economic costs as a per cent of property value, taking into account after-tax interest on debt, the after-tax return sacrificed on the investor's equity stake in the rental property investment, after-tax capital gains, operating costs of providing accommodation such as meeting rates and utility charges, repairs, property management fees and land taxes, and transaction costs.

This is computed using the AHURI-3M housing market microsimulation model (see Wood and Ong 2008 for details). In the survival models, we estimate the impact of landlords' user cost in 2002 on the probability of retaining their rental investment in 2006. In the propensity models, we estimate the impact of user cost in 2006 on the propensity to invest in rental housing in the same year, assuming that operating and stamp duties are zero as these cannot be observed for non-investors.

The formal description of investors' user cost of capital based on Wood and Ong's (2008) derivation is presented below. In the propensity model, the variables *v* (operating costs) and *s* (stamp duties) are assumed to be zero.

$$UC = \frac{i+v}{(1-\phi)} - CAP + AMORT \times (CAPTAX + TRANSCOST) \quad (1)$$

where

v = $m + t_p + t_L(1-\lambda_s) + b\lambda_s$, assumed to be zero in the propensity model

$$CAP = \frac{\pi_h - d}{(1-t_y)(1-\phi)}$$

$$AMORT = \frac{\delta}{(1-t_y)(e^{\delta T}-1)(1-\phi)}$$

$$CAPTAX = \tfrac{1}{2} t_y \left[(1-\beta)e^{\pi_h T} - (1+s)\right]e^{-kT}$$

$$TRANSCOST = s + \beta e^{\delta T}$$

i = interest rate

ϕ = agency costs as a proportion of gross rent, assumed to be 11 per cent

t_y = MITR (weighted average of partners of income unit in the case of couples)

m = maintenance costs as a fraction of asset price

t_p = property taxes as a fraction of asset price

t_l = land tax rate (applied to land value)

λ_s = the ratio of the building value to the asset price

$t_L(1-\lambda_s)$ = land tax as a fraction of asset attributable to land value

b = building insurance premium rate (applied to building value)

π_h = house price appreciation rate, assumed to be 3.5 per cent

d = rate of economic depreciation (excluding fittings), assumed to be 1.4 per cent

$\delta = \pi_h - (d + k)$

T = holding period

β = brokerage fees as a fraction of asset price, assumed to be 3.5 per cent

s = stamp duties as a fraction of asset price, assumed to be zero in the propensity model

$k = (1 - t_y)i$

Appendix 2: Wealth and Debt Profile of Investors and Other Australians, 2002

Table A 1: Income unit wealth and debt of investors and other Australians, 2002

	Mean ($'000)			*Composition of wealth based on*			*Per cent that have non-zero levels of wealth and*		
	Investors	*Other home*	*Other*	*Investors*	*Other home*	*Other*	*Investors*	*Other home*	*Other renters*
Wealth									
Primary home	313.6	279.1	0.0	28.3	51.8	0.0	85.9	100.0	0.0
Other property	319.4	5.9	1.7	28.8	1.1	1.8	100.0	2.2	0.7
Equity investments	82.2	42.6	11.1	7.4	7.9	12.1	70.5	52.4	25.9
Cash investments	8.8	2.6	0.7	0.8	0.5	0.8	7.9	4.0	1.5
Trust funds	14.1	8.5	3.2	1.3	1.6	3.4	10.8	4.4	2.7
Bank accounts	43.0	24.3	11.4	3.9	4.5	12.4	97.7	98.4	97.3
Life insurance	13.7	5.3	2.3	1.2	1.0	2.5	18.5	12.7	6.9
Superannuation	167.9	100.1	29.7	15.1	18.6	32.3	92.5	80.5	74.4
Business	111.4	46.1	19.6	10.0	8.6	21.3	25.1	14.7	8.3
Vehicle	25.9	20.6	10.2	2.3	3.8	11.1	97.5	95.8	84.1
Collectables	8.8	3.3	2.0	0.8	0.6	2.2	19.1	15.6	12.4
Total wealth	1108.8	538.4	92.0	100.0	100.0	100.0	100.0	100.0	99.7
Debt									
Primary home	67.8	52.3	0.0	39.6	74.5	0.0	44.0	50.6	0.0
Other property	71.8	1.5	0.6	41.9	2.2	4.5	48.6	1.1	0.6
Business	13.6	7.3	5.1	7.9	10.4	36.8	8.9	6.2	3.6
Credit card	0.9	0.9	1.1	0.5	1.3	7.9	26.6	29.5	36.8
HECS	0.8	0.9	1.7	0.5	1.2	12.4	12.9	8.9	19.7
Other	16.4	7.2	5.3	9.6	10.3	38.4	36.3	28.4	43.3
Total debt	171.3	70.2	13.8	100.0	100.0	100.0	76.8	65.8	63.4
Net wealth	937.5	468.2	78.2						

Source: Authors' own calculations from the 2002 HILDA Survey.

Appendix 3: Proportion of Negatively-geared Investors, by Alternative Data Sources

As noted in the main body of the report, negatively-geared investors are more likely to attrit from the sample. If investors with records in waves 2 or 6 were used to calculate the proportions negatively-geared, the proportions negatively geared would be 33.3 per cent (27.1%) in 2006 (2002).

In the HILDA Survey, persons who reported that they were landlords were asked the following question: '*What was the total amount of income you received from renting properties during the last financial year after expenses were deducted? Your share only. Please exclude rent already included in business income.'* In the rent section in tax return forms, individuals are asked to report their 'gross rent', 'interest deductions', 'capital works deductions' and 'other rental deductions' to derive net rent (Australian Taxation Office 2009a).

The questions on net rental income from the two sources do not appear to differ much. Yet there is a large discrepancy between the proportion of investors who are negatively geared in the HILDA Survey and Australian Taxation Office statistics. In the HILDA Survey, 33.3 per cent (27.1%) were negatively geared in 2006 (2002). However, according to Tax Office statistics, 67.9 per cent of investors were negatively geared in 2006 (Australian Taxation Office 2009b).

Reassuringly, the estimates produced from the HILDA Survey are broadly in line with estimates from other microdata released by the Australian Bureau of Statistics. For example, Wood and Watson (2001) estimated that 27.9 per cent of rental investors were negatively geared from the 1993 Rental Investors Survey. Calculations from the Income and Housing Cost Surveys reveal that 43.7 per cent (47.6%) of rental investors were negative geared in 2002 (2005). Estimates from all these surveys point to under half of rental investors being negatively geared, much lower than the two-thirds estimated from Tax Office statistics.

We offer some suggestions as to why the proportions estimated from the HILDA Survey and other microdata appear to diverge so widely from proportions computed from the Australian Taxation Office statistics:

- Individual landlords with no tax liabilities (for example, non-working partners that share ownership of a rental property) who do not file tax returns are not included in the ATO figures, but will show up in the HILDA and ABS samples.
- A considerable number of Australians (we estimate 921,000) own second homes that generate no rental income according to the 2006 HILDA survey. These second homes may be spasmodically leased (say to friends and relatives), and incomes are so insignificant or irregular that they fail to be reported in ABS and HILDA surveys. But owners nevertheless declare these incomes in tax returns because it allows them to deduct mortgage interest, repairs and so on from taxable income.
- Finally, there is always the possibility that taxpayers exaggerate deductions in tax returns, and fail to take into account certain costs (such as depreciation on fixtures and fitting) when reporting net rental income in HILDA and ABS surveys.

Appendix 4: Impact of Quarantining Negative Gearing on Rents in the Private Rental Housing Market

The negative gearing estimates from the HILDA Survey have their policy simulation uses because it can be used to estimate the effects of changes to various policy parameters. Upon quarantining negative gearing in the sample of landlords from wave 6, we find that landlords' mean after-tax economic cost would rise from 9.04 per cent to 9.09 per cent. This represents a small proportionate increase of 0.55 per cent in user cost [(9.09–9.04)/9.04 x 100%]. If this is passed on to the market rental rate, then private renters' rents would rise by 0.55 per cent on average. The typical private renter paying $9,410 in annual rent would experience an increase in rent to $9,462, an annual increase of only $52, or $1 per week. Eligible private renters would find that their Commonwealth Rent Assistance entitlement has increased from $851 to $854 to partially offset this rise in rents.

This small increase in rents paid by private renters reflects the minority status of negatively-geared investors in the HILDA sample. Note also that quarantining deduction of losses does not prevent their eventual deduction from taxable income; it delays their deduction until positive rental income is generated. It is therefore a less draconian measure than one preventing deduction of mortgage interest (and other costs) at any time.

Appendix 5: Impact of an Upfront Grant on Landlords' Probability of Retaining Rental Investments

To further illustrate the importance of financial drivers, we conduct a simulation of an upfront grant policy along the lines of that now offered by the Federal Government to landlords under the National Rental Affordability Scheme (NRAS). The NRAS provides a $6,000 tax credit (grant, if to a non-income taxpaying organisation) per new dwelling constructed, each year, for 10 years, plus $2,000 cash or an in-kind contribution from the relevant state or territory government. The NRAS seeks to stimulate the supply of private rental stock through the construction of 50,000 new dwellings for private rental households between July 2008 and June 2012. Landlords receiving the grant are required to rent out their dwellings for 20 per cent below the market rent while in receipt of NRAS allocations (Ong, Wood and Winter, 2009).

There are 543 landlords in our sample, representing 603,285 landlords in the Australian population. We assume that the upfront grant will be randomly assigned to 50,000 landlords in return for renting out their existing dwellings at 20 per cent below the market rent. The program is then designed to help retain affordable rental housing. Hence, it is assumed that the scheme will randomly allocate an upfront grant of $8,000 to one in every 12 landlords (50,000/603,285 = 1/12). This results in the grant being allocated to 45 (1/12 or 8% of the sample) randomly assigned landlords.

The provision of an upfront grant as proposed in this simulation will have a two-fold impact on landlords receiving the grant. First, it will lower user cost for these landlords. Second, it will also lower gross rental yield for these landlords as they will be required to rent out their dwellings at 20 per cent lower than the rent they are charging. We find that average user cost among landlords receiving the grant fall from 6.7 per cent to 5.9 per cent and the average gross rental yield falls from 5 per cent to 4.7 per cent. For these landlords, the probability of retaining their rental properties through to 2006 will rise from 46.3 per cent to 54.2 per cent.

Appendix 6: Formal Description of Sub-tenure Choice Estimation Method

Suppose that choice of housing sub-tenure is based on an index J (equal to the excess of investment demand over the consumption demand for housing), that depends on K factors including permanent income, marital status and so on. The values for individual i are X_{ik}, (k=1,….,K). The sub-tenure index can be written as:

$$J_i = \sum_{k=1}^{K} \beta_k X_{ik} + \varepsilon_i = Z_i + \varepsilon_i \qquad (2)$$

$$where\ \beta_k\ is\ the\ coefficient\ associated\ with\ the\ k^{th}\ \text{variable}$$

The sub-tenure index is a latent variable—it is not observed. We do observe the sub-tenure categories in which individuals are observed as J exceeds a series of thresholds. Housing sub-tenure is determined by:

$$\begin{aligned} Y_i &= 1(\text{Rent}), \quad \Rightarrow -\infty < J_i < \delta_1 \\ Y_i &= 2(Own1), \ \Rightarrow \delta_1 < J_i < \delta_2 \\ Y_i &= 3(Own2), \ \Rightarrow \delta_2 < J_i < \infty \end{aligned} \qquad (3)$$

The deltas are unknown parameters to be estimated alongside the betas. Give equation (1) the probabilities of Y_i taking the values 1, 2 and 3 are:

$$\begin{aligned} &\Pr(Y_i = 1) = \Pr(Z_i + \varepsilon_i < \delta_1) = \Pr(\varepsilon_i < \delta_1 - Z_i) \\ &\Pr(Y_i = 2) = \Pr(\delta_1 < Z_i + \varepsilon_i < \delta_2) = \Pr(\delta_1 - Z_i < \varepsilon_i < \delta_2 - Z_i) \\ &\Pr(Y_i = 3) = \Pr(Z_i + \varepsilon_i \geq \delta_2) = \Pr(\varepsilon_i \geq \delta_2 - Z_i) \end{aligned} \qquad (4)$$

Each of the observations is treated as a single draw from a multinomial distribution that has three possible outcomes. Suppose that the HILDA sample reveals that N_1 are renters, N_2 are owner occupiers that own no other property and N_3 are homeowners that own residential property other than their principal residence. The likelihood (L) of observing this pattern of ownership is the product of the probabilities of the individual observations

$$\begin{aligned} L = &\left[\Pr(Y_i = 1)\right]^{N_1} \left[\Pr(Y_i = 2)\right]^{N_2} \left[\Pr(Y_i = 3)\right]^{N_3} \\ &\left[F(\delta_1 - Z_i)\right]^{N_1} \left[F(\delta_1 - Z_i) - F(\delta_2 - Z_i)\right]^{N_2} \left[1 - F(\delta_2 - Z_i)\right]^{N_3} \end{aligned} \qquad (5)$$

F(x) is the cumulative probability distribution function of the error terms. Thus the probability that Z lies below or above the delta thresholds can be framed in terms of the probability that the error term lies below, above or between critical values that are linear combinations of the unknown deltas, betas and the predetermined explanatory variables that help determine sub-tenure choice. The difference between the ordered probit and logit models lie in the assumed distribution of the error term—in most applications in seems to make little difference. The beta and delta coefficients are chosen to maximise the L function in equation 4; the model is known as the proportional odds model because the odds ratio is assumed to be constant for all categories.

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