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Modelling the usage and understanding of financial products: An empirical analysis of Australian owner-occupied and investor mortgages

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Abstract

Binary logit models are used to predict usage and understanding of owner-occupied and investor mortgages on the basis of demographic, socioeconomic and financial characteristics. The data is drawn from the 2003 ANZ Survey of Adult Financial Literacy in Australia and relates to 3,548 respondents. Factors examined include financial literacy, gender, age, ethnicity, occupation, educational level and family structure, along with household income, savings and debt. Understanding is defined in terms of knowledge of mortgage rates, fees and charges and familiarity with key mortgage terms. The results indicate that being middle-aged or a couple with children increases the likelihood of an owner-occupied mortgage, while being from a non-English speaking background, a small business owner or a skilled tradesman increases the likelihood of an investor mortgage. The evidence also suggests that understanding of mortgages is unevenly spread across mortgagees. Understanding is generally poorer for females, rural and regional households and the young, and better for professionals, the university educated and small business owners and skilled tradesmen. The area least understood is mortgage fees and charges.

JEL classification C25, D12, D18

Keywords Owner-occupied and investor mortgages, household debt, residential property investment.

Introduction

Household mortgage debt in most global economies has grown dramatically relative to disposable income over recent years, as has concern that this poses a threat to consumer wellbeing. In the United States mortgage debt relative to disposable income is at a record high – rising from less than 36 percent of disposable income to more than 66 percent in the last thirty years (Maki 2000). Concern has also been expressed about mortgage debt in the United Kingdom – currently increasing by 13 percent annually (Nickell 2003; Scheherazade 2002). And a similar picture emerges in other OECD economies with debt to income ratios rising from eighty percent or lower in the early 1980s, to at least 120 percent in Canada and Germany, more than 130 percent in Japan, and 180 percent in the Netherlands (McFarlane 2003).

In Australia too, there has been unease about the growth of mortgage debt (Reserve Bank of Australia 2002, 2003). In the decade to December 2002 the ratio of household debt to income rose from a level that was low by international standards (56 percent) to one in the upper range for comparable economies (125 percent). Borrowing for owner-occupied housing accounts for most of this debt (85.5 percent) and much of its growth (15.3 percent in the last decade and 15.4 percent in the past five years). Other measures show similar results. For instance, household debt servicing (interest plus required payment of principal as a percentage of disposable income) for mortgage-holding households has risen to 20 percent, up from less than 14 percent a decade ago. For low income households, this can be as high as a third of after-tax income. Likewise, gearing ratios (the ratio of values of housing debt to housing assets) have risen from 13 percent to 20 percent over the past decade, but since most households hold no housing debt, gearing for mortgagees is actually about 43 percent. This is of particular concern given the recent and long-anticipated downturn in residential house prices in most Australian capital cities.

Unmistakably, owner-occupied and investor mortgages are of ever-increasing importance in Australian household debt portfolios, as is household debt relative to household assets. But a major problem is that remarkably little is known about the exact demographic, socioeconomic and financial profile of Australian mortgagees. Holding a mortgage is a life-stage most Australians travel through, and because of this household debt levels are more concentrated than indicated by debt aggregates. Profiling should provide a better understanding of households that may be adversely affected by higher debt burdens, servicing and gearing. This is especially relevant for macroeconomic policy modelling in the event of a severe collapse in residential and investor house prices, general economic downturn, or increase in interest rates.

This motivation, of course, fits well with the diverse area of research, mostly in the UK or US context, focusing on the demand for household debt. Leece (2000a), for instance, used the *UK Family Expenditure Survey* to estimate reduced-form mortgage demand equations. The main findings of this analysis were that there is significant cross-sectional variation regarding the demand for mortgages and that the choice of mortgage instrument. Leece (2000b) also examined the determinants of UK household mortgage debt, though using the *British Household Panel Survey* in the context of a choice between floating or fixed interest rates. He concluded that no socioeconomic variables, including age and first-time buyers and marital status, were significant factors in influencing this choice of mortgage instrument.

Demand functions for household debt have also been modelled in the United States. For example, using the *Survey of Consumer Finance* Crook (2001) examined what variables significantly affected the demand for household debt. It was concluded that household debt was a function of household age, income, size and employment status. Alternatively, Ling and McGill (1998) used the *American Housing Survey* to simultaneously estimate mortgage debt and house value. Ling and McGill (1998) found that larger debt values were often associated with greater value residences and the level of household income, along with household mobility and other demographic variables. Breuckner (1994), Jones (1993; 1994) and Hendershott et al. (1997) have also specified the demand for US household debt as a function of financial, demographic and socioeconomic factors.

At the same time, there is concern that householders' knowledge and understanding of mortgages has not kept pace with booming house prices and debts. This is clearly part of a wider unease with low levels of financial literacy in Australia, especially in young and disadvantaged households. For example, the Australian Law Reform Commission's (1997) *Seen and Heard* report found that young people were ill informed about a wide range of consumer services, while the ANZ Bank's *Survey of Adult Financial Literacy in Australia* conducted by Roy Morgan Research (2003a; 2003b) showed that while most Australians have basic financial literacy, young consumers and those from low socioeconomic backgrounds were at a disadvantage in making informed decisions. Similarly, submissions to the Senate Select Committee on Superannuation and Financial Services (2000) concluded that 46 percent of Australians have "unsatisfactorily low levels of literacy" and 15 percent are "functionally illiterate". Lastly, the Consumer and Financial Literacy Taskforce's (2004) *Australian Consumers and Money* stock take of initiatives by public, private and community sector bodies found that while there was no shortage of consumer information, a good proportion of that material was either not known, not properly targeted or not used by Australian consumers.

The purpose of this paper is then twofold. First, establish the profile of Australian mortgage-holding households in terms of their demographic, socioeconomic and financial characteristics. This should provide a better understanding of households potentially exposed to adverse household debt holding and their ability to deal with any changes in property and financial markets. Second, assay the current state of competence and knowledge concerning mortgage products in Australia. This will allow an assessment to be made of the success of programs by regulators, policymakers, industry groups and businesses to improve financial

literacy generally, and highlight any potential problems with the competence and knowledge base of mortgagees that may compromise their informed participation in these markets, or much worse, adversely affect their own financial wellbeing. The paper itself is divided into four main areas. The first section explains the empirical methodology and data employed in the analysis. The second section discusses variable specification, and the third section presents the results. The paper ends with some concluding remarks.

Research method and data

A convenient consumer behavior model put forward by the Australian Consumer and Financial Literacy Taskforce (2004) hypothesizes that the external environment, socioeconomic background and personal characteristics, financial experiences, and financial skills shape financial decisions. Economic, regulatory, cultural and political factors shape the external environment facing consumers. The consumer's own socioeconomic background and personal characteristics also affect the decision-making process. A role is played by financial experiences with particular products and services. And there are financial skills consumers can learn to assist decision-making. Clearly, modeling the use and understanding of mortgage products should take into account the different demographic, socioeconomic and financial backgrounds of consumers.

The unpublished data used in this study is from Roy Morgan Research's (2003) *ANZ Survey of Adult Financial Literacy in Australia*: a national telephone survey of 3,548 respondents. The data is composed of two sets of information. The first set of information comprises the eight dependent variables in this study and is presented in the uppermost portion of Table 1. The first two variables are from yes/no responses to whether the household had an owner-occupied and/or investor mortgage. At the time of the survey, 1,137 households (32.05 percent) had an owner-occupied mortgage, a further 363 households (10.23 percent) had an investor mortgage, and 182 households (5.12 percent) had both an owner-occupied and investor mortgage.

<TABLE 1 HERE>

The remaining six variables relate to questions aimed at quantifying respondents' specific knowledge of mortgage products in Australia. Five of these questions asked whether each respondent understood well, fairly well or very well mortgage fees and charges, redraw facilities, home equity loans, early termination fees, and mortgage insurance. The final question asked whether the respondent knew that a major disadvantage of fixed mortgage

rates was that they remained ‘locked in’ in the event of a fall in interest rates. The coding for the binary variables is detailed in Table 1. Responses to these questions ranged between the 38.50 percent of respondents who knew what mortgage insurance meant down to the 15.33 percent of respondents who understood the fees and charges on mortgages.

Table 2 provides tests of differences in mean responses between non-mortgagees, owner-occupied mortgagees and investor mortgagees. As shown in the upper panel of Table 2, the proportion of mortgagees indicating higher levels of understanding of mortgages is always significantly higher than that of non-mortgagees. For instance, 80.7 percent of mortgagees understood the term ‘early termination fee’ but only 15.7 percent of non-mortgagees, and 75.8 percent of mortgagees recognised the main disadvantage of fixed over variable rates in the event of a fall in interest rates, compared to just 15.8 percent of non-mortgagees.

The lower panel in this table compares owner-occupied and investor mortgagees. Only for three of the questions concerning mortgage understanding is there a significant difference: for the most part, the differences in magnitude are quite small. For example, 70.5 percent of investors understood ‘home equity loan’ compared to 62.5 percent of owner-occupiers, 84.6 percent of investors understood ‘early termination fee’ as against 80.3 percent of owner-occupiers and 81.8 percent of investors responded correctly concerning fixed and variable rates, compared to 74.5 percent of owner-occupiers. Plainly, mortgagees have a significantly higher level of understanding of mortgages than non-mortgagees, while investor mortgagees have a further (smaller) advantage over owner-occupiers in a few key areas.

<TABLE 2 HERE>

The analytical technique employed is to specify each respondent’s responses concerning mortgages as dependent variables in regressions with demographic, socioeconomic and financial characteristics as predictors. The nature of the dependent variables (binomial) indicates discrete dependent variable techniques are appropriate. Accordingly, binary logit models are specified. The first part of the analysis aims to predict the profile of mortgage-holding households: the sample comprises the entire set of 3,548 households. The second part of the analysis seeks to assay the understanding of mortgages. Only the subset of 1,321 mortgage-holding households is included in the sample.

Specification of explanatory variables

The next set of information is specified as explanatory variables in the binary logit regression models. These relate to the level of financial literacy, demographic, socioeconomic and financial characteristics of the surveyed households. The coding and descriptive statistics for these variables are included in the lowermost portion of Table 1. The first variable is a measure of financial literacy calculated by Roy Morgan Research (2003) using each respondent's answers to a set of eighty questions aimed at measuring adult financial literacy. These include: (i) mathematic literacy and standard literacy questions to test mathematical, reading and comprehension skills; (ii) financial understanding questions to evaluate understanding of what money is, how it is exchanged, and where it comes from and goes; (iii) questions on financial competence to check understanding of basic financial services, financial records, awareness of risk and return and attitudes to spending and saving; and (iv) questions on financial responsibility to confirm knowledge of life choices, rights and responsibilities and confidence when resolving problems. The composite scores range between one and ten from the least-to-most financially literate (see Worthington 2005 for further details).

Table 2 also compares financial literacy across non-mortgagee and investor and owner-occupied mortgagee households. As with the specific measures of understanding, financial literacy more generally is significantly higher for mortgagees than non-mortgagees, and higher again for investor mortgagees compared to owner-occupied mortgagees. In turn, part of these literacy differences may be associated with differences in exposure to mortgage products and markets and part with other, as yet unspecified, characteristics.

The remaining demographic, socioeconomic and financial variables upon which the questions concerning mortgages are regressed are also detailed in Table 1. Whilst there is no unequivocal rationale for predicting the direction and statistical significance of many of these independent variables, their inclusion is consistent with past studies of the determinants of financial access, literacy and behaviour and the presumed interests of consumer groups, regulators, policy-makers and other parties. For example, in their studies of financial literacy Beal and Delpachitra (2003) included gender, household status, age, educational and employment status and time spent in the workforce, while Chen and Volpe (1998) added race and nationality. Breuckner (1994), Jones (1993; 1994) and Hendershott et al. (1997) specified financial, demographic and socioeconomic characteristics in their studies of mortgage

demand. Most recently, Devlin (2005) used educational attainment, employment status, housing tenure, geographic location and ethnicity in a study of financial exclusion in the UK.

The first nine variables relate to the sex, geographical location, ethnic background and age of the respondent. These are used as proxies for characteristics exposing respondents to mortgages and mortgage-related information including stage of life cycle, access to labour and credit markets, exposure to marketing and information campaigns, and language and computer skills. Chen and Volpe (1998: 114) in an analysis of financial literacy, for example, found that "…the percentages of correct answers from the female participants (50.77%) are lower than those from male participants (57.40%)" as did Goldsmith and Goldsmith (1997). Similarly, Chen and Volpe (2002) concluded that the less (financially) knowledgeable group was also more likely to be younger and female, the Jumpstart Coalition for Personal Financial Literacy (2005) in the US established that Native, African, Hispanic and Asian-Americans scored lower than other (White) students and Devlin (2005) found higher levels of financial exclusion for Afro-Caribbean and Asian consumers in the UK. Likewise, the Parliamentary Joint Committee on Corporations and Financial Services (2004) linked isolated rural and regional populations with lower levels of understanding of financial products and Leece (2000b) included age and marital status in a study of mortgage demand. Negative coefficients are hypothesised for gender, rural and regional and language with age coefficients being negative for younger and older respondents and positive for middle-aged respondents.

The next four variables indicate whether the respondent is non-working and looking for work (unemployed), non-working and a student, non-working and engaged in home duties, non-working and retired, and non-working for any other reason. Garman et al. (1999), Beal and Delpachitra (2003), Worthington (2005) and Devlin (2005) also included employment status. Possible reasons for differences in use, competence and understanding of mortgages for non-working respondents include lack of (work) access to computers, telephones and the internet, less exposure to work-related literacy campaigns, and fewer synergies between work-related and personal knowledge of mortgages. It is reasoned that all categories of non-working respondents will have lower levels of use, competence and understanding of mortgages: negative coefficients are hypothesised. Eleven categories of occupation are then specified. While white-collar occupations generally have higher levels of competence and understanding of financial matters, no particular signs are hypothesised.

The next four variables categorise respondents according to the highest level of education attained: namely, HSC/VCE/6th Form/Year 12 (secondary education required for university

matriculation), technical/commercial/TAFE certificate or diploma (vocational specific post-secondary education), and university/CAE degree (three-year programs equivalent to university, polytechnic or liberal arts college elsewhere). All other things being equal, mathematical and language literacy skills attained in secondary and tertiary education should be useful for the purposes of financial understanding, with higher levels of educational attainment associated with a better understanding. Positive coefficients are hypothesised. The following two variables indicate whether the household structure is a single parent or a couple with children at home and follows suggestions that single parent households are especially at risk from a lack of financial access and understanding (Worthington 2005; Devlin 2005).

The final four variables in Table 1 are quantitative variables for household income, saving and debt. Hogarth and O'Donnell (1999; 2000) and Lee (2002), for example, discuss some of the problems of low-to-moderate income households in accessing the mainstream financial sector and Chen and Volpe (1998), Beal and Delpachitra (2003) and Worthington (2005) have linked income with many aspects of financial access and understanding. Ling and McGill (1998) have linked income with mortgage demand. The financial variables are household income, household savings, household mortgage debt and household non-mortgage debt in thousands of Australian dollars. A positive coefficient is hypothesised when use, competence and understanding of mortgages is regressed against all four variables.

Empirical findings

The estimated coefficients, standard errors and p-values of the parameters for the binary logit regressions are provided in Tables 3 and 4. Also included is the chi-squared statistic as a test of the null hypothesis that all slope coefficients are zero, the Hosmer-Lemeshow test for model misspecification and the Nagelkerke R^2 as an analogue for that used in the linear regression model. Table 3 presents the estimated coefficients and significance for the models predicting owner-occupied and investor mortgagee households. Table 4 shows the estimated coefficients and significance for the models predicting specific understanding of mortgage products. The potential regressors for both models include the thirty-five parameters in Table 1 with the exception of 'mortgage debt' in the models in Table 3 and 'financial literacy score' in the models in Table 4. This avoids bias associated with endogeneity i.e. between mortgage debt and mortgage holding and between mortgage-specific and overall financial understanding.

<TABLE 3 HERE>

Models employing the entire set of explanatory variables were initially estimated (not shown), followed by refined specifications (shown) obtained with forward stepwise regression using the Wald criteria. The refined models were always preferred in terms of the trade-off between comprehensiveness and complexity (given the lower value of the Hannan-Quinn criteria) so only the refined models are discussed. This allows a focus on the most significant factors affecting mortgage use and understanding. To save space, parameters not stepped in are not presented. The refined models also appear appropriate to the data examined and the values of the Nagelkerke R^2 are adequate for cross-sectional data.

To test for multicollinearity, variance inflation factors (VIF) are calculated. As a rule of thumb, a VIF greater than ten indicates the presence of harmful collinearity. Amongst the independent variables, the highest VIFs are for age 30-39 (5.02), other white collar occupation (5.73) and skilled trades occupation (4.98). This suggests that multicollinearity, while present, is not too much of a problem. The Hosmer-Lemeshow tests fail to reject the null hypotheses of no functional misspecification (that is, there is no significant difference between the observed and predicted cell counts) so we may conclude that all eight models are appropriate for modelling the use and understanding of mortgage products in Australia.

Consider first the model predicting owner-occupied mortgagee households (columns 2, 3 and 4). The estimated coefficients indicate that persons aged 18-24 years, the unemployed, students, retirees and other non-workers, and semi-skilled and unskilled trades have a greater likelihood of not being an owner-occupied mortgagee. Being 18-24 years decreases the log odds of having an owner-occupied mortgage by 1.60 and being retired decreases the log odds by 1.96. Put differently, the odds (e^x) of not having an owner-occupied mortgage if aged 18-24 years are 4.95 times the estimated odds for other ages and 7.10 times the estimated odds for retirees compared to other non-workers. On the other hand, being aged 30-39 and 40-49 years or a couple increases the likelihood of an owner-occupied mortgage. For instance, being a couple with children at home increases the log odds by 0.64 and odds by 1.90 times over other family structures. The estimated coefficients on financial literacy and income are also positive and significant indicating owner-occupied mortgage participation increases non-linearly, but monotonically, with financial literacy and the dollar value of income.

Next consider investor mortgagees (columns 5, 6 and 7). As shown, the most significant positive factors on investor mortgage holding include being from a non-English speaking background, a small business owner or a skilled tradesman. The increased odds of having an investor mortgage if from a non-English speaking background (1.64 times the odds for an

English speaking background) is reflective of a preference for real rather than financial assets by immigrant families, while the higher odds for small business owners and skilled tradesmen (respectively 1.89 and 1.48 times other occupations) indicates offsetting of business income through negative gearing (tax deductibility of investor interest and non-interest expenses). Significant negative influences on investor mortgages are being aged 18-24 years (log odds of 1.15 times and odds 8.79 times other age groups), retired (log odds of 2.09 times and odds 8.08 times other non-workers) or a single parent (log odds of 0.72 times and odds 2.05 times other family structures). Once again, the likelihood of a mortgage increases with financial literacy and income, as well as with the dollar value of savings and non-mortgage debt.

Table 4 includes the models predicting whether (mortgage holding) respondents knew well, fairly well or very well about fees and charges, redraw facilities, home equity loans, early termination fees, and mortgage insurance and whether they knew the main disadvantage of fixed rate mortgages was that rates were locked in the event of a fall in interest rates. In the case of an adequate understanding of the fees and charges on mortgages, just two variables were stepped into the model. These indicate that semi-skilled tradesmen and those with a higher income are more likely to understand mortgage fees and charges. This contrasts sharply with predicting the understanding of 'redraw facility' where twelve variables were stepped in. Remarkably, and given that the questions on mortgages are closely related, there are many differences between the factors significant in responding to these questions and those concerning the understanding of home equity loan, early termination fee, mortgage insurance and the main disadvantage of fixed rates.

<TABLE 4 HERE>

Key results are that female mortgage holders are 2.10 times less likely to understand 'home equity loan', rural and regional mortgage holders are respectively 1.44 and 1.38 times less likely to understand 'redraw facility' and 'home equity loan', small business owners are 1.68 times less likely to understand 'mortgage insurance' and retired mortgage holders are 2.07 times less likely to understand 'early termination fee'. One possibility is that the lower level of understanding shown by rural and regional mortgagees may be related to fewer opportunities for mortgage information in these areas and a lower level of training available to rural and regional mortgage providers. On the other hand, university educated mortgagees are 1.33 times more likely to understand 'home equity loan', 1.52 times more likely to understand 'early termination fee' and 1.70 times more likely to understand the main disadvantage of fixed rates than other levels of education. Interestingly, the unemployed are 1.49 times more

likely to understand ‘home equity loan’ and this is likely associated with the common necessity of drawing upon home equity during periods of unemployment.

As a final requirement, the ability of the models to accurately predict responses is examined. Table 5 provides the results for the models in each of Tables 3 and 4 with the predicted number in each response category. To start with, consider the predictions for the model of owner-occupied mortgage use. Of the 1,137 respondents with an owner-occupied mortgage, the estimated model correctly predicts 582 as having an owner-occupied mortgage and incorrectly predicts 555 as not having an owner-occupied mortgage. With the 2,411 respondents without an owner-occupied mortgage, the model correctly predicts 2,045 and incorrectly predicts 366. These represent the correct prediction of 51 percent of households with owner-occupied mortgages and 85 percent of households without an owner-occupied mortgage: a total prediction success of 74 percent.

A useful benchmark for comparison is the probability of correctly identifying households as owner-occupied mortgagees based on their sample proportion (equivalent to a regression model with a constant only). Since 32 percent of the sample is owner-occupier mortgagees, this model would correctly identify only 32 percent (364 households) as owner occupiers and 68 percent (1,639 households) as non-owner-occupiers: the total correct prediction of just 56 percent. Clearly, the demographic, socioeconomic and financial parameters specified in this study are useful for identifying households with owner-occupied mortgages.

<TABLE 5 HERE>

For investor mortgages, the model is clearly better at predicting those without this type of mortgage (99 percent) than those with (7 percent), a prediction success rate of 90 percent overall, and this indicates that it is difficult to identify investor property households with the parameters used in this study. One argument is that while owner-occupied mortgaging is an acknowledged life stage in most households, investor properties can be taken up at any stage. An additional factor is the sizeable amount of speculative residential property investment undertaken in the last ten to fifteen years and the decline in turn-of-the-century stock markets. By comparison, the models correctly predicted 59 percent of responses to the question of understanding concerning fees and charges, 79 percent for redraw facility, 67 percent for home equity loan, 82 percent for early termination fee, 56 percent for mortgage insurance and 77 percent for fixed vs. variable rates. Of course, these are ‘in-sample’ predictions and the results could differ if ‘out-of-sample’ data was made available.

Concluding remarks and policy recommendations

The present study uses binary logit models to investigate the role of demographic, socioeconomic and financial characteristics in determining use and understanding of owner-occupied and investor mortgages in Australian adults. To start with, it has been shown that the profile of mortgage holding in Australia varies strongly according to financial, demographic and socioeconomic characteristics. All other things being equal, persons aged 18-24 years, the unemployed, students, retirees and other non-workers, and semi-skilled and unskilled trades are less likely to be an owner-occupied mortgagee, while being aged 30-39 and 40-49 years or a couple with children are more likely. In terms of investor mortgages, being from a non-English speaking background, a small business owner or a skilled tradesman increases the odds, while those aged 18-24 years, retirees or single parent have significantly lower odds. Financial literacy and income also positively affect the probability of both owner-occupied and investor mortgage participation.

These findings serve to allay at least some fears about rising household debt levels in Australia. Clearly, both owner-occupied and investor mortgage debt are unevenly spread across households, with debt concentrated in a relatively small number in both instances. At the same time, mortgage debt is closely related to increased income and savings and improved financial literacy and this suggests that households are financially and intellectually well-equipped to cope with shocks to the residential property market. Comfortingly, investor (riskily invested) mortgage-holding households have yet further financial and financial literacy advantages over owner-occupied (less-riskily invested) mortgage-holding households.

However, a number of concerns are highlighted in mortgage-specific understanding. No more than forty percent of mortgage-holding households have an understanding of any of four key mortgage terms, only thirty-five percent understand the main disadvantage of fixed relative to available rates during falls in interest rates, and just fifteen percent understand the fees and charges on their own mortgage. Even this low level of understanding is unevenly spread with females, the young and old, and those in blue-collar occupations with low levels of educational attainment having an even poorer understanding of mortgages. Two broad policy implications are noted. First, nearly all households will benefit if literacy programs by governments and businesses continue to expand. Second, mortgage providers can assist especially disadvantaged consumers with targeted education and advice.

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TABLE 1. Variable definitions and statistics

Variable	Definition	Mean
Owner-occupied mortgagee	1 if have owner-occupied mortgage; 0 otherwise	32.05
Investor mortgagee	1 if have investor mortgage; 0 otherwise	10.23
Fees and charges	1 if understand fees and charges on mortgages well, fairly well or very well; 0 otherwise	15.33
Redraw facility	1 if understand what redraw facility means well, fairly well or very well; 0 otherwise	34.30
Home equity loan	1 if understand what home equity loan means well, fairly well or very well; 0 otherwise	27.87
Early termination fee	1 if understand what early termination fee means well, fairly well or very well; 0 otherwise	36.56
Mortgage insurance	1 if understand what mortgage insurance means well, fairly well or very well; 0 otherwise	38.50
Fixed rates	1 if know that fixed mortgage rates remain locked in if interest rates fall; 0 otherwise	35.03
Financial literacy score	Financial literacy score from 1 (lowest level of literacy) to 10 (highest level of literacy)	5.51
Gender	1 if female; 0 male	50.56
Rural and regional	1 if rural, regional or non-capital city household; 0 metropolitan	37.80
Language	1 if language spoken most often at home is non-English; 0 English	10.01
Age 18-24	1 if aged 18-24 years; 0 otherwise	12.80
Age 25-29	1 if aged 25-29 years; 0 otherwise	9.13
Age 30-39	1 if aged 30-39 years; 0 otherwise	20.24
Age 40-49	1 if aged 40-49 years; 0 otherwise	19.59
Age 50-59	1 if aged 50-59 years; 0 otherwise	15.39
Age 60-69	1 if aged 60-69 years; 0 otherwise	11.92
Unemployed	1 if non-working and looking for work (unemployed); 0 otherwise	4.26
Student	1 if non-working and principally engaged as student; 0 otherwise	3.38
Home duties	1 if non-working and principally engaged in home duties; 0 otherwise	7.22
Retired	1 if non-working and principally retired; 0 otherwise	21.03
Non-worker	1 if non-working and not student, home duties or retired; 0 otherwise	2.37
Professional	1 if principal occupation is professional; 0 otherwise	11.02
Owners or executives	1 if principal occupation is business owner or executive; 0 otherwise	1.63
Small business owner	1 if principal occupation is small business owner; 0 otherwise	4.59
Sales	1 if principal occupation is sales; 0 otherwise	6.54
Semi-professional	1 if principal occupation is semi-professional; 0 otherwise	11.95
Other white collar	1 if principal occupation is other white collar; 0 otherwise	22.13
Skilled trades	1 if principal occupation is skilled tradesman; 0 otherwise	17.19
Semi-skilled trades	1 if principal occupation is semi-skilled tradesman; 0 otherwise	11.22
Unskilled trades	1 if principal occupation is unskilled tradesman; 0 otherwise	7.69
Farm owner	1 if principal occupation is farm owner; 0 otherwise	1.10
Farm worker	1 if principal occupation is farm worker; 0 otherwise	0.87
Year 12	1 if highest level of education is HSC/VCE/6th Form/Year 12; 0 otherwise	15.76
Technical	1 if highest level of education completed is technical/commercial/TAFE; 0 otherwise	9.67
University	1 if highest level of education completed university/CAE; 0 otherwise	25.48
Single parents	1 if household structure is single parent with children at home; 0 otherwise	6.85
Couples	1 if household structure is couple with children at home; 0 otherwise	36.27
Income	Total household income ($000s)	61.84
Savings	Total household savings incl. superannuation (retirement plans) excl. home value ($000s)	40.88
Mortgage debt	Total household mortgage debt ($000s)	52.75
Non-mortgage debt	Total household non-mortgage debt ($000s)	15.38

TABLE 2 Comparison of means: Non-mortgagees and owner-occupied and investor mortgagees

		Group A	Group B	F-statistic	p-value	t-statistic	p-value
Non-mortgagees (A) and mortgagees (B)	Financial literacy	5.248	6.054	12.144	0.000	-8.039	0.000
	Fees and charges	0.033	0.409	6374.327	0.000	-25.029	0.000
	Redraw facility	0.133	0.789	136.045	0.000	-47.069	0.000
	Home equity loan	0.106	0.645	1204.549	0.000	-34.686	0.000
	Early termination fee	0.157	0.807	26.782	0.000	-46.940	0.000
	Mortgage insurance	0.343	0.474	115.927	0.000	-7.407	0.000
	Fixed rates	0.158	0.758	134.907	0.000	-40.774	0.000
Owner-occupied (A) and investor mortgagees (B)	Financial literacy	5.902	6.738	0.139	0.710	-5.013	0.000
	Fees and charges	0.405	0.430	2.301	0.130	-0.815	0.415
	Redraw facility	0.784	0.796	0.956	0.328	-0.484	0.628
	Home equity loan	0.625	0.705	36.202	0.000	-2.794	0.005
	Early termination fee	0.803	0.846	13.809	0.000	-1.876	0.061
	Mortgage insurance	0.467	0.474	0.196	0.658	-0.235	0.814
	Fixed rates	0.745	0.818	35.685	0.000	-2.952	0.003

The null hypothesis for Levene's F-statistic is equal variances; the null hypothesis for the t-statistic is equal means; the t-statistic assumes equal or unequal variances depending on the results of Levene's test of homogeneity of variances.

TABLE 2 Parameter estimates and statistics: Owner-occupied and investor mortgages

Variable/statistic	Owner-occupied mortgagee			Investor mortgagee		
	Estimated coefficient	Standard error	p-value	Estimated coefficient	Standard error	p-value
Financial literacy	0.033	0.016	0.035	0.090	0.023	0.000
Language	–	–	–	0.495	0.180	0.006
Age 18-24	-1.603	0.192	0.000	-1.156	0.296	0.000
Age 30-39	0.822	0.107	0.000	–	–	–
Age 40-49	0.610	0.109	0.000	–	–	–
Unemployed	-0.648	0.211	0.002	–	–	–
Student	-0.645	0.295	0.029	–	–	–
Retired	-1.960	0.181	0.000	-2.091	0.305	0.000
Non-worker	-1.517	0.364	0.000	–	–	–
Small business owner	–	–	–	0.638	0.235	0.007
Skilled trades	–	–	–	0.390	0.152	0.010
Semi-skilled trades	-0.303	0.136	0.026	–	–	–
Unskilled trades	-0.419	0.176	0.017	–	–	–
Single parents	–	–	–	-0.716	0.322	0.026
Couples	0.641	0.087	0.000	–	–	–
Income	0.008	0.002	0.000	0.018	0.003	0.000
Savings	–	–	–	0.019	0.003	0.000
Non-mortgage debt	–	–	–	0.004	0.001	0.000
Constant	-1.543	0.167	0.000	-4.722	0.273	0.000
Chi-squared test	940.296	–	0.000	384.719	–	0.000
Hosmer-Lemeshow	9.045	–	0.338	3.863	–	0.868
Nagelkerke R^2	0.326	–	–	0.213	–	–

The null hypothesis for the chi-squared test statistic is no difference between an intercept only and the estimated model; the null hypothesis for the Hosmer-Lemeshow test statistic is no functional misspecification; the Nagelkerke R^2 is analogous to that in the linear regression model.

TABLE 3 Parameter estimates and statistics: Mortgage understanding

	Fees and charges			Redraw facility			Home equity loan		
	Estimated coefficient	Standard error	p-value	Estimated coefficient	Standard error	p-value	Estimated coefficient	Standard error	p-value
Gender	–	–	–	–	–	–	-0.743	0.122	0.000
Rural and regional	–	–	–	-0.362	0.147	0.014	-0.319	0.126	0.011
Language	–	–	–	-0.476	0.224	0.034	–	–	–
Age 25-29	–	–	–	0.701	0.267	0.009	–	–	–
Age 30-39	–	–	–	0.921	0.186	0.000	–	–	–
Age 40-49	–	–	–	0.536	0.177	0.002	0.398	0.134	0.003
Unemployed	–	–	–	–	–	–	0.804	0.403	0.046
Skilled trades	–	–	–	-0.418	0.181	0.021	–	–	–
Semi-skilled trades	0.396	0.193	0.040	-0.832	0.221	0.000	-0.449	0.205	0.028
Unskilled trades	–	–		-1.080	0.284	0.000	-0.647	0.276	0.019
Farm owner	–	–	–	-1.138	0.593	0.055	–	–	–
Farm worker	–	–	–	-2.268	0.851	0.008	–	–	–
University	–	–	–	–	–	–	0.284	0.138	0.039
Income	0.006	0.002	0.007	0.010	0.003	0.001	–	–	–
Savings	–	–	–	–	–	–	0.008	0.003	0.003
Mortgage debt	–	–	–	0.002	0.001	0.012	0.002	0.001	0.000
Constant	-0.840	0.179	0.000	0.383	0.247	0.122	0.329	0.182	0.071
Chi-squared test	10.375	–	0.005	117.717	–	0.000	124.465	–	0.000
Hosmer-Lemeshow	6.572	–	0.362	5.184	–	0.738	8.876	–	0.353
Nagelkerke R^2	–	–	0.011	–	–	0.132	–	–	0.124

	Early termination fee			Mortgage insurance			Fixed rates		
	Estimated coefficient	Standard error	p-value	Estimated coefficient	Standard error	p-value	Estimated coefficient	Standard error	p-value
Age 18-24	–	–	–	–	–	–	-0.724	0.322	0.024
Retired	-0.726	0.320	0.023	–	–	–	-0.600	0.308	0.051
Small business owner	–	–	–	-0.518	0.245	0.034	–	–	–
Semi-skilled trades	-0.559	0.223	0.012	–	–	–	–	–	–
Unskilled trades	-0.587	0.292	0.045	–	–	–	–	–	–
Farm worker	-1.757	0.746	0.018	–	–	–	–	–	–
Technical	–	–	–	0.396	0.178	0.026	0.663	0.239	0.006
University	0.418	0.175	0.017	–	–	–	0.531	0.156	0.001
Income	–	–	–	–	–	–	0.006	0.003	0.023
Savings	0.007	0.003	0.033	–	–	–	–	–	–
Mortgage debt	0.002	0.001	0.011	0.002	0.001	0.027	–	–	–
Constant	1.010	0.181	0.000	-0.185	0.063	0.003	0.583	0.201	0.004
Chi-squared test	51.986	–	0.000	14.338	–	0.002	37.738	–	0.000
Hosmer-Lemeshow	2.952	–	0.937	9.343	–	0.229	3.271	–	0.859
Nagelkerke R^2	–	–	0.063	–	–	0.014	–	–	0.042

The null hypothesis for the chi-squared test statistic is no difference between an intercept only and the estimated model; the null hypothesis for the Hosmer-Lemeshow test statistic is no functional misspecification; the Nagelkerke R^2 is analogous to that in the linear regression model.

TABLE 4 Observed and predicted values

		Observed response		Predicted response		Correct
		No	Yes	No	Yes	%
Owner-occupied mortgagee	No	2411	0	2045	366	85
	Yes	0	1137	555	582	51
	Total	2411	1137	2600	948	74
Investor mortgagee	No	3185	0	3169	16	99
	Yes	0	363	339	24	7
	Total	3185	363	3508	40	90
Fees and charges	No	777	0	758	19	98
	Yes	0	544	524	20	758
	Total	777	544	1282	39	59
Redraw facility	No	281	0	23	258	8
	Yes	0	1040	22	1018	98
	Total	281	1040	45	1276	79
Home equity loan	No	466	0	122	344	26
	Yes	0	855	95	760	89
	Total	466	855	217	1104	67
Early termination fee	No	245	0	8	237	3
	Yes	0	1076	3	1073	100
	Total	245	1076	11	1310	82
Mortgage insurance	No	702	0	621	81	88
	Yes	0	619	501	118	19
	Total	702	619	1122	199	56
Fixed rates	No	310	0	2	308	1
	Yes	0	1011	1	1010	100
	Total	310	1011	3	1318	77

Observed is the actual response by category, predicted is the predicted response by category; percentage corrected is predicted response by category as a percentage of the observed category; the predictions correspond to the models in Tables 3 and 4; total percentage correct is the number of correct predictions as a percentage of the total observed.