Heterogeneous Homebuyers, Mortgage Choice and the use of Mortgage Brokers

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Abstract

Choosing a mortgage product in the face of labor income risk, interest rate risk and borrowing constraints is one of the most important decisions facing a household. This paper investigates the choice between a variety of fixed rate mortgages and adjustable rate mortgages. We find that households with a high loan-to-value ratio, risky income and high risk aversion are more likely to choose a fixed rate mortgage. Choosing a mortgage product relies market search and information. The paper finds that in general first-time homebuyers and those with a high loan-to-value ratio are more likely to use a mortgage broker.

JEL Classification: E40, G21, R51

Keywords: Mortgage choice, First-time homebuyer, Mortgage broker, Information, Predatory Lending

1. Introduction

Home purchase represents a major financial commitment for the homebuyer. For the majority, the finance required is borrowed from a lending institution. The mortgage market is highly competitive and lenders now offer a wide variety of mortgage products with different fixed, adjustable and tracker interest rate terms. In addition, lenders offer discounted adjustable and fixed rate products to attract new business and retain existing customers. In this paper we focus on two aspects of mortgage choice; household risk management and information search.

In a recent theoretical paper on mortgage choice and household risk management, Campbell and Cocco (2003) show that in a life-cycle model with borrowing constraints and income risk, an adjustable rate mortgage (ARM) "is generally attractive, but less so for a risk-averse household with a large mortgage, risky income, high default cost, or low moving probability." In this paper the choice of mortgage product is examined using a multinomial logit model. Our micro dataset allows us to analyse the mortgage choice for two heterogeneous groups, namely, first time buyers and repeat buyers. Our results indicate that first time buyers prefer fixed rate mortgages (FRM) that have the longest term. This is in accordance with the predictions of the theoretical model of Campbell and Cocco (2003).

Information plays an important role in the mortgage choice market, given the range of lenders and available products that face the borrower[1]. If the chosen product is to be the most efficient for the consumer then the consumer needs to have full knowledge of the range of mortgage products available and their prices. Homebuyers can undertake an information search themselves. Alternatively, a mortgage broker will provide information on the range of mortgage products available in the market, or a mortgage agency will provide information on products offered by the firms represented by that broker. Given the range of lenders and mortgage

[1] Miles (2004) present a useful diagram on the flow of information and funds in the UK mortgage market.

products it might be expected that buyers, to overcome information deficiencies, would use a mortgage broker to find them the most attractive option.

However, a feature of the mortgage market is asymmetric information. This information asymmetry can take two forms – moral hazard and adverse selection. In the case of moral hazard the borrower (principal) cannot observe the effort being made on his/her behalf by the mortgage broker (agent). With adverse selection the borrower is unable to judge the effectiveness of the mortgage broker. Generally mortgage brokers receive their commission from the lender (see Anglou and Arnott (1991) for difficulties associated with commission contracts for estate agents, pg 112). Thus, the homebuyer manages to avoid the cost of undertaking an information search in the expectation that the broker will source the most efficient mortgage for them[2]. However, Miles (2003, 2004) suggests that this may not always be the case as "intermediaries have some financial incentive to sell short-term discounted products with the prospect of a resale in the near future". Guttentag (2001) distinguishes between upfront mortgage brokers and conventional mortgage brokers. The latter tend to engage in predatory lending.

Our dataset identifies if the homebuyer used a mortgage broker or not. Our expectation would be that borrower characteristics would be important determinants of whether or not a broker is used. First-time homebuyers with little or no experience of the housing market are considered more likely to use a mortgage broker as they are seeking to overcome information asymmetries.[3] With mortgage brokers offering an opportunity for borrowers to overcome information deficiencies and choose a more efficient mortgage the characteristics that influence the decision to use a mortgage broker are examined in this paper. In a logit model we examine the influence of household characteristics on use of a mortgage broker. The analysis finds that,

[2] Of course this assumes that the broker is not influenced by different commission rates to encourage the take-up of particular products or products from a particular lender – the principal agent problem.
[3] The dataset we use in this paper indicates that just over half of borrowers use a mortgage broker.

in general, the borrowers that are more likely to use a mortgage broker conform to prior expectations, particularly first-time homebuyers or those with a high loan-to-value ratio. In the multinomial logit model for mortgage choice we find that the use of a mortgage broker as an explanatory is statistically significant and reduces the likelihood that all types of homebuyer would choose any mortgage over a discounted one-year fixed rate mortgage. The latter type of mortgage happens to be the cheapest in our dataset. It is suggestive that mortgage brokers are not engaging in predatory lending.

The rest of the paper is organized as follows. In Section 2 we present a review of the literature. Our micro dataset is described in Section 3. Section 4 presents our results. The last section offers conclusions.

2. Relevant literature

One of the early papers to examine the issue of mortgage product choice is Alm and Follain (1987), who develop a two-period theoretical model of mortgage choice. The household chooses the amounts of housing, non-housing consumption, risky investment assets and non-risky investment assets, with the real appreciation rate of house prices being one of a number of random variables. They use two approaches to mortgage choice in this environment. In the first approach the consumer compares utility levels between an adjustable and fixed rate mortgage. In the second approach the interest rate differential that makes the consumer indifferent between the two mortgage types is computed. One of the main conclusions is that as households are assumed to be risk averse and an increase in uncertainty about the mortgage rate increases the probability that a consumer chooses a fixed rate product. They also find that a larger mortgage increases consumer preference for a fixed rate product as a larger mortgage implies a greater

amount of investment in a risky asset if an adjustable rate mortgage is chosen. Alm and Follain (1987) also include the role played by expected capital gain from housing and existing household assets.

Brueckner (1986) also develops a two-period theoretical model of mortgage choice and take account of interest rate caps and margins. He reaches a number of conclusions: borrowers who place a high value on future consumption are likely to opt for a fixed rate product as they prefer a tight interest rate cap[4]; borrowers with a rapidly rising income stream are likely to favor an adjustable rate product, as are borrowers who make large downpayments as both these borrower types have a preference for a loose interest rate cap.

Dhillon, Shilling and Sirmans (1987) examine empirically the impact of pricing and borrower characteristics on the choice of mortgage contract. A probit model is used with the choice being limited to between one type of fixed rate mortgage and one type of adjustable rate mortgage. They find that the mortgage price variables are all significant. Generally, borrower characteristics either have a weak impact or are insignificant in determining the mortgage interest rate choice. Households with co-borrowers, married couples or a short expected tenure have a tendency to prefer adjustable rate mortgage products. Other characteristics such as age, education, first-time homebuyer and self-employment are insignificant. In contrast to the Brueckner (1986) the empirical findings also suggest that borrowers with greater wealth would seem to prefer adjustable rate mortgages

Brueckner and Follain (1988) include regional dummies in their probit model of mortgage choice. They also deal with the issue of the unknown alternative interest rate. In general data is available for the type of mortgage chosen by the borrower. Data is not available on the range of alternatives considered and rejected. They argue that this might be a source of

[4] Brueckner refers to an interest rate cap as the maximum increase between periods in the adjustable mortgage rate.

potential selectivity bias. This potential bias is due to the fact that the borrower can be assumed to have chosen a favorable mortgage type. They find little evidence of selectivity bias and maintain that this is to be expected "when consistent pricing policies lead to little variation in the FRM-ARM rate differential within markets". Borrower characteristics are generally not found to be significant, with only income and a variable identifying inter city movers, being close to significant. It is worth noting that their income effect is contrary to their expectation with the empirical results suggesting that high-income borrowers are more likely to choose an adjustable rate mortgage than low-income borrowers. However, they note that income variable exhibits a *t*-ratio that is only close to being significant and the strength of the income effect is modest. The important variables explaining mortgage choice are the differential between fixed and adjustable rates and the level of fixed rates.

Phillips and VanderHoff (1991) extend the basic model by decomposing the differential between fixed and adjustable rates to take account of initial discounted rates. The initial discounted rate is generally a promotional rate on offer by lenders to attract new customers. Usually this is for a set time period i.e. a one year reduced rate. They find that mortgage choice is primarily determined by relative mortgage costs with the initial discount being the most important factor influencing adjustable rate choice. Phillips and VanderHoff (1994) conclude that relative pricing and local area economic and housing market conditions are the main factors determining mortgage choice.

Sirmans and Ferreira (1995) examine the pricing of housing and mortgage services, using a multiple logit model to determine the probability that the homebuyer is a first-time or a repeat homebuyer. On the basis of these results differences in housing and mortgage characteristics are examined for repeat and first-time homebuyers. They find that first-time homebuyers exhibit a

slightly greater preference for fixed rate mortgages. However, there may be a problem of endogenity with their results. Type of mortgage is one of the variables being used to explain whether or not a homebuyer is a first-time or a repeat homebuyer. However, the decision to choose a fixed or adjustable rate mortgage may also determined by whether the homebuyer is a first-time or a repeat homebuyer

Sa-Aadu and Megbolugbe (1995) extend the analysis of mortgage choice by using a multinomial logit model to take account of differences in the length of the interest rate fixed term. They find that the impact of mortgage price varies across the alternative mortgage products. Differences in borrower characteristics, particularly mobility and affordability, have an influence on the type of mortgage contract chosen.

The role of information in the housing market is an important one. Some homebuyers, such as first-time homebuyers or those who have recently moved to an area, can have difficulty accessing information about the local housing market. The role of information on house prices is examined by Turnbull and Sirmans (1993), who used homebuyer characteristics as proxies for the level of homebuyer information and search costs. They find no evidence of significant differences in house prices across different types of homebuyer and conclude "existing institutions, such as multiple listing services, successfully ameliorate many of the potential price effects of asymmetric information and costly search".

In a recent paper on the issue of mortgage choice Campbell and Cocco (2003) develop a theoretical model to identify household characteristics that should lead the household to prefer one mortgage type to another. The paper places emphasis on mortgage choice as part of household risk management. Households are assumed to be risk averse and to face both income and interest rate risk. The paper presents a range of results based on assumptions about

borrowing levels and the sources of risk and uncertainty. They find that it is optimal for households with stable income and a small mortgage to choose a FRM. In an application if this model to the UK, Miles (2004) finds that "a significant proportion of households – though probably not a majority – might be expected to find that the advantages of very long-term fixed rate mortgages make them attractive."

3. The dataset

Our analysis is applied to the housing market in the Republic of Ireland. There has been massive housing boom in the last decade with real house prices increasing by 9.6% per annum between 1993 and 2003 and the number of mortgages taken out with financial institutions increasing by 6.4% per annum over the same period. Statistics for the Irish mortgage market suggest that the popularity of adjustable interest rate mortgage products has fluctuated over the past decade. The mid-1990s saw adjustable rate products accounting for just a third of the mortgage market, with fixed rate products accounting for over 67 per cent. However, lower interest rates associated with Ireland's entry to Economic and Monetary Union in 1999 has seen a revival of fortunes for the adjustable interest rate product which currently accounts for over 52 per cent of mortgage products on mortgage loans paid, Figure 1.

[FIGURE 1 HERE]

The data for this paper is drawn from a single lender, *permanent tsb*. *Permanent tsb* is a national lender and was previously a building society before converting to a bank in 1994. The company is the largest mortgage provider and the sample is representative of the Irish mortgage market. The dataset of mortgages paid contains details about mortgage product, term and interest rate at issue, as well as borrower and some house structure characteristics. The original

dataset contains over 45,000 cases where each case represents a mortgage paid. However, a number of cases are excluded from the analysis. Those cases for which income data is not available were excluded. Two broad lending guidelines exist in the Irish housing market based on mortgage service cost as a percentage of disposable income and a loan to income ratio. Cases that exceed these guidelines are also excluded, as these cases may reflect special circumstances that are not apparent from the data. Finally, the lender did not offer all the alternative mortgage products over the time period covered, for much of the time 7 year and 10 year fixed rate mortgages were not on offer to borrowers. These cases are also excluded. Typically the longest term for a fixed rate mortgage in the Republic of Ireland is five years.

Our final sample is 36,810 cases over the period January 1999 to December 2002. As is evident from Table 1 the observations span a range of interest rate products. The impact of promotional rates from the lender is evident, with the 1-year fixed and 1-year adjustable rates representing promotional products. First-time homebuyers and repeat homebuyers benefit from a discounted rate as banks seek to gain or retain their business. Table 1 also gives the frequency with which first-time and repeat homebuyers choose the different interest rate product types. First-time homebuyers are more likely to choose a fixed rate rather than an adjustable rate mortgage. They are also more likely to choose the fixed rate promotional product than the adjustable rate promotional product. Growth in house prices increases the level of borrowing that needs to be undertaken to purchase a dwelling. High borrowing levels suggest that an increase in interest rates would substantially increase repayments for those on adjustable rates. First-time homebuyers are younger, more income constrained and lack experience of the housing and mortgage market. On this basis they are expected to be more risk averse.

[TABLE 1 HERE]

Table 2 provides descriptive statistics for each type of homebuyer as well as for the total market. These statistics in many cases confirm prior expectations. First-time homebuyers are younger, less likely to be married and have fewer dependents. In general, first-time homebuyers buy less expensive, smaller properties, borrow more, have a higher loan-to-value ratio and longer mortgages.

[TABLE 2 HERE]

4. Results

4.1 Mortgage Product Choice

The theoretical papers of Alm and Follian (1987) and Brueckner (1986) develop models for mortgage choice based on the utility that the borrower expects from choosing either a fixed or adjustable rate mortgage. The models base the choice of mortgage product on relative costs, individual characteristics, housing market conditions and whether or not the household is risk averse. In this paper we use a multinomial logit model to empirically measure the impact of different financial and homebuyer characteristics on the choice of mortgage. The model takes the form:[5]

$$P\left(y=j\middle|\boldsymbol{x}\right)=\exp\left(\boldsymbol{x}\boldsymbol{\beta}_j\right)\Big/\left[1+\sum_{h=1}^{J}\exp\left(\boldsymbol{x}\boldsymbol{\beta}_h\right)\right],\qquad j=1,.....J, \tag{1}$$

where y is the dependent variable, with a value of between 1 and 5, see Table 3, depending on the type of mortgage product chosen and $\boldsymbol{x}$ is the set of explanatory variables. The model is estimated using a non-linear maximum likelihood method (see Wooldridge (2002) for details).

[TABLE 3 HERE]

[5] See Wooldridge (2002) for more details on discrete response models including multinomial logit.

A model of mortgage product choice is specified, using individual data on mortgage products, financial variables and borrower characteristics. The financial variables are the mortgage term, the ratio of the discounted adjustable rate to the discounted one year fixed rate, and the ratio of the average interest rate on fixed rate mortgage products to the standard adjustable rate mortgage. According to Campbell and Cocco (2003) "homeowners should respond to the yield spread between FRM and ARM mortgage rates, which is driven by the yield spread between long-term and short-term bond yields. When this yield spread is unusually high, more homeowners should take out ARMs; when it is unusually low, more homeowners should take out FRMs."

Since the dataset is from a lending institution it means that the borrower has already decided to take a loan from this lender. The decision we are modelling is with regard to the particular mortgage product the lending institution is offering. A difficulty is that while the mortgage option selected by the borrower is known the alternatives, including options from other lending institutions, that were considered and rejected are not known. The dataset is supplemented by data from the lender giving the prevailing interest rate on the range of available products for each month covered by the dataset. This gives information on the price of the alternative products that would have been considered by the borrower. The alternative not taken by the borrower is taken to be the average of the alternative products on offer over the sample period, i.e. the average interest rate on two-year, three-year and five-year fixed mortgages.

Affordability influences on mortgage product choice are captured by the loan-to-value ratio, the house price to income ratio and house price inflation. Our prior is that the higher these measures of affordability are the less likely the borrower is to choose an adjustable rate

mortgage. This is because an increase in interest rates on a high level of borrowings would decrease affordability, in other words the borrower has exposure to interest rate risk.

The borrower characteristics included in the equation are age, income, married, number of dependents and the number of borrowers. Previous studies (for example see Brueckner and Follain (1988), Phillips and VanderHoff (1991), Dhillon et al (1987)) have found that in general borrower characteristics are not important. However these variables would be related to a households risk aversion and income risk. According to Campbell and Cocco (2003) some these variables should matter as it is optimal for households with high risk aversion and or income risk to choose a fixed rate mortgage. A number of other studies have included a variable for mobility. No such variable is available in this dataset. However, mobility might be correlated with age and with the first-time homebuyer dummy variable. The influence of the house characteristics are represented by the house size and whether the house is located in Dublin city.

The results from the initial multinomial logit model are given in Table 4. The base group used are those who chose a 1 year fixed rate, a discounted fixed interest rate, and so the results are interpreted relative to this base. Variables relating to the mortgage and its interest rate are all significant. In common with Sa-Aadu and Megboluge (1995) the impact of the mortgage price variables is found to vary across the alternative mortgage products. An increase in the difference between the average fixed interest rates and the standard adjustable rate increases the probability an adjustable rate product will be chosen. As the borrowers loan-to-value ratio increases then the probability of choosing a mortgage product other than a one year fixed rate mortgage is lower, suggesting that as the amount of the loan increases borrowers are attracted to

[TABLE 4 HERE]

the affordability of a discounted interest rate and the certainty of knowing the repayment level over the short-term. Both of these results are in accordance with the model of Campbell and Cocco (2003). The results also show that use of a mortgage broker is statistically significant and lowers the likelihood that borrowers will choose a mortgage product other than a discounted one-year fixed rate. Since this is the cheapest mortgage this result is suggestive that Irish mortgage brokers are not engaged in predatory lending.

As the house price to income ratio increases this reduces the probability of choosing an alternative mortgage product than a discounted fixed rate mortgage. This result is consistent with Campbell and Cocco (2003) who find that households with large houses relative to income "are particularly adversely affected by the income risk of an ARM". Somewhat surprisingly as the number of borrowers increases this reduces the likelihood of choosing an adjustable rate mortgage. A prior would be that two borrowers, both working, might be attracted to the lower repayment levels associated with an adjustable rate mortgage. The results also contrasts with that of Shilling, Dhillon and Sirmans (1987) who find that households with coborrowers are more likely to use an adjustable rate mortgage. Examination of the data provides a possible explanation – joint borrowers are more likely to have dependents and so require certainty regarding the size of the monthly repayment.

Household characteristics would appear to be slightly less important than financial veriables in determining mortgage choice. Being a first-time homebuyer is also significant across the equations and increases the probability of choosing an alternative fixed rate product than a discounted one-year fixed rate. However, if a borrower is a first-time homebuyer this reduces the probability that they will pick an adjustable rate product. This is in contrast to Shilling, Dhillon and Sirmans (1987) who find that the first-time homebuyer variable has a

positive, albeit statistically insignificant, impact on the decision to choose an adjustable rate mortgage product. The result of this paper is consistent with Table 1 showing that first-time homebuyers are more likely to pick a fixed rate product. The period covered by the data was a time of rapid strong house price inflation**.** Worries about affordability in such a market may offer some explanation as to why first-time homebuyers in this dataset are more likely to choose a fixed rate mortgage product. The variable indicating if a borrower is male or not is significant in all equations and decreases the probability that a borrower will choose a fixed rate product and increases the probability that an adjustable rate product is chosen.

The sample is split into first-time and repeat homebuyers. A Chow test allows us to reject the null hypothesis of equal coefficients. As shown in Table 5 and Table 6 the impact of variables is similar for both types of homebuyers. However, first-time homebuyers show greater price sensitivity with the ratio between the standard adjustable and the discounted adjustable rate, and the ratio between the average fixed and standard adjustable rate both having a bigger impact on the probability that a first-time homebuyer will pick an adjustable rate.

[TABLE 5 AND 6 HERE]

4.2 Use of a Mortgage Broker

It would be expected that first-time homebuyers are more likely to use mortgage brokers. First-time homebuyers are new entrants to the market who are learning both the house search and mortgage search process. Those with a high loan-to-value ratio may also be more likely to avail of the services of a mortgage broker. This is in the hope that a mortgage broker with a wider information range would be able to source a more attractive loan product with a more affordable repayment. The factors that influence a homebuyer's decision to use a mortgage broker can also be examined given that this is identified in the dataset. Our data indicates that that 58% of first-

time homebuyers and 45% of repeat homebuyers used the services of a mortgage broker. This is similar to the UK where Miles (2004) found that "the proportion of first-time buyers using intermediaries is consistently higher than for other categories of borrowers and is currently close to 60 per cent."

In a competitive market like the mortgage product market there exists a wide range of mortgage types provided by a number of lenders. Thus, any homebuyer entering the market, be they a first-time homebuyer or a repeat homebuyer, faces a wide variety of interest rates and products. Information on the available interest rates by type of mortgage product is published weekly in the property supplements of the national newspapers. However, the potential homebuyer still has to ascertain how much they can borrow given their current income and existing level of outgoings. In other words, while information on prices is readily available information on mortgage "quality" is more difficult to access. Salop and Stiglitz (1977) develop a theoretical model of consumers in the insurance market where consumers face unforeseen information costs. Those who know the distribution of prices will buy bargains while those without information will buy randomly. In their conclusions they put forward the notion that "in the presence of some informed consumers, uninformed consumers ought to 'buy with the market'; price will reflect quality and market shares will reflect the overall 'best buys'".

Information asymmetry in the mortgage and housing market probably represents more of a challenge for the first-time homebuyer who is learning about the housing market in its entirety, whereas the repeat homebuyer has the benefit of experience gained in previous transactions. In the face of imperfect information the homebuyer still wishes to purchase the most efficient mortgage product for their needs. However, undertaking an information search represents a cost for the homebuyer in terms of time and income foregone. However, if the search is not

undertaken then selection of a sub-optimal mortgage product may mean higher monthly repayments. It may also result in a lower level of borrowing, restricting the homebuyer's house purchase ability.

One option is for the homebuyer to undertake an information search themselves in the expectation that the investment of the time and energy required will allow them to make the best choice. Alternatively, the homebuyer can use the services of a mortgage broker to undertake the search with a view to maximizing the amount of borrowings they can undertake, or to minimize the mortgage service cost on their borrowings. A logit model is used to empirically measure the impact of different homebuyer and mortgage product characteristics on the choice to use a mortgage broker or not. The paper then examines the influence of such variables on the decision by a homebuyer to use a mortgage broker. The model takes the form:

$$P\left(y = j \middle| \boldsymbol{x}\right) = \exp\left(\boldsymbol{x}\boldsymbol{\beta}_j\right) \Big/ \left[1 + \sum_{h=1}^{J} \exp\left(\boldsymbol{x}\boldsymbol{\beta}_h\right)\right], \qquad j = 1, \ldots\ldots J, \tag{2}$$

where y is the dependent variable, with a value of 0 or 1, and $\boldsymbol{x}$ is the set of explanatory variables. The model is estimated using non-linear maximum likelihood method.

The results of the logit model estimating the likelihood that a homebuyer will use a mortgage broker are given in Table 7. A Wald test rejects the null hypothesis that the coefficients are all equal to zero. All the variables are significant except household after-tax income and the number of borrowers. High loan-to-value ratios increase the probability that the homebuyer will use a mortgage broker. One possible explanation is that as the loan-to-value ratio increases the need to access the most competitive interest rate possible means that borrowers use a mortgage broker to undertake a mortgage product search. As the mortgage term increases the likelihood of using a mortgage broker also rises. This may reflect affordability issues with borrowers using mortgage brokers to access borrowing over a longer mortgage term to keep repayments

manageable. Being male, in permanent employment and buying a dwelling located in Dublin all increase the likelihood of using a broker. The impact of the Dublin location variable may well reflect easier access to mortgage brokers that for those living in rural areas. The higher the national average adjustable interest rate the higher the probability that the homebuyer will use a mortgage broker. The variable identifying if the purchaser is a first-time homebuyer or not is significant and suggests that first-time homebuyers are more likely to use a mortgage broker. This is line with the argument outlined above that first-time homebuyers are, by their nature, new to the homeownership and mortgage markets. Mortgage brokers are used in order to overcome information deficits and to ensure the most appropriate mortgage interest rate, possibly motivated by affordability.

[TABLE 7 HERE]

The table also shows the results of the logit model on use of a mortgage broker for the sample split by first-time and repeat homebuyers. A Chow test of the sample split, reported in Table 7, allows us to reject the null hypothesis that the coefficient vectors are the same for each type of homebuyer. The impact of the explanatory variables is broadly the same as for the full data set. In the case of first-time homebuyers a lower number of household characteristics are significant, while the purchase price of the property is much more significant than for repeat homebuyers.

The "Cases Correct" value indicates the number of observations for which the predicted value matches the actual value, that is, where the probability value is 0.5 or better. This measure is suggested by Wooldridge (2002) and indicates that the model performs quite well. It is worth noting that this measure does not tell us anything about the quality of the prediction. An alternative based on the log-likelihood is also calculated (see Pindyck and Rubinfeld (1991) and

Wooldridge (2002)) giving a pseudo R squared of .0575. However, Wooldridge (2002) notes "goodness of fit is not as important as statistical and economic significance of the explanatory variables."

5. Conclusions

This paper has examined the impact of homebuyer and mortgage product characteristics on the choice of mortgage product. In contrast to some other studies homebuyer characteristics were found to be significant in their impact. However, in common with the existing literature the mortgage price variables have the biggest impact. Use of a mortgage broker reduces the likelihood of choosing an adjustable rate mortgage. The results would appear to confirm the suggestion of Miles (2004) that brokers encourage the use of short-term products. However, this is a tentative conclusion and merely points to an area for further research. The paper also examines the impact of different characteristics by type of homebuyer and finds that the impact of different characteristics varies by type of homebuyer across the range of mortgage products.

The paper then extends the analysis of mortgage choice to consider what determines the use of a mortgage broker. The concern for the homebuyer is to try and purchase the most efficient product that suits their needs. Like any large market offering a wide range of products this can be hampered by search costs or by lack of information. Homebuyers requiring a mortgage can use the services of a mortgage broker to overcome a lack of information. In general, the variables that increase the likelihood that a mortgage broker will be used conform to prior expectations. Location is an important with an urban location increasing the likelihood that a mortgage broker will be used. First-time homebuyers or those with a high loan-to-value ratio are more likely to use a mortgage broker.

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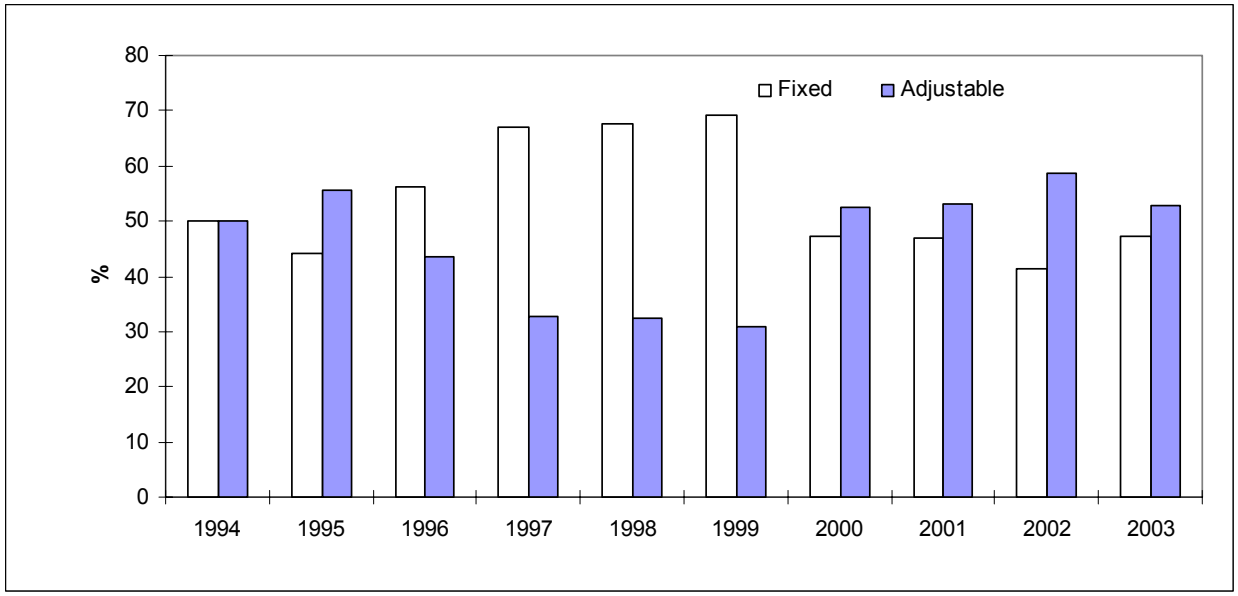
Figure 1: Mortgage loans paid by type of interest rate



Source: DOELG, *Annual Housing Statistics Bulletin*, various issues

Table 1
Frequency of product by repeat homebuyer, first-time homebuyer and total market

	Repeat Homebuyer	First-Time Homebuyer	Total Market
Type of mortgage product	%	%	%
1 yr fixed	53.7	61.5	57.8
2 yr fixed	4.6	5.7	5.2
3 yr fixed	3.7	4.8	4.3
4 yr fixed	0.2	0.2	0.2
5 yr fixed	2.0	2.4	2.2
7 yr fixed	0.1	0.1	0.1
10 yr fixed	0.5	0.4	0.5
Fixed term unknown	0.1	0.1	0.1
1 yr adjustable rate	26.1	20.9	23.4
Adjustable rate	9.0	4.0	6.4
Total	100.0	100.0	100.0

Table 2
Descriptive statistics by homebuyer type and total market

	Repeat Homebuyer	First-Time Homebuyer	Total market
Fixed interest rate mortgage*	64.9	75.1	70.3
Adjustable interest rate mortgage*	35.1	24.9	29.7
New House*	24.4	46.8	36.3
Loan amount, €	103,708	115,040	109,715
House Price, €	190,182	150,260	169,018
Loan-to-Value ratio	57.1	77.7	68
House Price/income ratio	4.4	3.5	3.9
Loan/income ratio	2.2	2.6	2.4
Mortgage repayment/ after-tax income, %	19.5	17.7	18.6
Mortgage term, years	21	25	23
Co-borrower*	71.9	68.8	70.2
Married*	56.7	18.4	36.4
Number of dependents	0.8	0.2	0.5
Age	37	30	33.5
House size, sq ft	1,306	1,192	1,245

* % within each homebuyer type

Table 3
Mortgage choice by type of homebuyer
Dependent variable for multinomial logit model

Y		Repeat Homebuyer	First-Time Homebuyer	Total
		%	%	%
1	1 yr fixed (discounted)	54.2	61.9	58.3
2	2 and 3 yr fixed	8.4	10.6	9.6
3	4 and 5 yr fixed	2.0	2.4	2.2
4	1 yr adjustable rate (discounted)	26.4	21.1	23.6
5	Std. Adjustable rate	9.0	4.0	6.4
		100.0	100.0	100.0

Table 4
Multinomial logit model for mortgage choice for all homebuyers

	2 and 3 year fixed rate	4 and 5 year fixed rate	1 year Discounted adjustable rate	Standard adjustable rate
Constant	**-1.071**	**-0.985**	**0.066**	**-2.291**
	-2.431	*-1.190*	*0.216*	*-4.329*
Spread between discounted fixed and adjustable	**0.242**	**2.101**	**-1.471**	**0.974**
	0.903	*4.036*	*-6.664*	*2.462*
Spread between average fixed and std. adjustable rate	**-0.234**	**0.038**	**1.058**	**2.898**
	-1.488	*0.106*	*8.997*	*9.914*
National mortgage rate	**-0.037**	**-0.279**	**0.186**	**-0.608**
	-1.017	*-3.925*	*6.170*	*-11.986*
Mortgage term	**0.000**	**-0.005**	**-0.002**	**-0.004**
	-0.617	*-6.275*	*-9.586*	*-8.546*
Loan to value ratio	**-0.751**	**-1.951**	**-0.821**	**-0.947**
	-5.413	*-7.670*	*-8.818*	*-6.243*
Household income ('000)	**-0.003**	**-0.021**	**0.010**	**-0.001**
	-1.571	*-5.036*	*7.155*	*-0.539*
House price to income ratio	**-0.036**	**-0.171**	**-0.022**	**-0.079**
	-2.454	*-5.741*	*-2.222*	*-5.705*
House price inflation	**0.049**	**0.055**	**-0.027**	**0.081**
	13.136	*6.621*	*-10.183*	*12.809*
Mortgage broker	**-0.199**	**-0.464**	**-0.162**	**-0.336**
	-5.185	*-6.049*	*-6.001*	*-6.827*
First-time homebuyer	**0.204**	**0.539**	**-0.045**	**-0.482**
	4.451	*5.862*	*-1.466*	*-8.563*
Age of main borrower	**-0.012**	**-0.010**	**0.004**	**0.007**
	-4.073	*-1.815*	*3.013*	*4.016*
Main borrower is male	**-0.188**	**-0.170**	**0.116**	**0.245**
	-4.335	*-1.986*	*3.631*	*4.167*
Main borrower is in permanent employment	**-0.194**	**-0.485**	**-0.038**	**-0.443**
	-1.204	*-1.853*	*-0.298*	*-2.311*
Number of borrowers	**0.117**	**0.264**	**-0.348**	**-0.358**
	2.422	*2.721*	*-10.623*	*-6.260*
Number of dependents	**0.010**	**0.025**	**0.063**	**0.060**
	0.442	*0.631*	*4.280*	*2.674*
House size (sq.ft. '000)	**0.053**	**0.295**	**0.245**	**0.353**
	1.079	*3.258*	*7.827*	*6.749*
Located in Dublin	**-0.092**	**-0.413**	**-0.284**	**-0.445**
	-1.850	*-3.648*	*-7.906*	*-6.691*
Observations	36581			
Log Likelihood	-38566.6			
LR test of coefficients	6231.5	P value	0.000	
Wald test of regression fit	9541.8	P value	0.000	

t statistics in italics
Base group = 1 year fixed mortgage rate

Table 5
Multinomial logit model for mortgage choice for first-time homebuyers

	2 and 3 year fixed rate	4 and 5 year fixed rate	1 year Discounted adjustable rate	Standard adjustable rate
Constant	**-1.566**	**-1.203**	**0.890**	**-4.172**
	-2.602	*-1.058*	*2.024*	*-4.399*
Spread between discounted fixed and adjustable	**0.588**	**2.900**	**-1.601**	**-1.115**
	1.647	*4.244*	*-5.046*	*-1.555*
Spread between average fixed and std. adjustable rate	**-0.188**	**-0.012**	**0.954**	**4.956**
	-0.933	*-0.026*	*5.716*	*9.098*
National mortgage rate	**0.028**	**-0.272**	**0.129**	**-0.509**
	0.577	*-2.851*	*3.000*	*-5.944*
Mortgage term	**-0.001**	**-0.005**	**-0.002**	**-0.003**
	-1.585	*-5.219*	*-6.507*	*-4.155*
Loan to value ratio	**-0.771**	**-1.689**	**-1.012**	**-1.600**
	-3.669	*-4.864*	*-6.706*	*-5.329*
Household income ('000)	**-0.010**	**-0.031**	**0.006**	**-0.003**
	-3.360	*-5.182*	*2.750*	*-0.719*
House price to income ratio	**-0.072**	**-0.180**	**-0.039**	**-0.135**
	-2.563	*-4.111*	*-2.143*	*-3.799*
House Price Inflation	**0.045**	**0.043**	**-0.025**	**0.123**
	8.760	*3.905*	*-6.341*	*9.316*
Mortgage broker	**-0.130**	**-0.533**	**-0.021**	**-0.153**
	-2.553	*-5.255*	*-0.560*	*-1.895*
Age of main borrower	**-0.011**	**-0.010**	**0.001**	**0.003**
	-2.276	*-1.183*	*0.928*	*0.904*
Main borrower is male	**-0.191**	**-0.330**	**0.149**	**0.193**
	-3.460	*-3.061*	*3.375*	*1.997*
Main borrower is in permanent employment	**0.014**	**-0.398**	**-0.048**	**0.084**
	0.065	*-1.193*	*-0.285*	*0.266*
Number of borrowers	**0.251**	**0.424**	**-0.420**	**-0.443**
	3.899	*3.308*	*-9.115*	*-4.695*
Number of dependents	**-0.017**	**0.048**	**0.092**	**0.122**
	-0.401	*0.698*	*3.011*	*2.221*
House size (sq.ft. '000)	**0.102**	**0.515**	**0.285**	**0.414**
	1.486	*4.390*	*6.037*	*4.542*
Located in Dublin	**0.044**	**-0.326**	**-0.275**	**-0.261**
	0.629	*-1.852*	*-4.943*	*-2.054*
Observations	19453			
Log Likelihood	-19584.6			
LR test of coefficients	2881.300	P value	0.000	
Wald test of regression fit	5324.6	P value	0.000	

t statistics in italics
Base group = 1 year fixed mortgage rate

Table 6
Multinomial logit model for mortgage choice for repeat homebuyers

	2 and 3 year fixed rate	4 and 5 year fixed rate	1 year Discounted adjustable rate	Standard adjustable rate
Constant	**0.006**	**-0.069**	**-0.904**	**-2.086**
	0.010	*-0.056*	*-1.980*	*-3.016*
Spread between discounted fixed and adjustable	**-0.204**	**0.941**	**-1.372**	**1.482**
	-0.494	*1.135*	*-4.446*	*3.088*
Spread between average fixed and std. adjustable rate	**-0.233**	**0.168**	**1.173**	**2.275**
	-0.914	*0.282*	*7.053*	*6.458*
National mortgage rate	**-0.115**	**-0.280**	**0.245**	**-0.624**
	-2.085	*-2.575*	*5.760*	*-9.755*
Mortgage term	**0.001**	**-0.004**	**-0.002**	**-0.003**
	1.123	*-3.339*	*-5.718*	*-5.612*
Loan to value ratio	**-0.878**	**-2.174**	**-0.633**	**-0.671**
	-4.559	*-5.564*	*-5.198*	*-3.679*
Household income ('000)	**0.002**	**-0.008**	**0.013**	**0.000**
	0.862	*-1.418*	*7.050*	*0.021*
House price to income ratio	**-0.021**	**-0.146**	**-0.010**	**-0.061**
	-1.159	*-3.503*	*-0.800*	*-3.933*
House Price Inflation	**0.051**	**0.072**	**-0.029**	**0.064**
	8.908	*5.431*	*-7.998*	*8.734*
Mortgage broker	**-0.278**	**-0.321**	**-0.296**	**-0.451**
	-4.706	*-2.685*	*-7.781*	*-7.162*
Age of main borrower	**-0.011**	**-0.007**	**0.007**	**0.015**
	-2.721	*-1.040*	*2.628*	*3.613*
Main borrower is male	**-0.162**	**0.088**	**0.049**	**0.261**
	-2.256	*0.607*	*1.048*	*3.454*
Main borrower is in permanent employment	**-0.489**	**-0.719**	**-0.034**	**-0.768**
	-1.959	*-1.632*	*-0.170*	*-3.043*
Number of borrowers	**-0.049**	**0.025**	**-0.227**	**-0.277**
	-0.645	*0.160*	*-4.687*	*-3.733*
Number of dependents	**0.024**	**0.031**	**0.051**	**0.047**
	0.941	*0.626*	*3.025*	*1.880*
House size (sq.ft. '000)	**-0.012**	**-0.031**	**0.187**	**0.294**
	-0.171	*-0.211*	*4.382*	*4.486*
Located in Dublin	**-0.216**	**-0.538**	**-0.287**	**-0.497**
	-2.999	*-3.527*	*-6.024*	*-6.272*
Observations	17128			
Log Likelihood	-18881.2			
LR test of coefficients	2932.100	P value	0.000	
Wald test of regression fit	4200.2			

t statistics in italics
Base group = 1 year fixed mortgage rate

Table 7
Logit model for use of a mortgage broker

	Full sample	Repeat Homebuyer	First-Time Homebuyer
Constant	**-2.295**	**-2.518**	**-1.984**
	-12.582	*-9.253*	*-7.899*
National mortgage rate	**0.087**	**0.101**	**0.072**
	5.395	*4.316*	*3.191*
Mortgage Term	**0.002**	**0.002**	**0.002**
	10.054	*6.641*	*5.315*
Loan-to-Value	**1.014**	**1.106**	**1.113**
	13.255	*10.749*	*9.321*
Household income ('000)	**0.000**	**-0.002**	**-0.001**
	0.367	*-1.412*	*-0.468*
House price ('000)	**0.002**	**0.001**	**0.006**
	8.208	*4.169*	*11.487*
House price inflation	**-0.019**	**-0.010**	**-0.020**
	-9.968	*-4.772*	*-7.084*
First-time homebuyer	**0.334**		
	12.640		
Age of main borrower	**0.007**	**0.007**	**0.005**
	4.035	*3.267*	*1.955*
Number of dependents	**-0.062**	**-0.066**	**-0.040**
	-4.900	*-4.574*	*-1.557*
Main borrower is male	**0.201**	**0.172**	**0.239**
	7.673	*4.318*	*6.781*
Main borrower is in permanent employment	**0.280**	**0.513**	**0.157**
	2.688	*2.298*	*1.160*
Number of borrowers	**-0.043**	**-0.030**	**-0.029**
	-1.525	*-0.732*	*-0.737*
House size (sq.ft. '000)	**-0.228**	**-0.165**	**-0.355**
	-7.957	*-4.134*	*-8.379*
Located in Dublin	**0.370**	**0.297**	**0.364**
	12.334	*7.341*	*7.835*
Observations	36581	17128	19453
Log Likelihood	-24019.6	-11420.4	-12505.2
Average Likelihood	0.519	0.513	0.526
Cases Correct Pseudo R sq.	0.609	0.597	0.630
Wald test	2385.390	P value	0.0000
Chow test of sample split	348.55	P value	0.0000