

CONSUMER EXPERTISE OR CREDIT RISK? AN EMPIRICAL ANALYSIS OF MORTGAGE PRICING

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ABSTRACT

Loan mortgage interest rates are usually the result of a bank-customer negotiation process. We argue that, since mortgage loan is a complex product, consumer expertise could influence the customer bargaining power in the negotiation. Thus far, consumer expertise has not been considered as a relevant factor for mortgage pricing. Using data on mortgage loan prices for a sample of 1092 households for the year 2005 (Bank of Spain Survey of Household Finances, EFF-2005), and including credit risk, costs, potential capacity of the consumer to generate future business and bank competition variables, the regression results indicate that consumer expertise-related metrics are highly significant as predictors of mortgage loan spreads.

Keywords

Interest rates dispersion, mortgage loan pricing, consumer expertise, knowledge, credit risk

1. Introduction

Financial literature has emphasized credit risk considerations to explain the divergences in mortgage rates paid by different borrowers. In this paper we argue that heterogeneity in consumers' financial sophistication may be a more important factor behind the observed price discrepancies.

The financial literature has modelled the pricing problem for the bank in a context of asymmetric information. Different borrowers have different probabilities of repaying the loan and the bank may have limited information on whether the borrower is a good or a bad risk (Stiglitz and Weitz, 1981). Since the bank's expected return from a client depends on the repayment probability, the banks use several screening devices to be able to identify those with a high probability of repayment. Interest rates, together with collateral requirements, may act as one of such devices. Stiglitz and Weitz also showed that even when the bank can distinguish between borrowers, the optimal pricing involves the same expected return for the loans to different types of borrowers so that those with lower probability of repayment pay higher interest rates. Strahan (1999) found that riskier borrowers pay more for their loans and face tighter non-price terms in their loan contracts, suggesting that banks use both the price and non-price terms of loans as complements in dealing with borrower risk.

Creditworthiness should therefore affect loan spreads. However, there is empirical work showing that credit risk is not sufficient to explain rate dispersion. For instance, some authors have attributed unexplained variability to race discrimination. See, for example, Crawford and Rosenblatt (1999) and Courchane and Nickerson (1997) who use bank level data on mortgage loans, and Schafer and Ladd (1981) who also find evidence of significant differences in loan pricing by race. The importance of credit risk for loan prices is not fully consistent. For instance, Rajan (1994) supported Strahan's conclusions but the works of Lummer and McConnell's (1989), Best and Zhang (1993) and Lax et al. (2004) concluded that credit risk does not have an effect on prices.

Financial research has focused on banks' pricing behaviour but since loan mortgage interest rates are usually the result of a negotiation process between the bank and the client, customers' financial sophistication should not be neglected. In this paper, we argue that consumer expertise might affect the result of the price bargaining process through a better information (about market conditions, his value to the bank,...) or better information processing. Our hypothesis is that financial expertise is a crucial variable to understand the differences in loan spreads. Alba and Hutchinson (1987) defined expertise as "the ability to perform product-related tasks successfully" (p. 411). This concept places its emphasis on the capacity of individuals to rationally face the purchase process. Implicit in Alba y Hutchinson (1987)'s contribution is that consumer expertise might be particularly relevant in complex buying processes and also in pricing contexts in which the final price is determined through a buyer-seller negotiation mechanism.

Mortgage loans have been usually considered as complex services and of great relevance to the customer (see e.g. Iglesias, 2004, Patrício et. al, 2008, Vroomen et al, 2005). Complexity may be even higher when banks implement a price bundling strategy (Guiltinan, 1987), which implies that the bank is willing to negotiate with customers a special price for the mortgage loan in order to sell other complementary products at its regular price (usually, debit and credit cards, home insurance, life insurance and payroll direct deposit). As a consequence of the special interest of the banks in these operations, consumers may have an unusual bargaining power; whether or not consumers profit from this bargaining power depends on their expertise.

For services that are complex and relevant, the consumers engage in an extended decision process, in which several offers of competing firms are compared (Barrutia and Echebarria, 2004, Iglesias, 2004 and Vroomen, et al. 2005). To get a better offer from their main bank, consumers could search for attractive offers from competitors (Vroomen, et al., 2005). More and less knowledgeable consumers could have different capacities to face the process.

Previous marketing literature has considered consumer knowledge as a potential factor affecting consumer behaviour (see e.g. Anderson and Simester, 2008, Anderson, Cho, Harlam and Simester, 2009, regarding 'price cues' and Ofir, et al., 2008 regarding memory-based price judgments). Our main hypothesis is that in the case of mortgage loans, more knowledgeable consumers will be more successful in the search and negotiation process and that the final mortgage loan spread will be strongly correlated with consumer expertise. Consumers with high expertise are able to understand what is at stake in the negotiation process and are more aware of their bargaining position concerning the value of cross-selling and a long association with the bank. This knowledge should improve their bargaining power and therefore result in a lower price.

As far as we know, consumer expertise has not been considered a relevant factor for home mortgage loan prices (or spreads) in the financial or marketing literatures. Related to our research is Grunert and Norden (2009), who have studied small companies bargaining power in their interaction with banks and showed that bargaining power depends on what they call soft facts. Soft facts refer to the assessment of the borrower's strategy, product-market position, and management skills -competence, education, leadership, and credibility.

Our research tries to explain and test empirically the impact of consumer expertise on the price of a complex product such as a mortgage loan. Although we focus on consumer expertise, in our model we also allow price heterogeneity to be explained by individual differences in creditworthiness and potential to generate future business, as well as factors related to service costs and bank competition. Our approach builds on the work of Zeithaml et al. (1985), Hoffman et al. (2002) and Tung et al. (1997) regarding services pricing; Meidan and Chin (1995) for specific marketing research on loan mortgage prices; and Strahan (1999) for credit risk considerations.

We conclude that consumer expertise is one of the main forces driving the price dispersion observed in mortgage loans, while, surprisingly, credit risk seems to be not as relevant. Our results also indicate that other cost and competition related variables, and the potential of the consumer to generate future business to the bank are significant to explain price. Results referred to risk variables are especially relevant. Banks seem to have reached a compromise between the credit risk-price alignment target and the objective of not losing the potential customer. In such a context, customer expertise turns out to be a key explanatory factor of price dispersion. This result could add some insights regarding the interpretation of the recent financial crisis.

From a managerial perspective, our results are consistent with the evidence that CEOs in banks observe that different prices are negotiated for mortgages in different regions or offices; this geographical dispersion in prices may be a rational consequence of consumer expertise heterogeneity. The observed non-alignment of price and risk in the sample period might be explained by the high value that this financial product has had for the banks and the strong competition to attract customers. Our research also seems to suggest that banks management could have been improved by integrating credit risk in the price decisions.

The structure of the rest of the paper is as follows. First of all, we review the relevant literature. Section 3 presents the data set and the empirical model, Section 4 shows the results and Section 5 ends with a discussion of our main conclusions and offers future avenues of research.

2. Literature Review

Our main research question is that consumer expertise has an impact on loan mortgage price. There exist general reasons and also specific contextual reasons to believe that consumer expertise should affect mortgage loan prices.

Literature review is addressed to justify the above approach through three subsections. First subsection is devoted to explain why consumer expertise should impact on prices from a general

perspective. Then we refer to the specific characteristics of the mortgage loan context. We defend that these specificities affect positively the relevance of consumer expertise to explain price dispersion. Finally we refer to other traditional explanative variables of price: search cost, potential capacity to generate future business, cost and competition.

2.1. Consumer expertise

Consumer knowledge has been treated in the literature as a one-dimensional construct, referred to as product familiarity or prior product related knowledge (Alba y Hutchinson 1987). This construct has been measured by several indexes which include frequency of purchase (e.g. Newman and Staelin 1973), formal training (e.g. Hutchinson 1983) and price recall (for a review, see Estelami et al. 2001).

Alba and Hutchinson (1987) use the term consumer expertise “in a broad sense that includes both the cognitive structures (e.g., beliefs about products and their attributes) and the cognitive processes (e.g., decision rules for acting on those beliefs)” (p. 411). They find several ways in which expertise affects consumer ability to perform a buying process successfully. Firstly, high expertise should imply a greater ability to understand the product. Secondly, experts are able to separate what is relevant and important from the irrelevant and the unimportant. Finally, the ability to elaborate on given information generating accurate knowledge that goes beyond what is given, improves as expertise increases.

Previous marketing literature has considered consumer knowledge as a potential factor affecting consumer behaviour. A body of research shows that ‘price cues’ (marketing tactics used to persuade customers that prices offer good value) are less effective with more knowledgeable consumers (Anderson and Simester, 2008, Anderson, Cho, Harlam and Simester, 2009). Knowledge increases people’s ability to interpret and use intrinsic product cues instead of other extrinsic marketing-driven cues (Monroe 2003). Also it has been suggested that a ‘price obfuscation’ strategy may be used by firms to increase margins (Ellison and Ellison, 2009). Firms can hinder customers’ ability to search for price information by reducing the perceived substitutability of the alternatives for non experts. A related literature, referred to memory-based price judgments (Ofir, et al., 2008) shows that, to make a judgment, more knowledgeable consumers use a broader content of the information recalled rather than only the easy to retrieve information. In the context of international marketing, it has been also recognized that customer sophistication varies widely across markets (Morris and Morris, 1990, Myers et al., 2002).

A related view is provided by economics of information search. A central thesis of economics of information search is that buyers search for information until the marginal cost of search exceeds the marginal benefit (Smith et al. 1999). This literature identifies different types of search costs. Among others it refers to cognitive costs which are internal to the buyer and reflect the cognitive effort buyers must engage in to direct search inquiries, sort incoming information and integrate with stored information to form decision evaluations (e.g. Hauser, Urban & Weinberg, 1993). These costs are determined or influenced by consumers' ability to cognitively process incoming information. Ability is supposed to be determined by consumers' prior knowledge of the product category, as well as by personal factors such as intelligence, education or training (Smith et al. 1999). Nevertheless, some studies have shown that experts engage less in search (e. g. Johnson and Russo 1984). According to Alba and Hutchinson (1987), one explanation of this phenomenon is that experts are able to rely on information acquired from previous search activity. So, experts engage in more search, but the amount of searching they carry out for any particular decision may be small. Interestingly, Moorthy et al (1997) find an inverted-U-shaped relationship between expertise and search. Those whose level of expertise is lowest perceive the category as commodity-like, are unable to make fine distinctions and therefore have little incentive to search. Individuals with a high degree of expertise experience relatively little uncertainty about the product and, moreover, feel little incentive to search. In the middle range, searching seems to increase with expertise. More recently, Mattila and Wirtz (2002) have suggested that the relationship between expertise and involvement depends on the

specific source of knowledge (i.e. word-of-mouth, internal memory, neutral independent and mass media).

Above research offers relevant insights to hypothesize that consumer expertise should impact on price. But as far as we know no previous research has studied the impact of consumer expertise on prices. Our research tries to contribute to fill this gap. We build mainly on the basis of Alba y Hutchinson (1987)'s concept of expertise and on the Cohen and Levinthal (1990)'s concept of absorptive capacity and propose that expertise is obtained and assimilated in an accumulative way. Prior knowledge confers ability to recognise the value of new information, assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990).

Consumer expertise might be especially relevant in complex buying contexts (Alba and Hutchinson, 1987). Vroomen et al. (2004) stated that in a mortgage loan context, consumers often use an extended decision process (Barrutia and Echebarria, 2004; and Iglesias, 2004), in which several offers of competing firms are compared and assistance of an expert is usually needed. In the USA, roughly 60 percent of home loans are done through mortgage brokers who negotiate their fees one-on-one with borrowers (Woodward, 2003). Interestingly, Woodward found that broker fees are profoundly related to borrower education. Among the 2,700 loans analyzed, in the period 1996-2001, average broker fees were \$2,425. Borrowers with a bachelor's degree pay their brokers \$1,500 less than those without, controlling for house value and metropolitan area income.

The use of bundling strategies (Guiltinan, 1987, Mulhern and Leone, 1991 and Stremersch and Tellis, 2002) by banks adds complexity. Universal banks often sell the mortgage loan as a leader product of a bundle that includes other complementary products. They usually use what Guiltinan, (1987)'s called a 'customer acquisition/mixed leader' strategy (Guiltinan, 1987) in which the mortgage loan price is sold to a reduced (and negotiated) price and the complementary products are usually sold to their regular price. Banks use bundling due to tactic and strategic reasons. A tactic reason is that banks expect that customers focus on loan characteristics (mainly loan price or rate spread in the case of a variable rate loan) as a main attribute of value and also that they buy the complementary products at their regular price (Adams and Yellen, 1976, Janiszewski and Cunha, 2004). Two strategic reasons are (Barrutia and Echebarria, 2004): (1) the great capacity for mortgage loan to create a long and depth relationship. The purchase of a home is the most significant investment many families ever make. Consequently, consumers feel it is reasonable to take out a multi-risk insurance policy on their home and on their loan payment (life insurance). Furthermore, the mortgage loan payment occupies a high percentage of net monthly salary, making it more convenient for customers to have their salary paid directly into a current or savings account they have opened with the bank, and (2) the purchase and financing of a home is a particularly important contextual experience for the consumer. In this special context the price factor is of great significance. Banks know that it is very difficult to attract new consumers when they are not involved in complex contextual experiences such as a marriage or buying a new house (Harrison, 2002).

To sell loan mortgages banks usually adopt a 'buyer-seller negotiation mechanism' (according with Kim et al., (2009)'s nomenclature). Concepts such as participative pricing, customized prices and personalized prices have emerged in the last decade as a relevant topic of research due, among other factors, to the advance of ICT's (see e.g. Choudary et al. 2005, Cross and Dixit, 2005, Dixit et al. 2008, Kim et al. 2009, Kopalle et al. 2009). But they have been usual in the Spanish mortgage loan context for a long time.

So, consumers are involved in a negotiation process. Negotiation literature refers to the limited capacity of human information processing and assumes that negotiators are not able of processing too many different reference points at the same time (Van Poucke and Buelens, 2002). Also the importance of learning in negotiation has been highlighted (Jordan, 2002). Negotiation has been described as a sequential decision-making process in which the decision maker has a chance to update his knowledge after implementing the decision made at a certain stage and receiving feedback so that he can make a more informed decision at the next stage

(Zeng and Sycara, 1998). So, the view of mortgage loan price determination as a negotiation process contributes to support the importance of consumer expertise as a determinant of price, because learning depends on previous knowledge or absorptive capacity.

In this context, we also believe that although consumers face a complex buying process they might have an unusual bargaining power. Consumer (bargaining) power derives from the singular interest of banks in the mortgage loan. But it also depends on consumers' ability to access appropriate information and/or to evaluate a product prior to purchase. Access to information is increasingly easier due to banks network is extensive and banks branches are close (especially in Spain). Also Internet' access has reduced information incompleteness and asymmetries (Pitt, et al. 2002, Varadarajan and Yadav, 2002). These arguments conduct us to think that to explain price diversity 'consumer expertise asymmetries' might be more important than information asymmetries.

2.2. Other explanative factors of loan prices

Service marketing literature has considered jointly cost- competition- and demand-related factors (Zeithaml et al. 1985) as determinants of price. Meidan and Chin (1995), after interviewing building societies' executives, found that mortgage pricing was influenced primarily by internal industry determinants - such as costs and competitors' prices - and to a lesser extent by market related factors. Hoffman et al. (2002)'s framework included not only demand-, cost- and competitive- factors but also customer, profit, product, and legal considerations. Tung et al., (1997) offered a service pricing approach that included, among other factors, bundling and unbundling services pricing.

Cost-oriented and competitive-oriented approaches are the two traditionally dominant pricing approaches in the service industry (Zeithaml et al., 1985). Hoffman et al. (2002) stated that cost-oriented pricing is more difficult for services. But covering service costs is supposed to be a basic objective. We assume that mortgage loan service cost is practically fixed (staff time and building maintenance) and practically independent of amount and term (Harrison, 2000). So the unitary costs of providing the mortgage service (costs per euro borrowed) are inversely related to the loan amount and the loan term. We should expect that impact of service cost in unitary price (interest rate) has a reverse relationship with the loan amount and term. Market conditions should also have an impact on negotiated prices. It is expected that the final price a consumer obtains is affected by the typical/average price for this service in this specific moment of time in the market. In particular, the Spanish bank market dramatically reduced loan spread before 2005 due to strong competition, consumer financial sophistication and the Internet irruption, among other factors (Barrutia and Echebarria, 2004).

Search costs refer to the amount of time and energy a consumer puts into the process of information gathering before making a decision. Since the mortgage decision is usually important for the consumer it implies a high search effort and involvement (e.g. Padula and Busacca, 2005). Grewal and Marmorstein (1994) state that consumers' willingness to spend time on comparing prices depends on the expected savings related to the purchase price and Mittal and Myung-Soo (1989) indicate that the level of involvement seems to be influenced by utilitarian (and also psychosocial) antecedents. It is to be expected, therefore, that there be a high degree of involvement, and search and cognitive effort when households are faced with the purchase of a mortgage loan. Search costs depend on factors external to the consumer and also on internal factors, such as cognitive skills and health status (Smith et al. 1999).

On the other hand, relationship marketing literature predict that banks focus on customer satisfaction and expected lifetime value (e.g., Reichheld 1996; Bolton, Lemon, and Verhoef, 2004; Bharath et al., 2007; Dawes, 2009). In a mortgage loan context, price could be a main factor to explain the consumer buying decision and satisfaction. So, when consumer has potential to generate future business to the bank, loan mortgage price could be lower in the hope of obtaining additional future business that increases lifetime value. We expect therefore that specific consumer potential to generate future business to the bank should impact on price.

3. Data and Empirical Model

The data set was obtained from the Bank of Spain (Spanish Survey of Household Finances, EFF-2005) and contains extensive information at the individual level on the financial situation and demographics for a sample of 5962 households (1092 of them were paying a mortgage loan). The description of the variables used in the analysis is included in Table 1.

Our empirical model includes as explanatory variables all the factors that may affect the interest rate paid by customer i for a mortgage loan to buy a home. They are grouped in three categories: customer expertise (E_i); credit risk (R_i) and control variables (C_i). Among the control variables we include: social capital; market conditions; potential to generate future business to the bank; cost; and demographic variables. The regression equation is:

$$s_i = \alpha + \beta_1 E_i + \beta_2 R_i + \beta_3 C_i + \varepsilon_i$$

where s_i is the difference between the loan mortgage interest rate of consumer i and the market price (EURIBOR).¹

Consumer expertise level (E) is proxied by (a) education, (b) occupation and (c) familiarity with banks.

(a) By using dummy variables, five levels of education are compared to the reference point, i.e. individuals who did not go beyond primary education.

(b) Also five levels of occupation are referenced against the unskilled workers point.

(c) Familiarity with banks is measured by using a dummy variable that echoes if at least one of the two main members of the family is working for the financial sector and other variables which reflect familiarity with bank products/channels. We consider traditional products (credit cards, transfers, insurance and pension plans) and more sophisticated products such as the buying of options and swaps and the use of the internet channel. Internet channel use is considered as an indicator of financial sophistication, in the specific case of Spain, because according to Eurostat less than 15% of all individuals aged 16-74 used this channel in 2005. Previous literature focuses on frequency of use to measure expertise (Estelami, et al. 2001). Our measure expertise focus knowledge absorption obtained through an accumulative process and includes indicators of sophistication.

So consumer expertise level is proxy by education, occupation and familiarity with bank products and channels. These proxies of expertise are used as predictors of loan mortgage prices.

We also consider knowledge transferability. It has been broadly recognized that knowledge is transferable. Individuals learn from their peers, neighbours and friends (Arrow, 1962). In terms of the influential distinction of Polanyi (1967), knowledge may be tacit and codified. Therefore, it is commonly argued that the transfer of tacit knowledge requires face to face contact, which has been referred as word of mouth (Bristor, 1990, Bansal and Voyer, 2000) and social capital (Bandura, 1977, Putnam, 2000). According with Granovetter (1973)'s view regarding weak ties and strong ties, network size and trust have been considered as key components of social capital (for a recent review see Zheng, 2008). The primary mechanism through which network dimension affects knowledge transference is the availability of a large and probably diverse volume of information. Trust is consistently agreed upon as a contributing factor to knowledge transference (Zheng, 2008).

¹ For variable rate loans –which account for more than 90% of mortgage loans in Spain-, bank and consumer negotiate the spread (price-EURIBOR) instead of the interest rate. Thus, our empirical model uses spreads as the dependent variable.

TABLE 1
Variables description.

Variables	Description
Dependent variable: price spread	Mortgage interest rate minus EURIBOR.
Consumer expertise/ General knowledge / Education (1) Secondary (≤ 16 years of age); (2) Upper Secondary/High school (≤ 18 years of age); (3) Vocational school (≥ 18); (4) College/university (≥ 18); (5) Master/Doctorate	Highest level of education attained by the two main members of the family. Five dummy variables were created; the reference point is the set of the individuals who did not go beyond primary education.
Consumer expertise/ General knowledge / Occupation (1) Skilled service employees (sellers,...); (2) Administrative; (3) Support technicians; (4) Technicians and scientists; (5) CEOs and high executives	Highest level of occupation attained by the two main members of the family. Five dummy variables were created; the reference point is the set of unskilled workers.
Consumer expertise / Sector Knowledge Financial services employee	Dummy variable that takes value 1 if at least one of the two main members of the family is working for the financial sector and 0 otherwise.
Internet user	Dummy variable that takes value 1 if family use internet banking services and 0 otherwise.
Bank transfers user	Dummy variable that takes value 1 if the family orders bank transfers (others than direct debits) and 0 otherwise.
Buyer of complex products (options, swaps, etc)	Dummy variable that takes value 1 if the family has bought complex financial products such as options and swaps, and 0 otherwise.
Insurance	Insurance premiums paid annually (thousand euros).
Credit card expenditure	Average monthly amount of credit card payments (thousand euros).
Pension plan	Dummy variable that takes the value of 1 if the family has a pension plan and 0 otherwise.
Social Capital Network size	Variable that takes the values 0, 1 and 2 if none, one or two of the two main members of the family, work for an institution or company with more than 20 employees.
Trust	Dummy variable that takes value 1 if the family received a loan from relatives or friends and 0 otherwise.
Risk variables Debt-to-wealth Debt-to-income Loan-to-income Loan-to-wealth Loan-to-real assets Loan denials	Ratio of total household debt and gross wealth (value of all assets). Ratio of total household debt and income. Ratio of loan amount and income. Ratio of loan amount and wealth. Ratio of loan amount and real assets. Number of times that the family has applied for a loan and has not been approved in the last two years (self-reported)
(1) Permanent labour contract (head); and (2) Permanent labour contract (other)	Dummy variable that takes value 1 if the head of the family (other member) has a permanent labour contract and 0 otherwise.
Market conditions / Mortgage date	Year of mortgage.
Potential cross-buying Income Real assets Financial assets	Annual income (thousand euros). Market value of family real assets (thousand euros). Market value of family financial assets (thousand euros).
Cost-related variables Mortgage loan amount Mortgage loan term Variable/fixed rate	Sum of money borrowed. Maximum number of years to repay the loan. Dummy variable that takes value 0 if the rate of interest is fixed for the whole life of the loan and 1 if it is variable.
Demographic characteristics Age Married Health	Year of birth of the head of the family. Dummy variable that takes value 1 if the head of the family is married and 0 otherwise. Dummy variable that takes value 0 if a member of the family has a bad or very bad health and 1 otherwise.

Raw data obtained from the Survey of Household Finances 2005. Bank of Spain

We also consider credit risk variables (R). Spanish Banks use expert judgements and more recently credit-scoring systems to assess the credit risk of mortgage loans. Credit experts are supposed to use traditional “three C’s” of credit that are capacity, capital, and creditworthiness (see e.g. Altman and Saunders, 1997, Straka, 2000). Capacity refers to how much debt a borrower can comfortably handle according with her/his income. Capacity is usually measured by using debt-to-income and loan-to-income ratios and employment status. We use these three variables as a proxy of capacity-related risk. Employment status is measured by using a dummy variable that considers if the head of the family (or other member) has a permanent labour contract. Capital refers to current available assets of the borrower, such as real estate, savings or investment that could be used to repay debt if income would be unavailable. It is measured by using the debt-to-wealth, the loan-to-wealth and the loan-to-real assets ratios. Creditworthiness refers to how a person has handled past debt obligations. Usually banks ask for specific credit reports to previous customer’s banks. To proxy it we use the variable loan denials (number of times that the family has applied for a loan and has not been approved in the last two years).

We measure social capital by using an indicator of network size (i.e. any member of the family working for an institution or company with more than 20 employees) and an indicator of trust (i.e. receiving loans from relatives or friends). Market conditions are measured by using the mortgage date.

Bank business refers to money management and movement. Specific consumer potential to generate future business to the bank is measured by using three indicators related to affluence: family income, real assets and financial assets. Loan amount and term are considered as cost related variables. Also fix rate loans are included as a cost related proxy because they incorporate an additional cost to warrant the same price during the whole life of the loan. Fix and variable rate mortgage loans are very different products regarding bank assets and liabilities management and their price follow different criteria. Demographic characteristics include age, married or not status and health as a proxy of search costs.

4. Results

Table 2 presents the regression results. Variables related with consumer expertise are very relevant to explain mortgage loan spread dispersion. In particular, variables related to general knowledge (education and occupation) and variables related to specific sector knowledge are critical to explain final prices.

Concerning education variables, all education levels have lower interest rates than the reference point (unfinished secondary education). The highest impact on interest rates corresponds to Master and/or Doctorate studies, as well as vocational studies, with around 0.3% lower interest rates. Skilled employees, technicians, scientists and high executives pay around 0.2% lower interest rates.

Interestingly, among the variables related to specific sector knowledge, the relevant ones are those that reflect the level of financial sophistication (i.e. use of the internet channel for bank transactions and use of complex services such as futures, options and swaps). This result supports our main research hypothesis, i.e. that consumer expertise has a significant effect on loan prices.

Previous financial literature has focused on credit risk. We use several variables that have traditionally been used to proxy credit risk. Debt-to-wealth, debt-to-income, loan-to-income, loan-to-wealth and loan-to-real assets ratios, as well as previous loan denials, have no impact on price. The unique credit risk proxy that is significant to explain price is to have a permanent labour contract. This is an expected result because in Spain labour market rigidities and high firing costs imply that permanent labour contracts are difficult and expensive to revoke. As a consequence, this variable is used by banks as a main indicator of credit risk. This low relevance of risk ratios is contrary to the normative prescriptions of the financial literature and it is an unexpected result.

TABLE 2
Determinants of mortgage loan prices.

	Specific. 1	Specific. 2	Specific. 3	Specific. 4
Consumer expertise				
<i>General Knowledge</i>				
<i>Education (achieved level)</i>				
Secondary ed. (16 years of age)	-.17 (.09)*	-.11 (.23)		
High school (18 years of age)	-.23 (.02)**	-.16 (.05)*	-.14 (.08) *	-.13 (.08)*
Vocational school (≥ 18)	-.35 (.00)***	-.28 (.00)***	-.25 (.00)***	-.27 (.00)***
College/university (≥ 18)	-.14 (.14)**			
Master, Doctorate	-.37 (.00)***	-.27 (.00)***	-.25 (.00)***	-.26 (.00)***
<i>Occupation</i>				
Skilled service employees (sellers,..)	-.27 (.01)**	-.24 (.00)***	-.23 (.00)***	-.22 (.01)**
Administrative	-.01 (.87)			
Support technicians	-.10 (.31)			
Technicians or scientists	-.18 (.13)	-.17 (.04)**	-.15 (.08)*	-.17 (.04)**
CEOs and high executives	-.20 (.06)*	-.17 (.04)**	-.18 (.03)**	-.17 (.03)**
<i>Sector Knowledge</i>				
Financial services employee	-.18 (.15)	-.20 (.11)	-.19 (.12)	
Internet user	-.12 (.06)*	-.16 (.01)**	-.15 (.01)**	-.18 (.00)***
Buyer of complex products (options, swaps, etc)	-.20 (.27)	-.26 (.11)	-.25 (.08)*	-.30 (.09)*
Bank transfers user	-.07 (.25)	-.10 (.12)	-.09 (.14)	
Insurance	.81 (.12)			
Credit card expenditure	-.01 (.79)			
Pension plan	-.03 (.62)			
Social Capital				
Network size	.08 (.10)	.06 (.19)		
Trust	-.59 (.31)			
Risk variables				
Debt-to-wealth	-.07 (.73)			
Debt-to-income	.005 (.77)			
Loan-to-income	-.005 (.71)			
Loan-to-wealth	1.39 (.10)	.5 (.73)		
Loan-to-real assets	-1.22 (.13)			
Loan denials	-.04 (.54)			
Permanent labour contract (head)	-.18 (.00)***	-.19 (.00)***	-.15 (.01)**	-.15 (.01)**
Permanent labour contract (other)	-.12 (.07)*	-.12 (.06)*	-.08 (.14)	
Market conditions				
Mortgage date	-.02 (.00)***	-.02 (.00)***	-.02 (.00)***	-.02 (.00)***
Potential cross-buying				
Income	-.06 (.90)			
Real assets	-.005 (.18)	-.005 (.03)**	-.006 (.02)**	-.006 (.02)**
Financial assets	-.005 (.84)			
Cost-related variables				
Mortgage loan amount	-1.03(.01)**	-1.05 (.00)***	-1.05 (.00)***	-1.13(.00)***
Mortgage loan term	-.01 (.01)**	-.01 (.00)***	-.01 (.00)***	-.01 (.00)***
Variable/fixed rate	-.86 (.00)***	-.87 (.00)***	-.88 (.00)***	-.88 (.00)***
Demographic characteristics				
Age	-.003 (.33)			
Married	.05 (.53)			
Health	-.05 (.71)			
Constant	49.69 (.00)***	48.90(.00)***	47.23 (.00)***	45.59(.00)***
N	1037	1040	1037	1037
F statistic	6.69***	11.23***	13.28***	16.03***
R ²	.2308	.2224	.2210	.2123

*** significant at the 1% level; ** at 5%; * at 10%; p values are reported in parentheses.

The three variables considered to proxy consumer potential to generate future business to the bank (i.e. real assets) are in general not relevant to explain prices. The only variable that turns out to be significant in some of the specifications is real assets (in million Euros) but its effect on the price spread is almost negligible. This result is inconsistent with relationship marketing literature normative prescriptions.

As was expected, market conditions are relevant to explain price dispersion. In particular our results echo mortgage market spread reduction in the last years as a consequence of changes in the strategic environment; in particular, the higher emphasis of banks in the mortgage market, which had been traditionally in the hands of saving banks, and increased consumer sophistication.

Costs show to be relevant to explain price. The unitary costs of providing the mortgage service are inversely related to the loan amount and the loan term and this is reflected on price. Variable and fixed interest rate loans are intrinsically different products and, as expected, spreads are significantly lower for variable rates.

Social capital should impact on price, but the available data do not allow us to measure it appropriately. Demographic characteristics are not significant; in particular, health, which is used as a proxy for search costs, is not significant.

5. Final discussion and conclusions

Our main purpose is to test the relevance of consumer expertise to explain the final loan mortgage prices negotiated between banks and their consumers. We use a concept and a metric of expertise that is wider than what have been usually considered by previous empirical literature. Previous literature has emphasized sector knowledge. We consider a more comprehensive concept of consumer expertise that includes sector/product knowledge and general knowledge. Overall, our results support the relevance of both dimensions.

Furthermore, when results are analysed in more detail they seem to suggest other interesting conclusions. The consumer expertise hypothesis seems to be clearly supported by the impact of the general knowledge variables (education and occupation). Regarding sector knowledge the variables that show to be relevant are the ones that reflect a relatively high level of financial knowledge (i.e. using complex products and new channels). Use of traditional products (such as bank transfers or credit cards) seems not to be relevant. Previous literature has usually measured expertise as frequency of use of unsophisticated products (Estelami et al. 2001). Our results indicate that in this context these measures could be inappropriate to proxy expertise.

Heterogeneity in consumer expertise could explain why managers bargain different prices in different areas despite offering the same product/brand, having sellers with similar capabilities and putting the same effort. Likewise, our research implicitly suggests that sellers' knowledge could be very relevant to achieve price targets. Nevertheless, as far as we know, consumer expertise has been treated only marginally by marketing/management price literature.

Our research uses a comprehensive view of price determinants to explain loan mortgage price. Traditional explanatory factors are jointly considered with consumer expertise factors. As expected, costs show to be also relevant to explain the final price negotiated. Likewise, other market and marketing related metrics show to be relevant to explain mortgage loan prices. We use a cross-section analysis, but mortgage loans are acquired in different years. As mortgage loan market has suffered spread reduction in Spain, it is expected that individuals obtain a better price when the loan is acquired later. This hypothesis was supported by the empirical test. Proxies that reflect the potential of the consumer to create future business to the bank turn out not to be relevant to explain mortgage loan prices.

The more surprising results refer to credit risk. Our research includes extensive and accurate information regarding the ratios that are supposed to be used by banks to measure risk. And these metrics of credit risk show not to be relevant to predict price dispersion. Only a relatively unsophisticated proxy of credit risk - i.e. a permanent labour contract - shows to have relevant

impact on price. Therefore, from an overall perspective, financial literature prescriptions seem not be relevant to understand loan mortgage price determination by Spanish banks. Risk-degree considerations seem not to explain the final negotiated price. Low relevance of risk ratios could be interpreted in the sense that these risk indicators could be more relevant for the bank's decision whether or not to grant a loan than for the loan spread. This interpretation is consistent with the traditional functional separation among the price and credit risk decisions in Spanish banks. In practice, credit risk and price tend to follow a different route in many Spanish banks. Once the decision as to whether the risk is or is not accepted, by the Credit Risk Department, the price is decided in the Commercial Department. Studies referred to the financial crisis have highlighted an unsophisticated management of credit risk by banks as a cause of it, but our data can not contribute evidence to conclude that banks have taken wrong decisions regarding risk approval or disapproval.

What our results seem to suggest is lack of financial rationality regarding price determination. But we do not believe that banks lack financial rationality regarding price. We believe that what is happening in practice is that the traditional concept of financial rationality focused on a single product (mortgage loan) is being replaced by a concept of financial-commercial rationality which is addressed to achieve financial goals through the use of marketing techniques that consider a client perspective (instead of product perspective). Main elements of this integrative financial-commercial rationality have been explained in sections 1 and 2. In essence, banks are interested in not losing mortgage loan operations due to Banks know that it is very difficult to attract new consumers when they are not involved in complex contextual experiences such as a marriage or buying a new house. Unfortunately, in this special context the price factor is of great significance for the consumer. But banks have ways to compensate a low mortgage loan price and obtain a relevant lifetime value. By using bundling banks expect that consumers buy complementary products at their regular price. The purchase of a home is the most significant investment many families ever make. Consequently, consumers feel it is reasonable to take out a multi-risk insurance policy on their home and on their loan payment (life insurance). Furthermore, the mortgage loan payment occupies a high percentage of net monthly salary, making it more convenient for customers to have their salary paid directly into a current or savings account they have opened with the bank. Mortgage loans have a great capacity to create a long and depth relationship and banks focus on lifetime value instead on adjust the price and the risk of the mortgage loan.

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