



**KTH Architecture and  
the Built Environment**

# **Essays on mortgage rate choice in Sweden**

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## **Abstract**

Buying a home is for many households the financially most important purchase they will make. The choice of mortgage instrument is also of importance in that it will determine a household's financial exposure. In the aftermath of the 2007–2008 financial crisis in the United States, the potential consequences for borrowers and the financial system became apparent in many countries. Even though the choice of mortgage is described as a very complex transaction, international studies have found that borrowers are less than optimally knowledgeable about the possible future consequences of their choice. This lack of knowledge has raised concern and prompted calls for more research on differences between mortgage markets and factors affecting consumers' mortgage choice.

This thesis answers this call by empirically exploring the Swedish case and by offering an expanded knowledge about factors that influence borrowers' mortgage choice. The thesis consists of five papers, and, in most cases, interviews and questionnaires were used to collect the data, depending on which type of data collection was considered best suited to serve the purpose of the individual paper. A close reading approach was also applied in one of the papers.

The findings indicate that in a Swedish setting, there are factors affecting borrowers' mortgage choice that have not previously been fully explored in the literature: the media and bank advisors. During the period studied, a negative correlation existed between the media and the choice of fixed rate mortgages, whereas a positive correlation existed between bank advisors and the choice of fixed rate mortgages. The study on advice given by a bank advisor also shows the advocacy of a mix of fixed and adjustable mortgage rates. Further findings corroborate those of earlier international studies, such as the impact of income, education, financial literacy and loan-to-value ratios on mortgage choice.

A general conclusion that can be drawn from the findings in the Swedish context is that the most financially vulnerable borrowers—those with lower income, lower education and/or higher loan-to-value ratios—are more likely to choose higher levels of fixed rate mortgages (or lower levels of adjustable rate mortgages). In doing so, they avoid exposing themselves to liquidity problems, which can be caused by increasing mortgage rates, and make future mortgage expenditures more predictable. These findings contradict much of the concern that both scholars and financial authorities have expressed about households' choice of mortgage instrument. Hence, these findings are of importance not only to research on mortgage choice but also to policymakers and the financial industry.

**Keywords:** Mortgage choice, Swedish mortgage market, consumer characteristics, borrower perceptions, financial advice, housing co-operatives

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# 1. Background

For many households, procuring a residential mortgage and choosing a mortgage instrument are the most important factors determining their financial exposure. The potential consequences have become obvious, especially in the aftermath of the 2007–2008 financial crisis in the United States when foreclosure and default rates increased and housing prices decreased (Aalbers, 2009). Research has suggested that, in conjunction with the crisis, the problems associated with mortgage lending have the potential to destabilise the financial system and the economy (Campbell, 2013).

The situation in the United States leading up to the financial crisis was characterised by a rapidly rising indebtedness among households after 2000, driven mainly by outstanding mortgages and historically low interest rates. A pattern involving increasing credit aggregates that in turn fuel real estate booms was also observable in other countries, such as Iceland, the United Kingdom and Spain (Claessens *et al.*, 2010).

Researchers have shown an interest in households' mortgage rate choice, beginning in the United States in the mid-1980s when adjustable rate mortgages (ARMs) were introduced. In the past decade, the choice of mortgage rate has received attention from scholars in other parts of the world, such as Great Britain, Italy, Australia and the Netherlands.

The choice of mortgage has been described as a complicated one (Barr *et al.*, 2008) and as one of the most complex transactions ever undertaken by the majority of consumers (Woodward, 2003). The fact that individuals purchase mortgages infrequently (Essene and Apgar, 2007) and often negotiate them at the same time that they are undergoing a major life transition also adds to the complexity (Campbell, 2013). Scholars have also found that mortgagees are less than optimally knowledgeable about the possible future consequences of their choice. Even the most financially sophisticated borrowers often find it difficult to shop effectively for mortgages (Essene and Apgar, 2007).

Concerns have been raised that borrowers are not able to determine correctly which type of mortgage has a higher expected cost (Lino, 1992). Borrowers often enter the market without knowing exactly what kind of mortgage they want or need; therefore, they can be (negatively) susceptible to outside influences. Researchers have argued that borrowers often make choices based on their current circumstances instead of their long-term best interests (Essene and Apgar, 2007).

Moreover, researchers have found evidence that many consumers who enter into complex financial contracts, such as mortgages, are financially illiterate (Lusardi, 2008a, 2008b). Individuals frequently fail to understand the terms and conditions of consumer loans and mortgages, and those with lower levels of financial literacy are more likely to have a costly mortgage (Moore, 2003). This evidence is also in line with findings by Bucks and Pence (2008), who found that borrowers experiencing large payment changes if interest rates rose were comparatively more likely to report not knowing their contract terms.

Whereas most studies have found that high income earners opt for ARMs (Brueckner and Follain, 1988; Coulibaly and Li, 2009; Fortowsky *et al.*, 2011), a study by Finke *et al.* (2005) described a possible trend towards an increased use of ARMs among lower income households. This possible trend points to a shift in ARM borrower composition away from those with the greatest resistance to financial shock towards those with the least resistance.

Previous research illustrates the complex nature of choosing a mortgage rate and the importance of this choice on households' financial situation and, potentially, the financial stability of a country. It also highlights the need for a more in-depth understanding of how borrowers perceive their acquisition of information about mortgage options and, ultimately, how they act on this information.

## **2. Aim and research questions**

The aim of this thesis is to contribute towards an increased understanding of factors influencing Swedish homebuyers' mortgage choices. The mortgage choice is defined as the choice between ARMs (in the Swedish context, mortgages that are periodically adjusted every three months) and fixed rate mortgages (FRMs) (with an initial fixed period of at least one year).

More specifically, the main research questions are as follows:

1. Are factors that have been shown to be of importance for mortgage choice in other countries also influencing Swedish borrowers' mortgage choice?
2. Are there determinants other than those previously studied in a non-Swedish context that affect mortgage choice?

In the first study carried out, the impact of bank advisors turned out to be of importance for mortgage choice, thus resulting in the complementary research question:



3. How do banks formulate advice for their customers concerning mortgage choice, and is this advice of use to borrowers?

During the progression of this thesis, an additional research question came into focus. The definition of the term *borrowers* was extended to include mortgage choice in an organisational context that affects a large portion of homeowners in Sweden, namely, co-op organisations. In these co-op organisations, mortgage decisions are made jointly by a board consisting of residential members (predominantly laypeople). The research question is formulated as follows:

4. Which determinants do co-op board members perceive as influencing their mortgage choices?

The empirical case under examination is the Swedish mortgage market (an overview of this market is provided in section 4). This market has not been examined in detail with regard to mortgage choice, despite the fact that the residential mortgage market in Sweden constituted approximately 63 per cent of the gross national product (GNP) in 2011, equaling SEK 2,200 billion (Statistics Sweden, 2012).

Mortgage choice can be studied from the perspective of individuals, the financial industry or the economy as a whole. This thesis focuses on the choices of individual Swedish citizens in an attempt to explore factors that, in addition to price and contract factors and those consumer characteristics already pointed to by others, could influence homebuyers' mortgage choice. A better understanding of the perceptions underlying individuals' mortgage choices gives grounds for a more efficient industry and promotes better regulatory work and market efficiency.

This introductory part of the thesis is organised as follows: After the introduction (section 1) and the aim (section 2) of the thesis, earlier research is presented in section 3. The Swedish case is outlined in section 4, and the data and methods used are presented in section 5. The five papers that were written based on the data gathered for the thesis are described in section 6 and the findings from the papers as answers to the research questions are presented in section 7. The contributions and limitations of the thesis and ideas for future research are elucidated in section 8.

### 3. Earlier research on mortgage choice

Choosing a mortgage can be described as a decision of great importance to the individual borrower. It is a decision made in a situation of uncertainty, and the grounds for financial decision-making in situations of uncertainty have been theoretically explored and discussed by different schools of economic research. Distinguished scholars, including Herbert Simon, Daniel Kahneman and Amos Tversky, have been awarded the Prize in Economic Sciences in Memory of Alfred Nobel for their theoretical developments in the field of financial decision-making. Research on the rationality of households is known to the author but is not further developed here. From a theoretical perspective, the aim of this thesis is primarily to test more specific theories/hypotheses concerning determinants of mortgage choice, which are in line with those of most researchers in the area of mortgage choice. Thus, this thesis makes a mainly empirical contribution.

Changes in the American financial landscape in 1981, particularly the regulatory change allowing lenders to offer ARMs, stimulated a scholarly interest in mortgage choice. Most of the research has been carried out in the United States; however, some research has also been conducted in other parts of the world in the past decade.

In a set of theoretical papers based on standard microeconomic theory, the mortgage decision problem facing borrowers was initially modelled based on different assumptions (e.g., Statman, 1982; Brueckner, 1986; Alm and Follain, 1987; Brueckner and Follain, 1988). Results from these studies showed that the optimal choice should depend on, for instance, income stream, age, inflation and the mortgage rate spread. In 2003, Campbell and Cocco further developed this theoretical line in a much cited article where they described optimal consumption and mortgage choice through a life-cycle model showing that borrowers with rather small mortgages, stable income, low default costs and high probability of moving in the near future should choose ARMs over FRMs.

The results of the earlier theoretical articles were later used as a starting point in several empirical studies. For instance, in 1987, Dhillon *et al.* conducted the first (according to the authors) empirical examination regarding the impact of pricing and borrower characteristics on the choice of mortgage contract. Their results did not, however, fully match the predictions of the theoretical literature. Although they found price variables to have a statistically significant effect, borrower characteristics had a weak effect on the choice of mortgage contract.

Additional American findings suggest the importance of price factors such as rate spread (e.g., Vickery, 2006; Coulibaly and Li, 2009) and loan-to-value (LTV) ratios (Duffy and Roche, 2005; Vickery, 2006). Borrower characteristics that were determined to be of importance in these empirical papers include mobility (Sa-Aadu and Megbolugbe, 1995; Coulibaly and Li, 2009), income (Finke *et al.*, 2005; Coulibaly and Li, 2009; Fortowsky *et al.*, 2011), age (Sa-Aadu and Megbolugbe, 1995) and education (Coulibaly and Li, 2009).

Most of these empirical studies primarily used database information. Sa-Aadu and Megbolugbe (1995) tested hypotheses using a sample of mortgages originated by a single lender; Finke *et al.* (2005) used survey cross-sectional data; Coulibaly and Li (2009) used data from the Survey of Consumer Finances; and Fortowsky *et al.* (2011) empirically tested a hypothesis about the impact of mobility on mortgage contracts, using data from a large national database of repeat mortgage transactions. All in all, earlier American studies mostly relied on secondary data, which were analysed with quantitative methods.

During the past decade, research on mortgage rate choice has also been conducted in countries outside the United States (albeit to a much lesser degree), such as in the United Kingdom (Leece, 2000), Australia (Blacklow *et al.*, 2010) and Italy (Paiella and Pozzolo, 2007; Zocchi, 2013). (For more information about different mortgage market structures, see e.g., Scanlon and Whitehead, 2004; Tsatsaronis and Zhu, 2004; Lea, 2010; Scanlon *et al.*, 2011; Campbell, 2013). This topic is developed further in paper V. A short summary shows, for instance, that price factors, such as the ARM-FRM difference and the LTV ratio, highly influence mortgage choice in most studies. As for borrower characteristics, the early study by Dhillon *et al.* (1987) showed that these characteristics did not influence mortgage choice in any statistically significant way. Numerous later studies have, however, empirically shown that borrower characteristics do indeed affect the choice of mortgage instrument.

A brief summary of empirically investigated determinants of mortgage choice is presented in Figure 1.

In this thesis, the starting point and main focus are the previously investigated borrower characteristics and the contract factor LTV ratio (see the grey shaded area in Figure 1). In addition, borrowers' own perceptions of the importance of a number of factors regarding mortgage choice are explored.

<b>Price factors, transaction costs and taxes</b>  FRM-ARM interest rate spread  The yield curve slope	<b>Contract factors</b>	<b><u>Borrower characteristics</u></b>
	Loan-to-value ratio	<u>Income</u> Age <u>Mobility</u> <u>Education</u> <u>Financial literacy and numeracy</u>
	Loan-to-income ratio	<u>Household composition</u> Risk <u>preferences</u>

*Figure 1.* A simplified model of earlier empirical mortgage choice findings.

## 4. The Swedish case: A background

In their 2008 study, Scanlon *et al.* described a trend involving rapid increases in home prices and mortgage debt in many industrialised countries. This trend has also occurred in Sweden, where the household loan-to-income ratio increased from 110 percent to 164 per cent between the years 2002 and 2011. As shown in Figure 2, average house prices more than doubled and prices for apartments almost tripled during the same period (Statistics Sweden, 2012).

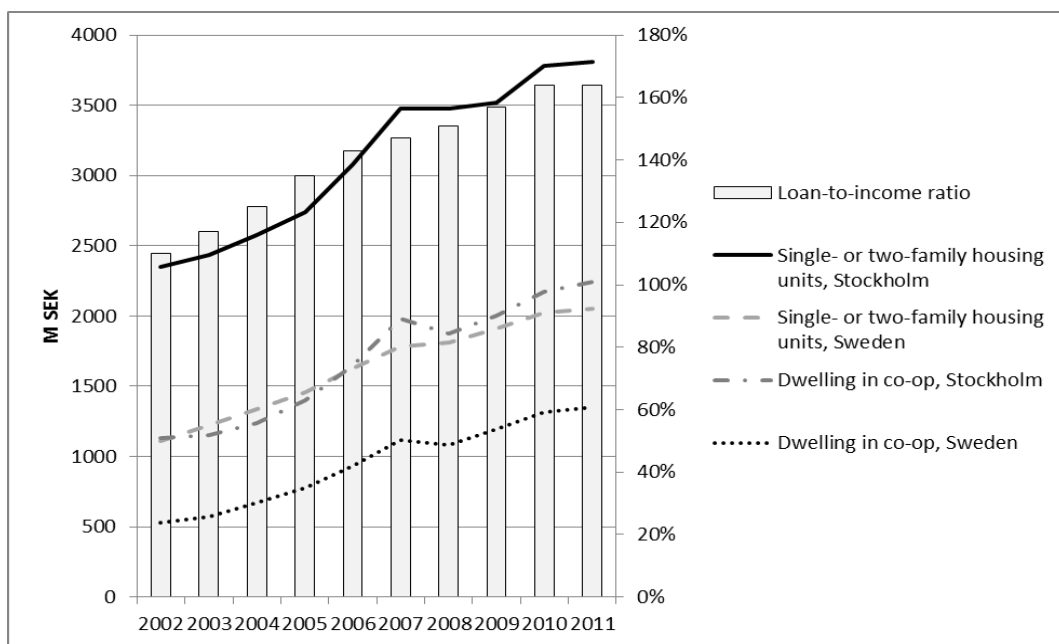


Figure 2. Average prices for co-operative apartments, single- or two-family housing units and average loan-to-income ratios. *Source:* Statistics Sweden, 2012 (SCB).

Sweden also experienced historically low mortgage rates, which in turn fuelled a housing price boom. The interest rate reached its lowest point in the summer of 2005 (the list rate for ARMs was approximately 2.4 per cent). A period characterised by increasing mortgage rates then followed. After the Lehman bankruptcy in September 2008, ARMs peaked at around 6.4 per cent in the autumn of 2008 (Figure 3). As shown in Figure 3, the interest rate difference between the ARM and the two-year FRM has been small or very small for most of the past couple of years, with the exception of 2010. For this reason, this thesis does not investigate the influence of the actual interest rate gap in any depth. Instead, in the case where this gap is explored, it is the borrowers' perceived influence that is examined.

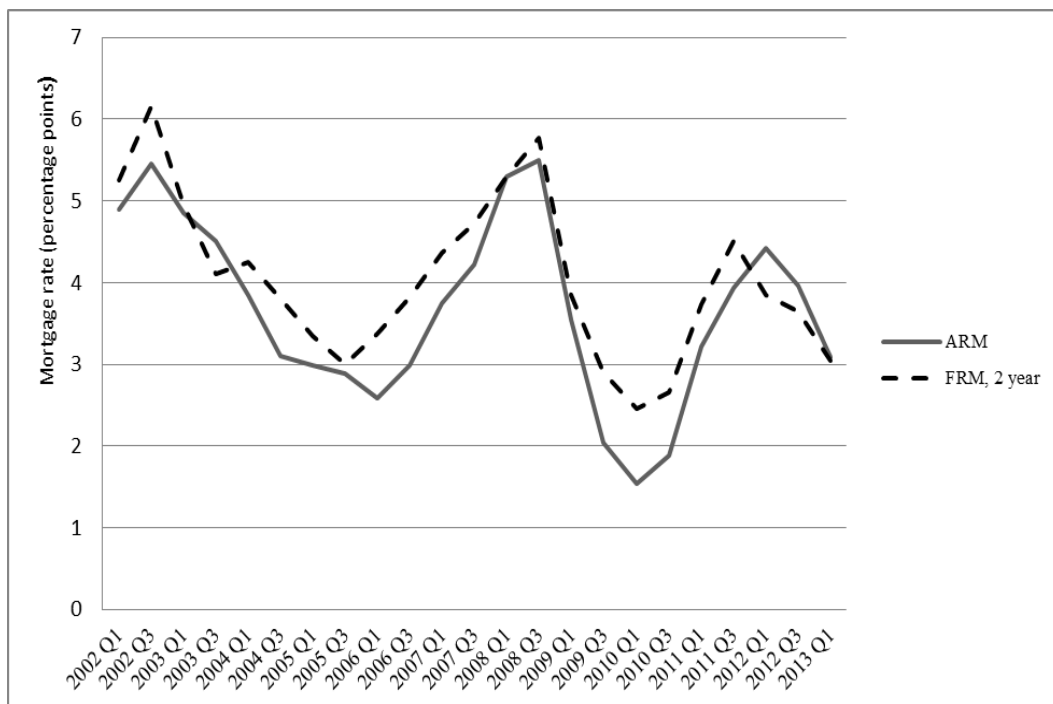
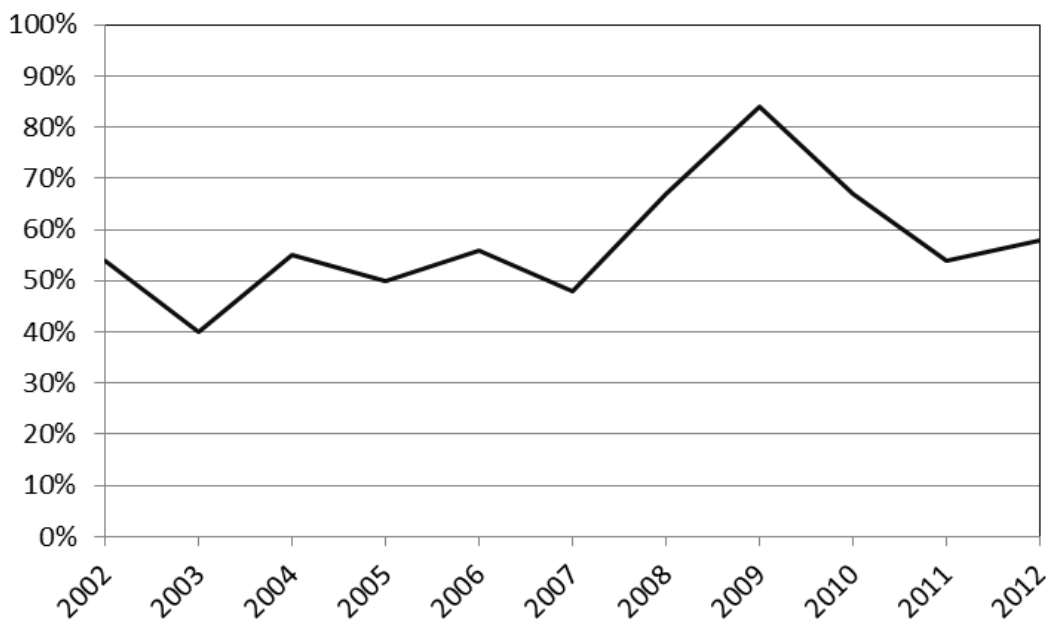


Figure 3. Mortgage interest gap 2002 Q1–2013 Q1. (ARM, adjustable rate mortgage; FRM, fixed rate mortgage). Source: Swedish Housing Finance Corporation (2013).

In addition to this development of increasing home prices and decreasing mortgage rates, there was a change in homebuyers' mortgage preferences in Sweden. During this time period, an increasing share of households opted for ARMs (in Sweden, defined as mortgages with an initial fixed period of three months). From a share of 30 per cent in 1998, the share of new mortgages granted increased to 78 per cent in May 2010. At the end of 2012, the share of ARMs was around 60 per cent (see Figure 4). It should also be mentioned that in Sweden, it is possible to divide a mortgage into several parts with different maturities. For instance, a borrower can have a mortgage that is one third an ARM, one third a two-year FRM and one third a five-year FRM.



*Figure 4.* Share of adjustable rate mortgages (ARMs) for new mortgages on a yearly basis, 2002–2012. *Source:* Statistics Sweden, 2013 (SCB).

High levels of ARM s have been perceived to be a potential source of economic and housing market instability in the United Kingdom (Vickery, 2006), a country with a mortgage market resembling that of Sweden in many aspects—namely, high prepayment penalties, recourse loans and ARM dominance (Campbell, 2013). In periods of increasing interest rates, ARM and FRM borrowers are affected differently: Such changes have no effects on mortgage payments for existing FRM borrowers, but they do have a direct effect on new borrowers. For ARM s, an increase in interest rates could put a strain on households’ cash flow/liquidity (Barnes and Thwaites, 2005). If interest rates decrease, FRM borrowers in Sweden are unable to refinance without incurring considerable penalty fees; they also face relatively higher costs than anticipated—from the debtors’ point of view (Campbell and Cocco, 2003). (For a more extensive description of the difference in risk characteristics between contracts for FRMs and ARM s, see Miles and Pillonca, 2008).

The high levels of ARM s and increasing debt-to-income ratios in Sweden caused a great deal of political concern. In December 2007, the Swedish national bank, the Riksbank, stated that if house prices and household debt continued to increase faster than household income for a longer period of time, the risk of negative effects would increase for the real economy, and individual households that borrow too much may encounter difficulties (Riksbanken, 2007). A few months later, the Riksbank noted that adjustable rates were chosen for the majority of new mortgages and that this could lead to a greater vulnerability to interest rate changes than

if fixed rates were chosen (Riksbanken, 2008a). Later that year, the Riksbank also emphasised that even though the risk of extensive credit loss in the banking sector was small, the financial crisis had resulted in increasing mortgage rates for all households, the debt ratio had increased the most for new homeowners, and households in larger cities were the most affected owing to higher mortgages (Riksbanken, 2008b). On this occasion, the Riksbank pointed out that higher mortgage interest rates would also affect households that had bought dwellings in co-op associations.<sup>1</sup>

In Sweden, virtually all owned apartments are co-ops where the co-op organisation has taken on a debt (master mortgage) of which all owners are responsible. The total sum of master mortgages in Sweden amounted to more than 260 billion SEK, or approximately 30 billion euro, as of January 2012 (Statistics Sweden, 2012). Thus, on top of their private mortgage, mortgagees might face higher monthly fees when their housing associations are assigned higher interest rates on their mutual debt/master mortgage.

All in all, the development of the Swedish housing and mortgage market might have exposed households with mortgages to financial vulnerability. (For a more detailed description of the structure of the Swedish housing and mortgage markets, see European Mortgage Federation, 2012). In this context, it is worth noting that even though the choice of mortgage instrument is considered one of the most important factors determining a household's financial exposure (and a complicated factor, at that), there are, as of today, no regulations concerning mortgage advisory services, at least not in Sweden.

This situation is in contrast to the regulations that have been implemented concerning financial advising services provided to consumers who seek to invest their assets in financial instruments and in certain life insurance policies: When the Financial Advisory Services to Consumers Act (2003:862) entered into effect in 2004, Sweden was one of the first countries in Europe to regulate financial advising (for an overview of the regulation of financial advice in Sweden, see Banking and Finance Business Act, 2004; Andersson and Korling, 2012).

For the past several years, there has, however, been an ongoing discussion in Sweden (Swedish Financial Supervisory Authority [Finansinspektionen], 2006) and within the European Union about implementing regulations concerning mortgage loan relations between the financial industry and consumers in a similar way as those of other financial products. Here follows a short summary of the discussion so far:

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<sup>1</sup> In this thesis, the term *co-op* (also known as tenant-owned co-operative housing) is used to describe the Swedish *bostadsrätt*.



Over the years, the European Commission has undertaken a number of initiatives aimed at ensuring that consumers make informed mortgage choices. In 2001, the European Commission, for example, adopted a recommendation, the Voluntary Code of Conduct, laying down guidelines on the provision of harmonised information to consumers concerning home loans. The aim of these guidelines was to make it easier for consumers to compare loan products available from different lenders, including lenders from other member states, thus allowing consumers to make informed choices (European Union, 2001). The Voluntary Code of Conduct came into effect in September 2002.

In June 2012, the European Parliament Economic and Monetary Affairs Committee went a step further and approved new rules to ensure that homebuyers are properly informed before procuring a mortgage. These rules aim to ensure that borrowers are offered mortgages that are tailored to their needs and that their creditworthiness is properly assessed (European Parliament, 2011). These rules are intended to protect borrowers not only from irresponsible lending but also from their own misjudgements, thus ensuring that mortgages are granted only to those who can afford them.

The aims of the new rules are briefly outlined as follows:

- Any financial advice given to borrowers should be impartial.
- Advice given should enable loan takers to understand the long-term financial consequences of the mortgage.
- Everyone signing up for a mortgage is supposed to receive comparable information about the products available and be informed whether there is any financial incentive that might lead the advisor to recommend a particular product.
- Credit terms offered to borrowers must be in line with their present financial situation and their prospects.

Until these changes are implemented in one form or another, households have to rely on their own knowledge about and expectations of the mortgage market or rely on suggestions from others, either financial experts or non-experts.

If borrowers rely on experts, the present unregulated situation does not ensure that the advice they receive is impartial. In addition, there is no guarantee that the advice is given with an understanding of the long-term financial consequences for the individual household.

Therefore, the pressure on the individual household to make sound and well-grounded decisions is great, and how these decisions are carried out warrants further exploration.

## 5. Data and methods

The five papers presented in this thesis use seven different data sets, of which six were collected by the author. They were collected during the time period from spring 2008 (just before the global financial crisis struck Sweden) to spring 2012 (the point in time when the Swedish economy recovered in comparison to those of many other countries in the aftermath of the global financial crisis).

As described earlier the presented studies build on earlier empirical work in that previous findings from countries other than Sweden are used as a base for data collection. In addition to variables used in previous research (accounted for in section 3), variables not previously tested in the field of mortgage studies were included, and data to study their impact were collected. The data collection methods used in the papers were chosen based on their suitability in fulfilling the purpose of the individual paper. In most cases, interviews and questionnaires were used. Table 1 is a summary of methods used for collecting and analysing data.

*Table 1.* Methods for collecting and analysing data.

<b>Paper</b>	<b>Data collecting methods</b>	<b>Data analysing methods</b>
I: Bank advisors' influence on mortgage choice in Sweden	Literature reviews Database search Official Internet websites Interviews – primary data Questionnaire – primary data	Binary logistic regression
II: Banking advice on fixed or adjustable mortgage rates	Literature reviews Database search Official Internet websites	Chi-square test Close reading
III: The relationship between consumer characteristics and mortgage preferences: A case study from Sweden	Literature reviews Database search Official Internet websites Telephone survey – secondary data	Binary logistic regression
IV: Borrower characteristics and mortgage choice in Sweden	Literature reviews Database search Official Internet websites Questionnaire – primary data	Binary logistic regression
V: Mortgage decisions in Swedish housing co-operatives	Literature reviews Database search Official Internet websites Interviews – primary data Questionnaire – primary data	Binary logistic regression

In the initial phase of the thesis, interviews were performed with homebuyers (paper I) as a way in which to collect Swedish data. The findings from these interviews were then used in subsequent questionnaires so as to obtain larger data sets (papers I, V) and in a telephone survey (paper IV). Interviews were also performed with board members in co-op associations (paper V).

In paper III, an existing data set was used. An independent market research institute commissioned by the Swedish Financial Supervisory Authority (FI) collected the data in 2010. The data were collected by telephone in a representative randomised survey. The data set was provided by the authority.

The findings in paper II were tested using the chi-square statistic, a nonparametric technique that determines if a distribution of observed frequencies differs from the theoretical expected frequencies. It is suitable for nominal or ordinal level data such as those analysed here (Levine *et al.*, 2008).

Data in papers I, III, IV and V were analysed using binary logistic regression, which is considered suitable when the dependent variable is dichotomous and the tasks are to explore the relative influence of the independent variables and to assess possible interaction effects between them (Spicer, 2005). As advocated by Hosmer *et al.* (2013) for the type of data in this thesis, the logistic regression function was chosen over the Probit function.

## **6. Summaries of the five papers**

In this section, a summary of each article is provided in which data, methods and main results are briefly presented. Together, the articles represent a sequence with each one, more or less, building on findings from the initial literary reviews and the stepwise empirical collection of Swedish data. They also form a timeline in that papers II through V build on findings from the performed surveys in paper I (see Figure 5).

### **6.1. Paper I: Mortgage rate choice: the effect of bank advice**

This paper, which was written as part of the licentiate in 2010, was modified in 2012–2013. It has been accepted for a second submission to *Journal of Financial Services Marketing*.

The first article empirically explores which factors Swedish mortgagees perceive as driving forces for their mortgage choice, thereby providing an understanding of borrowers' own reflections concerning their mortgage choice and generating possible new hypotheses for future research. An additional purpose is to explore whether concern is warranted regarding future developments of household mortgage expenses. It is set against a background of rapidly increasing housing prices and increasing household indebtedness and only a short time before the financial crisis erupted in Sweden.

#### **Data and methods**

Initially, an interview study was performed with 30 buyers of apartments in the Stockholm city area. The interviewees were selected in collaboration with real estate agents, and personal interviews were conducted with those who wanted to participate. The interviews took place either at the time when the interviewees were taking possession of their property or by phone a few weeks afterwards so as to avoid memory lapses. The interviews were semi-structured, and the questions were based on international findings concerning mortgage choice.

The results from this study were further investigated in a questionnaire that was distributed to a larger and more heterogeneous group of homebuyers. The questionnaire on mortgages procured during 2008 was a joint venture with the Association of Swedish Real Estate Agents' research fund. Of the 987 questionnaires that were distributed to households in five Stockholm municipalities during the spring of 2009, 367 questionnaires were returned. Questionnaires lacking vital data were excluded. Answers from 297 respondents were tested

against six stated hypotheses by binary logistic regression to assess the impact of the tested variables on the likelihood of choosing mostly ARMs.

## **Results**

This study provides evidence that income, LTV ratio and households' perception of bank advisors as important are highly statistically significant parameters for mortgage choice. Higher income households choose ARMs to a greater extent than lower income households, and households with high LTV ratios are approximately four times less likely to choose ARMs than those with lower LTV ratios.

From the initial interviews, the importance of bank advisors was derived, and when tested for, recommendations from bank advisors were shown to have an influence in that those who perceived themselves as being influenced by their bank were statistically significant more inclined to divide their mortgage into ARMs and FRMs. This result is interpreted as an attempt by banks to help their customers spread their interest risk and is, to my knowledge, a new finding. Paper I suggests that in 2009, there was no imminent risk of households being unable to manage their mortgages because those choosing ARMs tended to have relatively high incomes.

### **6.2. Paper II: Banking advice on fixed or adjustable mortgage rates**

This paper is published in *Journal of Financial Services Marketing* (Vol. 17, No. 3, pp. 227–241).

Based on the notion that financial advisors influence borrowers' mortgage choices, as suggested in paper I, the objective of this study is to determine empirically how a leading Swedish bank framed the advice it provided to customers on mortgage choice during the period from 2001 to June 2009. This was a period when mortgage rates fluctuated substantially in Sweden.

The study is set against the background that there is currently no law or regulation in Sweden that monitors financial advice concerning mortgage products. However, advice concerning the choice of mortgage is still frequently given by different bank experts. When reporting on mortgage choice, the media mainly rely on bank advisors for information.

## **Data and methods**

In paper II, data consist of 92 newsletters offering mortgage advice that were published by a major Swedish bank for a period of eight years. The newsletters are available on the bank's website and at its branch offices. The title of the newsletter creates expectations that it should contain advice specifically on mortgage interest rates. The information in the newsletters was provided by the same author in a similar manner during a long period of time that included both upturns and downturns in the economy.

The pieces of advice were categorised into two dimensions depending on the content and the strength of the advice. A close reading approach, as described by Paul and Elder (2006), was used to identify the key information and actual advice given to the bank's mortgage customers. The categorised pieces of advice were then used as a base for a formal hypothesis testing with the chi-square method so as to find patterns that may be related to earlier findings about mortgage choice and financial advice. Comparisons between the adjustable and fixed interest rates made during the hypothesis testing were based on the ARM and the two-year FRM. The interest rate levels, which were obtained from the Swedish Housing Finance Corporation's website, were assumed to be comparable to those of other banks.

## **Results**

Regarding the strength of the advice, the reading showed that most pieces of advice were generic; they included general formulations rather than specific conditions. As for the content of the advice—that is, whether the advice recommended adjustable, fixed or a mix of both forms of mortgage rates—a majority of the pieces of advice advocated a mix.

Contrary to what was expected based on the existing literature, no apparent association was detected between the advice provided by the bank and interest rate trends (neither short- nor long-term trends). Nor were any statistically significant associations detected between the advice and the interest rate gap between fixed and adjustable rates.

Only in the case of the absolute level of the mortgage rate was there a statistically significant result. However, this result was the opposite of what was expected and showed that in periods with comparatively low fixed interest rate levels, there was an increase in recommendations favouring adjustable and mixed rates but no recommendations for fixed interest rates. This finding is noteworthy because locking in the mortgage rate at a historically low level could be of interest, for example, to financially constrained or risk-averse borrowers.

All in all, the findings imply that the bank's advice in these newsletters was formulated on a rather unclear basis and contradicted most existing literature. Thus, it would have been of limited use to borrowers.

### **6.3. Paper III: The relationship between consumer characteristics and mortgage preferences: A case study from Sweden**

This paper is co-written with Inga-Lill Söderberg and published in *International Journal of Housing Markets and Analysis* (Volume 6, Issue 2, pp. 209–230).

This paper centres on consumer characteristics and how they may influence consumers' mortgage rate decisions in a Swedish context. In addition to exploring typical background variables, such as income and education, the paper focuses on consumers' level of financial literacy, perceived risk aversion and ability to handle sudden mortgage rate increases. A gender-related check of the proposed extended model is also performed.

The overall purpose is to enhance the understanding of the Swedish case in such a way that it may serve as a base for the development of consumer education programmes and a better assessment of national resources for furthering the knowledge of citizens and the banking industry.

#### **Data and methods**

Second-hand empirical data, originally collected by an independent market research institute commissioned by FI, were used in this paper. A representative randomised survey amongst the Swedish population was conducted by telephone in May–June 2010. The telephone survey was answered by 1,302 individuals between 18 and 79 years, giving a response rate of 49 per cent. Of the 623 respondents who reported that they had mortgage loans, 505 respondents answered all the questions on the survey. These 505 respondents constitute the sample in this study. Two models were created: a basic model including the variables age, income, education and self-reported risk aversion, and an extended model including the basic model variables as well as the variables financial literacy and self-reported ability to handle sudden mortgage rate increases. Both models were investigated using binary logistic regression to determine the likelihood of choosing mostly FRMs. In addition, the extended model was checked for gender effects.



## **Results**

The results show that a lower level of education, lower income, lower financial literacy, higher risk aversion and trouble handling interest rate increases influence Swedish consumers to choose mostly FRMs.

The test of gender effects does not show any statistically significant effects on the overall results. A gender-divided regression, however, shows that age, a low level of education and risk averseness in a statistically significant way affect men's mortgage choices, whereas income, trouble handling interest rate increases and low financial literacy affect women's mortgage choices. These differences in the gender-divided material could have implications for policymakers and the financial industry if and when identifying adequate actions.

The overall results indicate that the most vulnerable Swedish mortgagees, in terms of financial status and level of knowledge, seem to choose FRMs to a greater extent. Thereby, they make future expenditures more predictable for the household by reducing liquidity risks. Based on the findings of this paper, further legislation or changes in public policy do not seem to be necessary at this point in time.

### **6.4. Paper IV: Borrower characteristics and mortgage choice in Sweden**

This paper is co-written with Inga-Lill Söderberg and submitted to *Journal of European Real Estate Research*.

This article is an attempt to answer calls for more knowledge about the effect of consumer characteristics on mortgage choice and, in light of the U.S. mortgage crisis, calls for more information on local mortgage market practices so as to find examples that can serve as best practices for policymakers. A complementary aim is to compare the results with those reported in other countries. In addition to exploring much-studied background variables, such as age, income, LTV ratio and education, the rated importance of previous experiences with mortgages and the influence of the media and bank advisors are examined.

### **Data and methods**

The data used in this study were collected through a survey, distributed among a randomised representative sample of Swedish citizens by an independent market research institute, TNS/SIFO International, to its Web panel with a representative sample of the Swedish population. To control for changes in interest rates and other external factors affecting

contract factors, a time limit was set, and the survey was conducted from 27 March to 4 May 2012. Only respondents who had made an active decision concerning their mortgages in the three months leading up to their participation in the survey were to be part of the sample. Owing to survey costs, a limit was set at approximately 500 individuals.

The survey was distributed to 7,738 Web panelists, of whom 2,927 answered the survey. Of the 2,927 respondents, 2,426 were screened out because they did not comply with the survey inclusion criteria. Thus, 501 respondents were included in the study. Binary logistic regression was performed to assess the correlation of a number of contract factors and consumer characteristics and consumer perceptions of factors influencing mortgage choice of mostly FRMs. The results of this regression were compared to a set of hypotheses.

## **Results**

All nine variables in the proposed model made statistically significant contributions. Five of these variables—higher age, LTV ratio, income, education and risk aversion—are positively correlated to the choice of FRMs. In these five aspects, the Swedish mortgage market also seems to be driven by the same factors as in other mortgage markets.

Contrary to what was hypothesised, households reporting low financial risk tolerance were less inclined to choose FRMs. This finding might be attributed to ARMs being marginally less expensive than FRMs during the investigated time period and to these households being unprepared to pay the risk premium inherent in FRMs.

The findings also show that the following factors have an impact on mortgage choice: consumers' personal experiences in home buying, the influence of the media and the influence of bank advisors. The first two factors have a negative effect on the choice of FRMs, whereas the last factor is positively correlated to the choice of FRMs.

The paper suggests that in addition to the factors that are commonly investigated in connection to mortgage choice, there are other factors such as previous mortgage experience and the roles of the media and financial advisors that influence the choice between fixed and adjustable mortgages.

## **6.5. Paper V: Mortgage decisions in Swedish housing co-operatives**

This paper is accepted for publication in *International Journal of Housing Markets and Analysis*.

The fifth paper extends the exploration of mortgage rate choice beyond the individual household to include housing co-operative organisations in which the mortgage choice can be expected to be a joint decision. The subprime mortgage crisis has presumably affected not only individual homebuyers but also buyers of dwellings in co-op associations, owing to uncertainties concerning price development and mortgage rates. Buyers of dwellings in co-op associations face financial uncertainty regarding the mutual master mortgages that most of these co-ops have, thereby exposing these households to a higher debt burden than they might realise.

This is one important motive for studying this aspect of mortgage choice. The total sum of master mortgages amounted to more than SEK 260 billion in January 2012, and this large number represents yet another important reason for studying this issue in an effort to gain more knowledge about the factors on which co-op board members base their mortgage decision, how they act on the information and whether there are reasons for concern, either for individuals or at the aggregate level.

### **Data and methods**

The empirical data used in this paper were collected in two steps. Initial data were collected through personal interviews with chairpersons in a sample of 12 co-op boards in the Stockholm region between November 2011 and February 2012. The co-ops were chosen based on four criteria: the presence of a mortgage, the number of units, the year the co-op was founded and geographical location. Six of the co-ops were located in the central part of Stockholm, the other six in a suburban area about 10 km from the city centre.

Based on earlier findings on mortgage choice on a household level and the results from the interviews, a questionnaire was constructed and sent to 680 randomised co-op boards in the Stockholm area. The total number of responses was 245. Of these, 230 co-ops had a mortgage. The results of this study are based on the answers of 213 respondents; 17 of the 230 co-ops with mortgages were excluded because of implausible or missing data.

From the questionnaire, responses concerning location, year of construction, financial matters and mortgage choice determinants were primarily selected for analysis. They were tested through binary logistic regression and compared to the hypotheses based on earlier

findings about factors influencing households' mortgage choices. A separate check for location was also performed.

## **Results**

The main result indicates that mortgage choice in co-op associations is more dependent on financial similarities than on location. The LTV ratios had a dominant influence on mortgage choice in that high LTV ratios were connected to higher levels of FRMs. Individual board members also seemed to have an influence on mortgage choice, albeit much weaker: Boards that perceived individual members as important for mortgage choice were more likely to choose ARMs.

In terms of the location of co-op associations, the results showed that the variables LTV ratio and the media made a statistically significant contribution to the model concerning city co-ops. In the suburban group, the LTV ratio and board members significantly contributed to the model.

The results in this study suggest that co-op boards are aware of financial risks connected to mortgages and that they try to make mortgage expenditures more predictable by controlling liquidity risks. The findings also show that the short-term threat of increasing interest costs seems to be limited, at least during the studied time period.

## 7. Findings from the papers as answers to the research questions

Four research questions were posed, as described in section 2. The research presented in the five papers provided answers to these questions. Figure 5 illustrates the development of the research through the papers, in which different determinants of borrowers' choice of mortgages were found to be statistically significant. Each research question is separately addressed in the following paragraphs of this subsection.

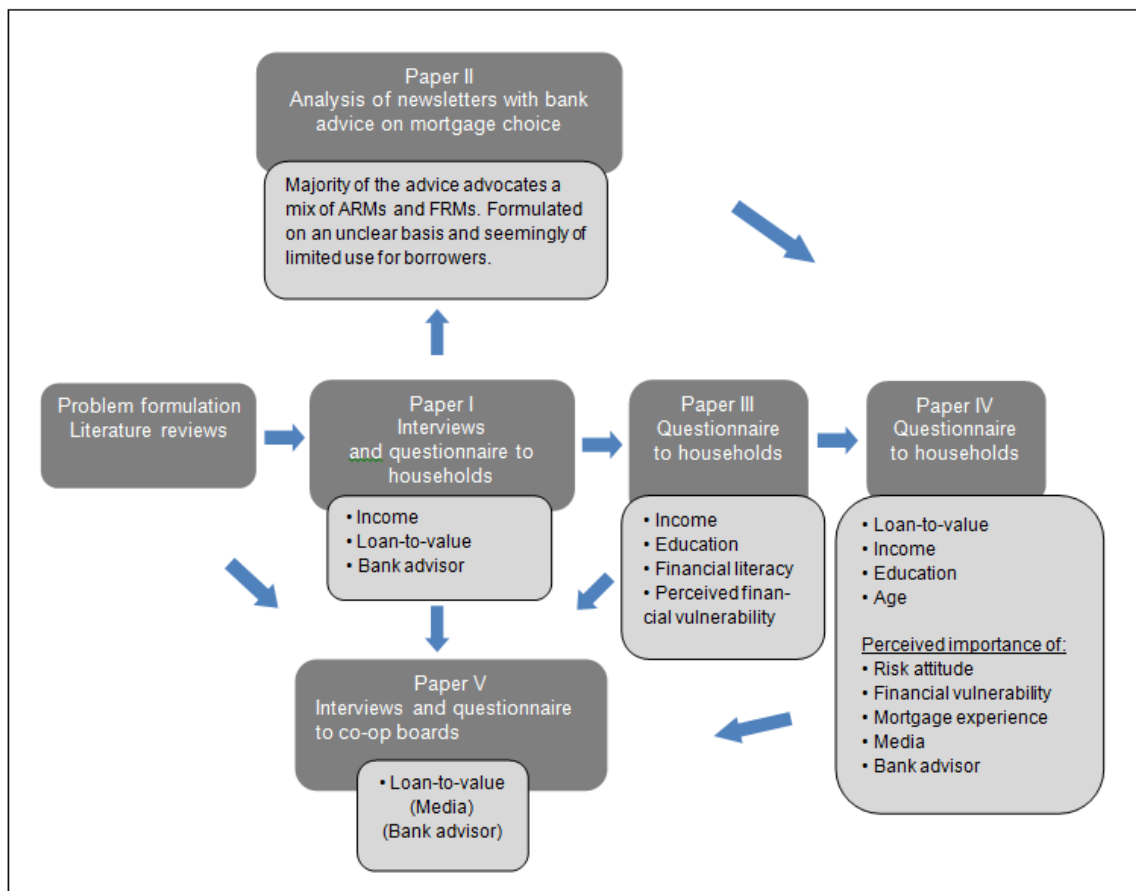


Figure 5. The research process (dark grey shaded areas) and the development of results (light grey shaded areas). ARM, adjustable rate mortgage; FRM, fixed rate mortgage.

**Research question 1:** Are factors that have been shown to be of importance for mortgage choice in other countries also influencing Swedish borrowers' mortgage choice?

- Paper I provides statistically significant evidence that income and LTV ratios are correlated to mortgage choice.
- Paper III shows the importance of income, attitudes towards risk, borrowers' level of education, restricted financial resources and financial literacy. This paper also shows

that although gender does not have an overall effect on mortgage choice, there are indications that the determinants of men's and women's mortgage choice differ.

- Paper IV provides further evidence that LTV ratios, education and income are determinants of mortgage choice. Age, attitudes towards general risk taking and restricted financial resources also influence this choice.

**Research question 2:** Are there determinants other than those previously studied in a non-Swedish context that affect mortgage choice?

- Paper I provides evidence that recommendations from bank advisors are correlated to mortgage choice.
- Paper IV: Bank advisors promote FRMs. Earlier mortgage experience and the influence of media are negatively correlated to the FRM choice.

**Research question 3:** How do banks formulate advice for their customers concerning mortgage choice, and is this advice of use to borrowers?

- The findings in paper II show that a large portion of the advice provided by banks—regardless of interest rate trends or the ARM/FRM gap, for instance—recommends that borrowers split their mortgage and choose both adjustable and fixed interest rates. These findings indicate that the investigated pieces of advice are of limited use to borrowers.

**Research question 4:** Which determinants do co-op board members perceive as influencing their mortgage choices?

- Paper V shows that the LTV ratio is the dominant determinant of mortgage choice and that high LTV ratios are correlated to higher proportions of FRMs.

## 8. Contributions, limitations and ideas for future research

The five papers in this thesis aim to contribute towards an increased understanding of factors that Swedish borrowers perceive as influencing their mortgage choice. This aim is fulfilled through empirical studies on how various determinants influence borrowers’ mortgage choice on a household level as well as in an organisational setting, such as a co-op association.

This thesis makes two contributions. The first contribution is the exploration in a Swedish setting of borrower characteristics that international studies have previously found to be of importance for mortgage choice. The second contribution is the identification of two determinants of mortgage choice, which, to my knowledge, have not been previously examined: the influence of bank advisors and the media. Previous mortgage experience is also shown to be of importance (see Figure 6).

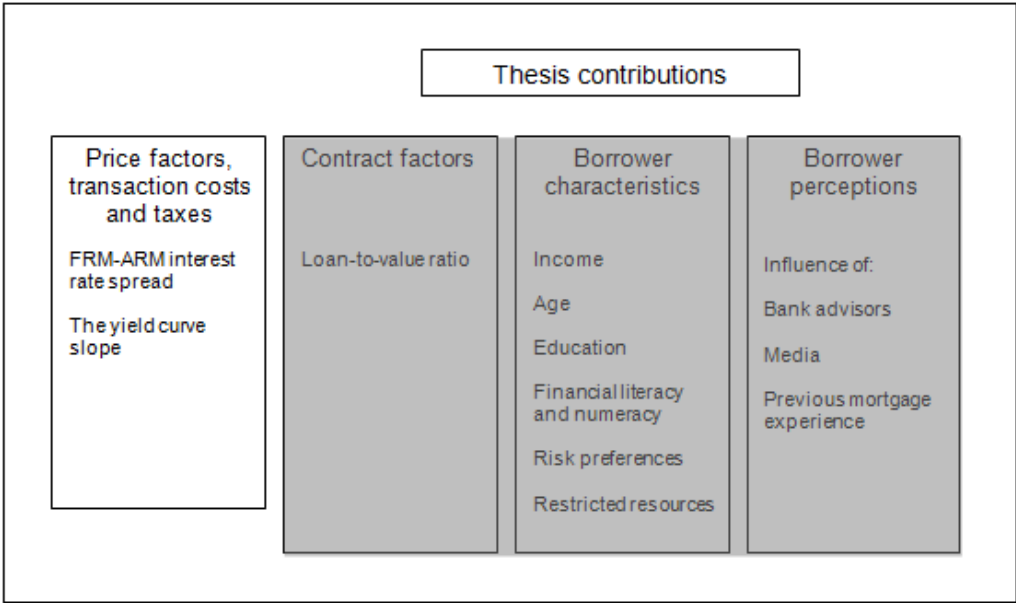


Figure 6. Contributions to mortgage choice literature. ARM, adjustable rate mortgage; FRM, fixed rate mortgage.

Taken together, the different papers showing the Swedish case partly confirm earlier international findings concerning the correlation between borrower characteristics and mortgage choice: Factors like income, education, financial literacy, risk perception and limited ability to handle increased costs have an impact on mortgage choice. However, the Swedish findings do not always point in the same direction as those of previous studies and, in one case, are not even consistent between the papers (see Table 2).

In paper III, the impact of restricted resources is shown to have a positive correlation to FRMs (in 2010), whereas in paper IV, this variable is revealed to have a negative correlation to FRMs (in 2012). This discrepancy might be attributed to a difference in the investigated time period; however, it has to be studied further before any far-reaching conclusions can be drawn. In addition to the explored factors presented in Table 2, paper III provides evidence of gender differences concerning factors determining mortgage choice: The most statistically significant determinants for women are income, restricted resources and financial literacy, whereas they are age, education and risk aversion for men.

*Table 2.* Explored factors and their influence on households' choice of adjustable rate mortgage (ARM) or fixed rate mortgage (FRM).

	Borrower characteristics						Contract factor	Variables of perceived importance		
	Income low/high	Education low/high	High age	Risk aversion	Restricted resources	Low financial literacy	High loan-to-value	Media	Bank advisors	Previous mortgage experience
Paper I Influence on choice of ARM	High = positive	Not tested	No impact	Not tested	Not tested	Not tested	Negative	No impact	Negative	Not tested
Paper III Influence on choice of FRM	Low = positive	Low = positive	No impact	Positive	Positive	Positive	Not tested	Not tested	Not tested	Not tested
Paper IV Influence on choice of FRM	Low = positive	Low = positive	Positive	Positive	Negative	Not tested	Positive	Negative	Positive	Negative

Data for this thesis were collected from spring 2008 to spring 2012. The time period under investigation is of interest because it coincides with the time period before, during and after the global financial crisis. Sweden's economy has been affected by the global financial crisis to a lesser degree than most other countries: No major drops have occurred in real estate prices, credit losses in the banking system have been low and the national debt was lower at the end of 2012 than in 2008 (Riksbanken, 2012).

Nevertheless, Sweden experienced a period of increasing interest rates just before the crisis hit, and authorities and politicians have expressed much concern about mortgage rates, real estate prices and LTV ratios. These issues have also attracted a great deal of attention because of the events that unfolded in the United States and worldwide when the financial crisis erupted. For these reasons, these issues have been recurring topics in the Swedish media from 2007 onwards. All this is also reflected in the papers.



When the financial crisis affected Sweden in the second half of 2008, the Riksbank decreased the repo rate, resulting in historically low mortgage rates. During the time period when work for this thesis was carried out, an additional measurement was introduced to reduce households' financial vulnerability—and, in the long run, presumably the vulnerability of the Swedish economy. In October 2010, FI introduced a general guideline for mortgages collateralised by homes so that new loans should not exceed 85 per cent of the home's market value.

The results of this thesis provide evidence that the most vulnerable households do not take out large portions of ARMs. As shown in paper I, Swedish households that mainly chose ARMs in 2008 and 2009 had relatively high incomes and lower LTV ratios. Papers III and IV show that the most vulnerable Swedish borrowers choose FRMs to a greater extent than those who are less vulnerable, and, in so doing, they avoid obvious liquidity risks. This finding is also in line with the bank recommendations on mortgage choice studied in paper II. In this paper, a leading bank advisor suggests that borrowers should divide their loans and choose both adjustable and fixed interest rates, thereby limiting the risk of drastically increased mortgage costs. Notably, the findings in paper II show that in periods with comparatively low fixed interest rate levels, there were no bank recommendations to lock in the mortgage rate. This was contrary to the expected results, as an FRM might be of interest to financially constrained and/or risk-averse borrowers.

The idea put forward by the Riksbank in 2008 about the potential negative effect of higher mortgage interest rates for buyers purchasing dwellings in co-op associations has not come to fruition. Co-op board members seem to be rather risk averse on behalf of their members in that associations with higher LTV ratios avoid high levels of ARMs for the mutual master mortgage, thus limiting the short-term threat of increasing interest costs.

All in all, these findings contradict much of the concern that both scholars and financial authorities have expressed about households' choice of mortgage instrument, as outlined in the beginning of this introduction.

Low mortgage rates for a number of years, steady or rising prices on dwellings and capped mortgages have together contributed to a situation in which mortgage holders (based on my interpretation of the interviews conducted for this thesis) do not express any sign of worry about their mortgages and do not talk about their mortgages as a source of risk.

A topic for future studies could be to explore in more detail the impact of risk aversion on mortgage choice, especially in a situation characterised by higher mortgage rates.

One limitation of this thesis is the fact that the ARM/FRM gap was negligible for most of the time period under investigation. Because many scholars have found that this gap influences the mortgage rate choice, it is an obvious topic for future study under conditions in which the ARM/FRM gap is larger. In my opinion, another exciting topic for future study would be to explore the relationship between bank advice and the media.

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