

Mortgage Decisions in Swedish Housing Co-operatives

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Introduction

Co-ops make up an important tenure form in Sweden as 20 per cent of all dwellings on the Swedish housing market (65 per cent of all owner occupied-dwellings) are organized in this way, the majority being apartments. A co-op differs from condominiums in that the buyers will not actually have a direct ownership of the dwelling, only a share of the co-op association and the right to occupy a particular unit for a non-restricted time period. When buying a co-op, the price consists of two parts: the purchase sum (which can be financed with a personal mortgage) and a share of the mutual debt held by the co-op association, the so called master mortgage, of which all shareholders in a building are responsible. The costs connected to the mutual master mortgage will affect the monthly fee paid by the shareholder because the fee should cover all maintenance and operating cost as well as the capital costs for the master mortgage.

The total sum of master mortgages in Sweden amounts to more than 260 billion SEK, or approximately 30 billion euro, as of January 2012. That sum equals almost one quarter of Sweden's national debt or approximately 65 per cent of the total lending to Swedish households with co-ops as collateral (Statistics Sweden, 2012). In the light of the recent subprime mortgage crisis and subsequent turbulence in the financial markets concerns regarding this issue were raised by Riksbank, Sweden's central bank (Sveriges Riksbank, 2008).

It has been established that a home-buyer's choice of residential mortgage is likely the single most important factor that determines a household's exposure to interest risk (Vickery, 2006) and is of first-order importance for households, financial institutions and macroeconomic stability (Campbell, 2012). Because of its importance, a number of

international studies have investigated the choice of mortgage at the household level, both empirically and theoretically (e.g. Bergstresser and Beshears, 2010; Campbell, 2006; Chambers *et al.*, 2009; Coulibaly and Li, 2009; Duffy and Roche, 2005; Leece, 2000; Vickery, 2006).

Decisions regarding financial matters, such as loans and maturities, in a co-op association have however not been investigated, to our knowledge, even though master mortgages constitute such a large part of the total loan stock, as well in Sweden as in other Scandinavian countries such as Norway and Denmark. Co-ops are also available in for instance Canada and the US.

In a co-op association, mortgage choices are made by a board, which is elected by and consists of members of the co-op association. Because there is no requirement that board members should have professional financial or legal experience, the board consists more or less of laypeople. The board clearly has a far-reaching financial commission and this is the starting point for this paper which investigates how co-op boards act and which factors form the basis of their mortgage rate decisions.

This article presents the results of an interview study performed from November 2011 to February 2012 and a subsequent questionnaire study, for which the aim of both is to shed light on the mortgage choice of co-op board members. The interview study, which was performed with chairpersons in co-op associations in the Stockholm area, presents the experiences of board members in making the choice between a fixed-rate mortgage (FRM) and an adjustable-rate mortgage (ARM). Based on these responses, a questionnaire was created and sent to a wider set of co-ops in the Stockholm area. The results are compared to hypotheses based on earlier findings from studies on households' choice of mortgage rate. The objective is to contribute to previous findings in three separate ways: to examine the driving forces behind co-op boards' mortgage choices, to highlight the potential liquidity risk

concerning master mortgage costs in light of financial instability in the market and to expand the existing literature on mortgage choice.

This introduction is followed by a brief literature review. The context of the study—that is, the Swedish co-op market—is outlined, followed by a section on the data and the methods. The results are then discussed, and implications for further research and practice are suggested.

Literature review and hypotheses

Co-ops: mutual debt and price

Previous studies have examined how co-ops are constituted legally and financially in different countries—for example, in Norway (Hansmann, 1991; Robertsen and Theisen, 2011); in the United States (Kelly, 1998; Sazama, 2000; Schill *et al.*, 2004), and in Sweden (Almenberg and Karapetyan, 2011; Hjalmarsson and Hjalmarsson, 2009). Most of these papers also focus on if, and in which case how much, the mutual debt in the housing co-op affects the price for a dwelling—either in itself or compared with dwellings in condominiums.

Findings from the Swedish papers show that the size of the co-op's master mortgage loan does not reflect in apartment prices. Almenberg and Karapetyan's results from 2011 suggest that apartment buyers have poor awareness of the details of their co-op's master mortgage compared to their personal mortgage loan. Hjalmarsson and Hjalmarsson (2009) find that those households that most often fail to discount properly future rent payments relative to sales price tend to be poorer and less well educated. These earlier Swedish studies show that co-op loans are not properly discounted for in sales prices and that the most financially vulnerable households are the least aware of the potential liquidity risks associated with a master mortgage.

Mortgage choice in general

A rich literature exists on factors influencing mortgage choice at the household level throughout the world. The literature has two major strands - borrower characteristics and contract factors.

The strand concentrating mainly on borrower characteristics includes e.g., Bergstresser and Beshears, 2010; Brueckner and Follain, 1988; Coulibaly and Li, 2009; Finke *et al.*, 2005; Fortowsky *et al.*, 2011. Findings in this literature point to income as an important factor in the choice of mortgage as well as for instance education, age and financial literacy (for a more comprehensive review, see Hullgren and Söderberg, 2013).

The other strand in the literature centres mainly on price and other contract factors (e.g., Brueckner and Follain, 1988; Campbell, 2006; Chambers *et al.*, 2009; Dhillon *et al.*, 1987; Duffy and Roche, 2005; Leece, 2000; Sa-Aadu and Sirmans, 1995; Smith, 1987; Statman, 1982; Vickery, 2006).

One important price factor is the loan-to-value (LTV) ratio as presented by Duffy and Roche (2005), who show that buyers with high LTV ratios opt for FRMs. This finding is in line with that of Brueckner (1986), who reports that those making large down payments (a low LTV ratio) opt for ARMs. Presumably, households with higher LTV ratios choose FRMs because they feel a need to avoid sudden increases in mortgage rates and potential liquidity risks. Based on these previous results, I propose the following hypothesis:

Hypothesis 1: Co-op boards base their mortgage choice on the LTV ratio: high LTV ratios imply a lower degree of ARMs.

Another finding in the literature is that the spread between the FRM and the ARM is a primary determinant of mortgage choice; that is, mortgage choice is price sensitive (Leece, 2000). This finding is also in line with for example those of Smith (1987), Brueckner and

Follain (1988), Campbell (2006), Vickery (2006) and Coulibaly and Li (2009). Based on these international findings, the following hypothesis is proposed:

Hypothesis 2: Co-op boards base their mortgage choice on the perceived importance of the ARM-FRM price difference.

An additional factor that has attracted interest during the past few years is the media's influence. Lai and Ge (2009) find that the media has an important role in providing information on property. A recent Swedish study on households' mortgage choices has also stressed the impact media has on those decisions (Hullgren, 2010), stating that mortgagees who claim being influenced by the media to a higher degree choose ARMs.

Media has also been found to play an important role in shaping public perceptions in other areas, for instance, by influencing consumer demand (Kalaitzandonakes *et al.*, 2004), investors (Barber and Odean, 2011); financial market participants (Engelberg and Parsons, 2011) and stock prices (Meschke, 2004). Therefore, it is reasonable to believe that the media could also impact mortgage choice. Mortgage rates and advice on mortgage choice have been recurrent topics in the Swedish news in the years leading up to this study, and, until recently, the primary message being presented has skewed towards choosing ARMs. Based on these findings, the following hypothesis is proposed:

Hypothesis 3: Co-op boards that state that their mortgage choice has been influenced by the media opt for ARMs.

In addition to testing these three hypotheses I also investigate whether there are other external sources that co-op boards perceive as driving forces for their decisions (the impact of bank advisors, individual board members and loan size; variables based on the responses in the interview study).

The case: the Swedish context

Co-ops

Co-ops constitute approximately 20 per cent of the total housing in Sweden: of the country's 4.5 million dwellings, approximately 2 million were single-family homes, 1.6 million were rental homes and 900,000 were dwellings in the 26,000 co-ops in 2010. The major part of co-op dwellings, approximately 700 000, are situated in Stockholm where also the average prices have more than doubled during the period 2000-2010 (Statistics Sweden, 2012). This development is to a large part due to Stockholm being among the fastest growing among European cities, in combination with housing shortage, no vacancies in the rental sector and low numbers of new construction (Lundström and Wilhelmsson, 2007).

In Sweden, co-ops are not seen as part of publicly assisted housing or affordable housing cooperatives, as is sometimes the case in other countries, such as Canada (Wolfe, 1998) and the United States (Hansmann, 1991; Sazama, 2000). It is rather the traditional way of owning one's apartment. Swedish co-ops are regulated by a special law, and each cooperative is an individual legal entity. Co-ops are not obliged to register their annual reports at any authorities, thus making official statistics on financial matters in co-ops incomplete.

The co-op is a non-profit organisation with the purpose of providing cost-based living for its members. When an individual buys a dwelling in a co-op, that individual does not have the actual property rights over the apartment, just an exclusive share of the cooperative and a membership in the cooperative association. The shareholder is free to sell the apartment on the market, and there is generally no pre-emption right.

The net payments in a co-op are paid monthly by the association members, a fee depending on the unit's share of the total co-op association. This comprises maintenance fees, taxes and capital costs connected to the cooperative's loan — in the case where the co-op has one.

For the individual member, two components determine monthly costs: the individual capital costs (i.e., mortgage and amortization of loans taken by the individual to buy the apartment) and the fee to the co-op association. So even if the members in a co-op association legally are not personally responsible for paying the association's debt, the association's indebtedness can affect the households' finances.

According to Statistics Sweden (2013), the average LTV ratio (the co-op's total master mortgage divided by the tax assessment value) in co-op associations in the whole of Sweden was 32 per cent (26 per cent in the capital Stockholm). In 2004 these figures were 50 per cent (39 per cent in Stockholm), so there has seemingly been a decrease. Behind these figures though, lies a development where the amount of co-op debt has increased by 60 per cent while the overall tax assessment value has increased by 150 per cent.

Co-ops and price trends

During the period 2000–2010, the prices for dwellings co-ops in Sweden changed considerably. The average purchase price for an apartment in Stockholm increased by 122 per cent (see Table 1).

Table 1. Average purchase prices for co-op units according to Statistics Sweden (2012).

	2000 average price, SEK	2010 average price, SEK
Co-op units, Stockholm	975,000	2,165,000 (+122%)
Co-op units, Sweden	390,000	1,073,000 (+175%)

Increased housing prices have led to an increase in the indebtedness of households, and the loan-to-disposable income ratio increased from approximately 108 per cent in 2000 to about 166 per cent in 2010 (Statistics Sweden, 2012). This figure covers all borrowers, both those with owner-occupied houses and co-op apartments. It should be mentioned that owners of co-op apartments are on average more indebted than owners of single-family dwellings

and in addition: If co-ops' master mortgages would to be included in the calculation of the households' debt ratio, households' debts on an aggregated level would be more than 190 per cent of disposable income (Finansinspektionen, 2013).

During the same period, the length of home loan lock-in periods has fluctuated. There are no official statistics showing the distribution of ARMs and FRMs in the co-op market, but on a household level, statistics show that in the year 2000 about 65 per cent of new lending occurred at variable rates. In early 2010, this share was 80 per cent. Since then, the share has decreased to 62 per cent in December 2012 (Statistics Sweden, 2013). All in all, it seems reasonable to conclude that in recent years, households have been more sensitive to sudden increases in mortgage rates.

The Swedish mortgage market

Mortgage loans in Sweden are secured by collateral, normally as a mortgage on the property. The lending consists of a first mortgage, which involves pledging the property for up to 75 per cent of its value (since 2010). Additional credit is provided as a second mortgage by the bank or mortgage institution. Mortgage institutions offer a range of credit facilities at adjustable or fixed interest rates.

As already pointed out, ARMs dominate the Swedish market, whereas FRMs are mostly taken out at 1-, 2- or 3-year maturities, thus making the Swedish mortgage market quite different from, for instance, the US market. Only 4.7 per cent of all lending from mortgage institutes in January 2012 constituted FRMs longer than five years (Statistics Sweden, 2012). All mortgages are recourse mortgages—the lender can pursue a defaulted borrower for the balance of the mortgage even after an eventual foreclosure on the dwelling. Thirty per cent of interest payments up to 100,000 SEK annually are deductible for households; for larger annual payments, it is 21 per cent. Interest payments are not, however,

deductible for co-op loans. From 2008 co-op associations are taxed according to the number of dwellings in the building(s). In 2012, the tax amount was SEK 1365 for each dwelling. The total amount is paid by the association and indirectly by the members through the monthly fee.

During the period when data for this paper were collected (November 2011 through July 2012), interest rates for housing loans decreased, and there were only minor differences between the FRM and ARM rates (see Table 2). Only during short periods in 2003 and 2008 have the two-year FRM rates been lower than the ARM, as was the case during the period of time when the interviews and questionnaire were carried out.

Table 2. List rates in per cent for mortgages (Source: Swedish Housing Finance Corporation, 2012).

Date	ARM (3-month maturity)	2-year FRM	5-year FRM	10-year FRM
Nov. 2011	4.33	4.05	4.60	4.99
Feb. 2012	4.30	3.83	4.22	4.73
Jun. 2012	3.97	3.70	4.05	4.55

During this period, the prognosis of the Swedish central bank, Riksbank, for the repo rate (the repo rate is the rate of interest at which banks can borrow or deposit funds at Riksbank for a period of seven days) was adjusted from 2 per cent to 1.75 per cent in December 2011. The forecast for the years to come was also adjusted during the first half of 2012 (as shown in Tables 3 and 4) —indicating that there would be no drastic changes in ARMs for some time. It is against this background the mortgage choice in this article should be seen.

Table 3. Riksbank's forecast in February 2012 for the repo rate in per cent, quarterly mean (Source: Riksbank).

Date	Q2 2012	Q1 2013	Q1 2014	Q1 2015
Feb. 2012	1.5 (1.7)*	1.5 (1.8)*	2.2 (2.6)*	3.0

* The forecasts made in December 2011 are in parentheses.

Table 4. Riksbank's forecast in June 2012 for the repo rate in per cent, quarterly mean (Source: Riksbank).

Date	Q1 2012	Q2 2012	Q1 2013	Q1 2014	Q1 2015
April 2012	1.6 (1.6)*	1.5 (1.5)*	1.5 (1.6)*	2.2 (2.2)*	3.0 (3.0)*

* The forecasts made in February 2012 are in parentheses.

Method and background data

Interview study

The 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. Addresses to the co-ops were collected with the help from a private real estate information company Boreda. The sample was drawn from their database based on four criteria: the presence of a mortgage, the number of units, geographical location and the year the co-op was founded. These criteria were chosen so as to make relevant comparisons and to find differences in variables like property values and loan amounts.

Mortgages: The chosen maturities of the master mortgages in the whole sample differed widely: two co-ops had only one loan each, an ARM. One co-op had two loans, both ARMs. The other nine co-ops had between two and five loans with a mixture of ARMs and FRMs or with more than one FRM (see Table 5). In some cases, the mortgage decision had been made by previous boards, and the interviewee(s) could not exactly account for those decisions but only for the current preference.

Size: The initial intention was to find co-op associations of about the same size. Because of a limited number of choices in combination with finding board members who

were willing to participate, however, the size of the associations came to vary between 41 and 258 units, the median being 83 (see Table 5).

Location: The sample was divided into two parts. Six associations are located in the Stockholm city area. The other six associations are located in Farsta, a suburb built initially around 1960 and located about 10 km from the city centre (see Table 5). Prices for apartments in this area are in general less than 50 per cent compared to the city.

Year co-op was founded: To obtain separate samples, the six associations in each location were then divided into two groups each: associations founded before 1975 and those after 2006. The year 2006 was changed to 2003 so as to obtain an adequate number of associations in the suburb category (see Table 5) and constitute co-ops that can be considered “new”. The year 1975 was chosen as this year marks the end of a period in Swedish housing policy, called the Million Homes Programme. This was the result of a political decision to end the prevailing housing shortage, and a million new dwellings were built during the period 1965 to 1975. These houses are now between 40 and 50 years old and consequently seen as being in the group “old”. It can be argued that these older co-ops might have paid off a high proportion of the initial mortgage but on the other hand, these houses either have been, or are, in need of major renovations, such as changing the electric systems, sewage systems, roofs and so on, which in most cases have to be financed through new mortgages.

Table 5. Basic data about the 12 co-ops in the interview study.

	City, new	Suburb, new	City, old	Suburb, old
Number of units in co-op	45–85	63–258	81–102	65–85
Year founded	2007–2008	2003–2008	1930–1973	1957–1958
LTV ratios (min-max)	0.31–0.52	0.49–0.73	0.05–0.17	0.05–0.20
Only ARM	0	0	1	2
Only FRM	3	3	1	0
Both ARM & FRM	0	0	1	1

The interviews took approximately one hour each and were conducted with the chairperson and sometimes an additional board member. They were based on a number of open-ended questions concerning general facts about the co-op association and its financial management. The board members sometimes answered that multiple sources influenced the mortgage choice. Answers were categorised jointly by the research group. The answers in the interview study could not be formally tested because of too few observations, but they were used as a base for the questionnaire.

LTVs were calculated as the quotient of the co-op's total mortgage sum divided by the tax assessment value set by the Swedish Tax Agency. The LTVs are calculated based on the co-op's latest annual report, mostly that from 2011. As shown in Table 5, not surprisingly LTVs are highly correlated to the age (old or new) of the co-op but not to location; all six of the new co-ops chose FRMs for the total loan amount.

In some cases one or more of the co-op's mortgages were taken out before the interviewee was part of the board, but the interviewees had all taken part in mortgage discussions at some point and reported what had been perceived as important factors for mortgage choice at those occasions. Presumably, it is likely that there are some differences in the situation in which boards choose FRM compared to ARMs: ARMs are passive in their nature and might not be changed unless there are significant reasons to change, such as expectation of higher interest rates. In the case of FRMs, they will only require further considerations at the end of the term, but as they tend to be relatively short term, boards will have to make active decisions quite regularly.

Interviews revealed that other factors than purely financial ones were perceived by board members as having importance. The media, the co-op's contact person at the bank and the knowledge tied to a specific board member were all issues that often occurred in the interviews. There was no conformity in the descriptions of the actual professions or financial

experiences of the board members that were perceived as knowledgeable and consequently seen as a driving force for the mortgage decision. Some were owners of a business, someone worked as a bank cashier and yet others were described as being “generally interested in financial matters”. Comments like “we have worked with these types of decisions for six years” also occurred.

One reflection based on the interviews is that of all twelve boards members interviewed, only two said that they did not have the competence within the board to take a decision concerning mortgages. These were both members in suburban co-op boards.

The major findings from the interviews (year co-op was founded, importance of individual board members and bank advisor), were used in a subsequent questionnaire to investigate whether they were frequent bases for mortgage decisions in co-ops.

Questionnaire

In April 2012, a questionnaire was sent to 680 co-ops in the county of Stockholm where the addresses again were provided by Boreda. The co-ops were chosen to fit into the four categories “old/city”, “old/suburb”, “new/city” and “new/suburb” and had between 30 and 150 apartments. The ‘city’ sample contained all co-ops within a radius of 2 km from the city centre, and the ‘suburb’ sample was randomly selected among co-ops located more than 5 km from the city centre, given the aforementioned limitations .

The questionnaire was marked with numbers so that a remainder could be sent to those co-ops that had not answered after approximately 2 months. The total number of responses was 245 (36 per cent). Of these, 230 co-ops had a mortgage, and after having excluded 17 due to implausible or missing data, the results of this study are based on the answers of 213 respondents (31 per cent). (For basic data see table 6).

Because there are no official registers on co-op annual reports, a comparison between those co-ops that answered that answered the questionnaire and the whole sample cannot be

made in a satisfactory way. The ratio of answers in every group in comparison to the total amount of answers was however similar so there seems to be no reason to assume that there are any systematic differences between the four groups.

Table 6. Basic data about the co-ops that answered the questionnaire (n=206)

	City, new	Suburb, new	City, old	Suburb, old
No. of co-ops	36	46	76	72
LTV (min-max)	0.04–0.72	0.07–0.89	0.02–0.90	0.01–0.84
LTV (mean)	0.41	0.53	0.26	0.33
Share (in %) within each group with ARM >50%	17	4	18	35

From the questionnaire, responses concerning location, year of construction, financial matters and mortgage choice determinants were primarily selected for analysis. The constructs used in the regressions are presented in Table 7.

Table 7. Variables used in the binary logistic regressions.

Variable	Definition	Mean
ARM75	A binary variable indicating whether a loan taker has chosen a high share of ARM or not: >75% ARM = 1; ≤75% ARM = 0	0.19
LTV	A continuous variable (0.02-0.90)	0.36
MEDIA	A variable indicating respondents' perceived importance of media for mortgage choice on a 5-point scale, ranging from 'not at all important' (1) to 'very important' (5).	2.24
BANK	A variable indicating respondents' perceived importance of their bank contact for mortgage choice on a 5-point scale, ranging from 'not at all important' (1) to 'very important' (5).	2.85
MEMBER	A variable indicating respondents' perceived importance of an individual board member for mortgage choice on a 5-point scale, ranging from 'not at all important' (1) to 'very important' (5).	3.42
LOANSIZE	A variable indicating respondents' perceived importance of loan size for mortgage choice on a 5-point scale, ranging from 'not at all important' (1) to 'very important' (5).	3.15
RATEDIFF	A variable indicating whether respondents perceive importance of the interest rate difference between ARM and FRM as an important for mortgage choice on a 5-point scale, ranging from 'not at all important' (1) to 'very important' (5).	3.56

n = 213

The dependent binary variable ARM75 was derived from a multiple-choice question, in which the respondents stated how large a part of the total loan amount was an ARM: 0%–25%, 26%–50%, 51%–75% or 76%–100%. Those with more than 75 per cent ARMs were categorized as 1, all others as 0.

The explanatory variable LTV is a continuous variable based on the loan amount and assessed tax value in 2012. The rest of the variables (MEDIA, BANK, MEMBER, SIZE and DIFF) were constructed depending on the boards' perceived importance of these variables for their mortgage choices. Answers were given on a 5-point scale, ranging from 'not at all important' to 'very important'. A binary logistic regression was performed to explore the impact of these different variables on mortgage choice.

Results

A regression with the dependent variable ARM75 was performed and the results are shown in Table 8.

Table 8. Logistic regression predicting likelihood of choosing mostly ARM

	B	SE	Sig.	Odds ratio
LTV	-6.248	1.279	0.000***	0.002
MEDIA	0.180	0.171	0.290	1.198
BANK	0.064	0.143	0.653	1.066
MEMBER	0.304	0.172	0.077*	1.356
LOANSIZE	-0.223	0.184	0.225	0.800
RATEDIFF	-0.004	0.171	0.981	0.996
Constant	-0.652	0.792	0.411	0.521

Note: The dependent variable is ARM75. The number of observations included in the analysis is 213. The Cox and Snell R^2 is 0.167, and the Nagelkerke R^2 is 0.269. ***Statistically significant at the 0.01 level (2-tailed), **Statistically significant at the 0.05 level (2-tailed), *Statistically significant at the 0.10 level (2-tailed).

The tested main model is statistically significant, $\chi^2(6, n = 213) = 38.873, p = < 0.001$, indicating that the model as a whole is able to distinguish between the respondents who chose mostly ARMs and those who chose lower levels of ARMs. The model as a whole explains between 16.7 per cent (Cox and Snell R^2) and 26.9- per cent (Nagelkerke R^2) of the variance in mortgage rate choice made by co-ops.

As shown in Table 8, only two independent variables make a unique contribution (statistically significant estimated parameters) to the model (LTV and MEMBER). The strongest predictor of choosing mostly ARM is LTV, with an odds ratio (OR) value of 0.002. The result indicates that co-ops with high LTV ratios are extremely less likely to choose ARM than those having lower LTVs, controlling for all other factors in the model.

The OR value of the predictor MEMBER is 1.356 indicating that respondents who perceive individual member as important for mortgage choice are almost 1.4 times more likely to choose ARM than those who do not, controlling for all other factors in the model.

To check the robustness of the result, the regression was run stepwise but doing so did not alter the previous result. A control for the impact of the year the co-op association was founded was also performed but did not significantly influence the results. A correlation check shows that there is no collinearity between the variables.

As the initial interviews indicated differences between co-ops situated in the city area or in the suburbs, a separate regression was performed to check for this. Table 9 shows the results.

The model with only city co-ops is statistically significant, $\chi^2 (6, n = 213) = 16.710, p = 0.01$, indicating that the model is able to distinguish respondents who chose mostly ARMs from all others. The model with only suburban co-ops is also statistically significant, $\chi^2 (6, n = 213) = 35.880, p < 0.001$.

Table 9. Logistic regression predicting likelihood of choosing mostly ARM; location-separated model (C=city, S=suburb)

	B		S.E.		Sig.		Odds ratio	
	C	S	C	S	C	S	C	S
LTV	-4.227	-9.256	1.811	2.264	0.020**	0.000***	0.015	0.000
MEDIA	0.564	-0.401	0.239	0.315	0.018**	0.203	1.757	0.670
BANK	0.084	0.033	0.215	0.229	0.695	0.887	1.088	1.033
MEMBER	0.407	0.467	0.272	0.275	0.135	0.089*	1.502	1.596
LOANSIZE	-0.306	0.082	0.256	0.336	0.232	0.806	0.736	1.086
RATEDIFF	0.138	-0.240	0.240	0.337	0.566	0.476	1.148	0.786
Constant	-2.977	1.047	1.463	1.129	0.042	0.354	0.051	2.850

Note. The dependent variable is MChoice. The number of observations is C/S 213. The Cox and Snell R^2 is C 0.148/S 0.283; the Nagelkerke R^2 is C 0.238/S 0.459. ***=Correlation is significant at the 0.01 level (2-tailed). **=Correlation is significant at the 0.05 level (2-tailed). *=Correlation is significant at the 0.10 level (2-tailed).

As shown in Table 9, the two independent variables that now make a statistically significant contribution to the model concerning city co-ops only are LTV and MEDIA. In the suburban group, the two variables LTV and BOARDMEMBER significantly contribute to the model. In both groups, the main predictor of choosing mainly ARMs is LTV, with OR-values indicating strong negative correlation.

6. Discussion

The objective of this paper is to study empirically the determinants of mortgage choice in co-ops with Sweden as a case. Interviews with representatives from 12 co-ops in the Stockholm area were initially performed during 2011 and 2012 and used as a basis for a questionnaire sent to 680 co-ops. The results from these questionnaires are compared to three hypotheses based on earlier findings concerning mortgage choice at the household level. Based on the interviews, three additional factors possibly affecting the mortgage choice of co-ops are tested.

The first hypothesis states that co-op boards base their mortgage choice on the LTV ratio and that high LTV ratios imply a lower preference for ARMs, thus minimising the liquidity risk in case of sudden increases in mortgage costs. The results give strong support to

this hypothesis and thus also to the findings on a household level made by Duffy and Roche (2005) and Brueckner (1986).

The second hypothesis states that co-op boards base their mortgage choice on the ARM-FRM gap. This study is based on the perceived importance of this gap and the result from the model shows no support for this hypothesis, contradicting earlier findings (Campbell, 2006; Coulibaly and Li, 2009; Leece, 2000; Vickery, 2006).

The third hypothesis concerns the media's influence on mortgage choice. Earlier research (Hullgren, 2010) finds a connection between the influence of the media and the choice of ARMs. No such connection is established in the main study. However, when testing for location, it shows that for the mortgage choice in the city area, the media is with statistical significance correlated to high levels of ARMs. Thus, the hypothesis is rejected for the main model but the correlation between mortgage choice and media in the city area is of interest for further studies.

Contrary to information obtained in the interview study, the mortgage choice does not seem to be statistically significantly affected by bank staff. Individual board members however seem to have impact on the mortgage choice in that there is a preference for ARM in the suburb sample. To further explore the individual characteristics of board members, such as the level of financial literacy and numeracy is a topic for future studies.

This study was set in the Stockholm area during a period when there were practically no differences between ARM and FRM rates. An additional topic for future research to investigate whether the variables in this study have a different impact in other regions or in time periods when the differences in mortgage rates are greater.

All in all, the results show there seems to exist certain awareness in co-op boards about the liquidity risks connected to the association's mortgages, so that boards with higher LTVs avoid high levels of ARMs.

These findings can be of value to both homebuyers and the financial industry because they indicate that co-ops are rather risk averse on behalf of their members and that the short-term threat associated with increasing interest costs is limited in the current financial market.

References

- Almenberg, J. and Karapetyan, A. (2011), “*The Hidden Costs of Hidden Debt*”, paper presented at the International Conference of the French Finance Association (AFFI), May 11–13, Montpellier, 2011. Available at <http://ssrn.com/abstract=1836868> (accessed 15 May 2011).
- Barber, B. M. and Odean, T. (2011), “*The behavior of individual investors*”, Working Paper No. 1872211, September. Social Science Research Network.
- Bergstresser, D. and Beshears, J. L. (2010), “*Who selected adjustable-rate mortgages? Evidence from the 1989–2007 surveys of consumer finances*”, Working Paper No. 10-083, March. Boston: Harvard Business School.
- Boreda (2012) <http://www.boreda.se>.
- Brueckner, J. K. (1986), “The pricing of interest rate caps and consumer choice in the market for adjustable-rate mortgages”, *Housing Finance Review*, Vol. 5 No. 2, pp. 119–136.
- Brueckner, J. R. and Follain, J. R. (1988), “The rise and fall of the ARM: an econometric analysis of mortgage choice”, *The Review of Economics and Statistics*, Vol. 70 No. 1, pp. 93–102.
- Campbell, J. Y. (2006), “Household finance”, *The Journal of Finance*, Vol. 61 No. 4, pp. 1553–1604.
- Campbell, J. Y. (2012), “*Mortgage market design*”, Working Paper No. 18339, August. Cambridge Massachusetts: National Bureau of Economic Research.
- Chambers, M., Garriga, C. and Schlagenhaut, D. (2009), “The loan structure and housing tenure decisions in an equilibrium model of mortgage choice”, *Review of Economic Dynamics*, Vol. 12 No. 3, pp. 444–468.
- Coulibaly, B. and Li, G. (2009), “Choice of mortgage contracts: evidence from the survey of consumer finance”, *Real Estate Economics*, Vol. 37 No. 4, pp. 659–673.
- Dhillon, U. S., Shilling, J. D. and Sirmans, C. F. (1987), “Choosing between fixed and adjustable rate mortgages: a note”, *Journal of Money, Credit and Banking*, Vol. 19 No. 2, pp. 260–267.
- Duffy, D. and Roche, M. J. (2005), “Heterogeneous homebuyers, mortgage choice and the use of mortgage brokers”, Working Paper Series, February. Dublin: The Economic and Social Research Institute.
- Engelberg, J. and Parsons, C. (2011), “The causal impact of media in financial markets”, *The Journal of Finance*, Vol. 66 No. 1, pp. 67–97.
- Finansinspektionen (Swedish Financial Supervisory Authority), “The Swedish Mortgage Market 2013”, available at: ww.fi.se/upload/90_English/20_Publications/10_Reports/2013/bolan_2013eng.pdf (accessed 14 May 2013).
- Finke, M. S., Huston, S. J., Siman, E. and Corlija, M. (2005), “Characteristics of recent adjustable-rate mortgage borrowers”, *Financial Counseling and Planning*, Vol. 16 No. 2, pp. 17–28.

- Fortowsky, E., LaCour-Little, M., Rosenblatt, E. and Yao, V. W. (2011), “Housing tenure and mortgage choice”, *Journal of Real Estate Finance and Economics*, Vol. 42 No. 2, pp. 162–180.
- Hansmann, H. (1991), “Condominium and cooperative housing: transactional efficiency, tax subsidies, and tenure choice”, *The Journal of Legal Studies*, Vol. 20 No. 1, pp. 25–71.
- Hjalmarsson, E. and Hjalmarsson, R. (2009), “Efficiency in housing markets: which home buyers know how to discount?”, *Journal of Banking & Finance*, Vol. 33 No. 11, pp. 2150–2163.
- Hullgren, M. (2010), “Factors affecting the Swedish home buyer’s choice of fixed versus adjustable mortgage loan interest rates”, in *Mortgage Rate Choice*, Stockholm, Royal Institute of Technology.
- Hullgren, M. and Söderberg, I. (2013), “The relationship between consumer characteristics and mortgage preferences: a case study from Sweden”, *International Journal of Housing Markets and Analysis*, Vol. 6 No. 2, pp. 209-230.
- Kalaitzandonakes, N., Marks, L. and Vickner, S. (2004), “Media coverage of biotech foods and influence on consumer choice”, *American Journal of Agricultural Economics*, Vol. 86 No. 5, pp. 1238–1246.
- Kelly, A. (1998), “Capitalization of above market financing: condos and co-ops”, *Journal of Real Estate Research*, Vol. 15 No. 1–2, pp. 163–175.
- Lai, Y. and Ge, X. J. (2009), “Media’s influences on purchasing of real estate – case of Guangzhou, China”, in: G. Newell (Ed) *Proceedings of Pacific Rim Real Estate Society 15th Annual Conference*, pp. 1–17 (Sydney, Pacific Rim Real Estate Conference).
- Leece, D. (2000), “Household choice of fixed versus floating rate debt: a binominal probit model with correction for classification error”, *Oxford Bulletin of Economics and Statistics*, Vol. 62 No. 1, pp. 61–81.
- Lundström, S. and Wilhelmsson, M. (2007), “The Stockholm Housing Market” in *European Metropolitan Housing Markets*, Andersson, Å., Petterson, L. and Strömquist, U. (Eds.), Springer, Berlin Heidelberg, pp. 323-340.
- Meschke, J. F. (2004), “CEO interviews on CNBC”, in: D. Diamond (Ed) *AFA 2003 Washington, DC Meetings*. Available at <http://ssrn.com/abstract=302602> (accessed 12 August 2012).
- Robertson, K. and Theisen, T. (2011), “The impact of financial arrangements and institutional form on housing prices”, *Journal of Real Estate Finance and Economics*, Vol. 42 No. 3, pp. 371–392.
- Sa-Aadu, J. and Sirmans, C. F. (1995), “Differentiated contracts, heterogeneous borrowers, and the mortgage choice decision”, *Journal of Money, Credit and Banking*, Vol. 2 No. 2, pp. 498–510.
- Sazama, G. (2000), “Lessons from the history of the affordable housing cooperatives in the United States: a case study in American affordable housing policy”, *American Journal of Economics and Sociology*, Vol. 59 No. 4, pp. 573–608.
- Schill, M., Voicu, I. and Miller, J. (2004), “The Condominium v. Cooperative Puzzle: An Empirical Analysis of Housing in New York City”, Working Paper No. 04-003, February. New York: New York University.

Smith, D. J. (1987), “The borrower’s choice between fixed and adjustable rate loan contracts”, *Real Estate Economics*, Vol. 15 No. 2, pp. 110–116.

Statistics Sweden (Statistiska centralbyrån) (2013) Financial markets statistics March 2013. Available at: http://www.scb.se/statistik/_publikationer/FM5001_2013M03_BR_FM5001BR1305ENG.pdf (accessed 14 May 2013).

Statman, M. (1982). “Fixed rate or index-linked mortgages from the borrower’s point of view: a note”, *The Journal of Financial and Quantitative Analysis*, Vol. 17 No. 3, pp. 451–457.

Sveriges Riksbank (Sweden’s central bank) (2008) Financial stability report 2008:2. Available at <http://www.riksbank.se/en/Press-and-published/Reports/Financial-Stability-Report/2008/> (accessed 12 September 2012).

Swedish Housing Finance Corporation (SBAB) (2011) <http://www.sbab.se>.

Vickery, J. (2006), “Interest rates and consumer choice in the residential mortgage market”, Working Paper, February. New York: Federal Reserve Bank of New York.

Wolfe, J. M. (1998), “Canadian housing policy in the nineties”, *Housing Studies*, Vol. 13 No. 1, pp. 121–133.