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Interest Rate Mortgages
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The Case of Lithuania**

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1 Introduction

The choice of a short-term fixed mortgage rate may impact greatly on a household's financial situation (Campbell and Cocco, 2003). A number of empirical studies have investigated household characteristics as determinants for mortgage interest rate choices. Previous empirical research relating household characteristics to the homeowner's choice of mortgage type used data from well-established mortgage markets.¹

In this paper, we analyze how borrower characteristics influence the choice between the short-term fixed-rate mortgage (STFRM) and the long-term fixed-rate mortgage (LTFRM) types in an emerging market. We use the national *Survey of Households with Housing Loans* conducted by the Bank of Lithuania between 2009 and 2012. This paper is the first to empirically test the findings of Campbell and Cocco in an emerging market. Following the model of Campbell and Cocco (2003), our analysis focuses on the interaction of demand and supply. We focus on the contract outcome; we do not specify who initiated such outcome – the household or the mortgage provider. We supplement the findings of previous literature by testing the model among financially constrained households in a different economic and institutional setting; that is, in Lithuania.

We define financial constraints of a household in multiple ways: high mortgage payment-to-income ratio, low residual income, high loan-to-value ratio, absence of savings, existence of other obligations, a single breadwinner in the household, and the existence of dependants in the household. Estimates based on these measures indicate that constrained households are more likely to choose a safer, but more expensive, long-term interest rate mortgage. Our results are in line with Campbell and Cocco's (2003) suggestion that, when borrowing constraints are binding, financially constrained households should choose a long-term interest rate mortgage. Our results contradict the empirical evidence of Coulibaly and Li (2009), of Damen and Buyst (2013), of Ehrmann and Ziegelmeier (2013), and of Hullgren and Söderberg (2013) that financially constrained households prefer short-term interest rate mortgages. We argue that the difference arises because of institutional features.

Our study adds to existing literature by showing that, in the world where borrowing constraints are binding, financially constrained households have the safer mortgage type that reduces consumption shock and liquidity risks.

¹ Bergstresser and Beshears (2010) and Coulibaly and Li (2009) use a dataset from the US, Bacon and Moffat (2011) from the UK, Paiella and Pozzollo (2007) from Italy, Ehrmann and Ziegelmeier (2013) from the Eurozone, Damen and Buyst (2013) from Belgium, Hullgren and Söderberg (2013) from Sweden, and Dungey et al. (2013) from Australia.

2 Literature review

In their normative theoretical model, Campbell and Cocco (2003) state that a short-term interest rate is generally attractive, but less so for households with houses that are expensive relative to their income, for those with variable income, and for those with high risk aversion.

In their empirical research, Coulibaly and Li (2009) find that households that are more financially constrained are more likely to choose STFRM. Larger mortgages relative to income are associated with the choice of STFRM. The authors assert that their findings are consistent with the predictions of the normative model of Campbell and Cocco (2003). Current constraints on affordability may not necessarily signal binding borrowing constraints. Such an assumption may be based, not only on the expectations of future income and asset price growth or the expectation of a non-increasing interest rate, but also by institutional features, such as lenient treatment in the event of bankruptcy and easy to obtain refinancing. Different authors interpret financial constraints in different ways. Coulibaly and Li (2009) argue that a low income-to-mortgage ratio is an indicator of current financial constraints, whereas Damen and Buyst (2013), Hullgren and Söderberg (2013), and Finke et al. (2005) associate them with the probability of future vulnerability.

We test the household choice of mortgage in a market where currently constrained households have a high probability of binding borrowing constraints in the future. These households do not have the option of a strategic default. In addition, the likelihood of facing a real interest rate shock is high. Our premise is that, in an emerging economy for financially constrained households, it is rational to choose a safer, though more expensive, mortgage.

Our research contributes to the literature by assessing whether or not households behave according to normative predictions in an economic and institutional setting in the absence of features encouraging risky behavior.

3 Institutional background

Our study was conducted in the Lithuanian mortgage market. The decision to take a mortgage exposes a household to significant risks, such as: an emerging economy, a small and open economy, an economy characterized by volatile income and housing prices (see Figure 1), and divergent interest rates and income trends (see Figure 2, year 2009).

The majority of mortgage institutions are commercial banks providing short-term funding. Banks sell mortgages directly to households, so there are no intermediaries between mortgage lenders and borrowers, and refinancing activities are not widespread. In general, a loan application is approved, provided that a household earns sufficient income to maintain an average cost of living and to service the debt, has no payment defaults, and the value of collateral is sufficient to cover the obligations. After the loan approval, the household chooses

the interest rate type: either short-term, with an initial fixed rate of less than one year; or long-term, with an initial fixed rate of more than one year – usually from two to 15 years. At the end of the period of the fixed interest rate, the interest for a new chosen period, which may be shorter, longer or the same as the first, is set in line with the current interest rate. The short-term interest rate equates to the interbank interest rate, which is one of the following: EURIBOR or LIBOR EUR for one, three, six or 12 months, optionally for loans in Euros; or VILIBOR for one, three, six or 12 months, optionally for loans in the national currency. Interest rate settings for long-term fixed interest rate loans are less transparent, but are still related to the price of the Euro interest rate swaps. The main mortgage providers do not offer teaser interest rates or periods. Prior to 2013 there was no personal bankruptcy legislation - all loans were recourse loans. In case of financial trouble, the house or apartment had to be sold at a price not lower than the outstanding loan. Otherwise, any remaining loans continued to be the borrower's liability. There are no securitization activities and no sub-prime loan markets in the Lithuanian mortgage system. These institutional characteristics differentiate the Lithuanian market from that of the US and other well-established markets. Examining a market with less developed borrower protection and more vulnerable households reveals a clearer relationship between a household's characteristics and its interest rate choices.

4 Data

We use data from the Bank of Lithuania's *Survey of Households with Housing Loans*. The bank has carried out this survey annually from 2009 to 2012. We examine relationships between a household's demographic characteristics (age, education, household composition), its financial characteristics (household income, possession of savings, possession of other obligations), its loan contract characteristics (year of the loan, loan value, loan currency, monthly payment, loan-to-housing value ratio), and its choice of period of the fixed interest rate mortgage. The survey data covers loans originated from 1999 to 2012. The fluctuation in the share of STRFM loans (number of households) in our sample is consistent with the fluctuation in the share of STRFM loans observed in the market data (Figure 3). We explain the higher average level of STRFM in market data by the effect of rich households with large (STRFM) mortgages overestimation.

Between 2009 and 2012 the bank surveyed more than 3.7 thousand households. Because the key variable – the loan-to-value ratio – was only available from 2010, we use data from only three survey periods (2010, 2011, and 2012). Furthermore, we exclude respondents who have chosen not to report their current financial data, such as income, savings and other obligations. These restrictions reduce our sample to 1,429 observations. In comparison with existing literature, this is still a sizeable data set for a given number of variables.

The main limitation of the data is that the survey records household financial constraints, such as income, other obligations and possession of savings, and demographic characteristics at the time of the interview, not the mortgage origination time. We base our estimates on the assumption that a household might be able to switch from STFRM to LTFRM if concerns about future borrowing constraints should arise. If the household chooses not to do so, we assume that the current household circumstances still warrant the current mortgage contract. Nevertheless, to make allowances for this deficiency, we run robustness tests, restricting the sample to households with mortgages that have originated within three to five years of the interview date.

To our knowledge, the Bank of Lithuania survey data was the best available data at the time of the research. There was no equivalent of the Consumer Finance Survey in Lithuania since commercial banks were not willing to share their data due to identity protection requirements.

Based on the model of Campbell and Cocco (2003), we include the following variables to explain household financial constraints: a loan payment-to-income ratio, possession of savings, a loan-to-value ratio, and the existence of other obligations, such as the number of dependants (children) in the household, and the age and education of one of the breadwinners. In addition, we introduce housing value and income size to act as controls for differences among households' wealth, their foreign currency borrowing factor and, as a factor of the macroeconomic effects, we also introduce the year of origination of the loan. To isolate data from the outliers, we examine the distribution of variables and winsorize payment-to-income ratio at 1 percent level.

Our hypothesis is that households with current financial constraints prefer a mortgage with a long-term fixed interest rate and to not expose themselves to higher interest rate risk of STFRM. Households with a high payment-to-income ratio, with low income residuals, or with no current savings, should rationally choose a mortgage with a long-term fixed interest rate. A high loan-to-value ratio and the existence of other obligations also indicate potential future borrowing constraints. Older age and lower education are signs of lower value in the future labor market. A single adult breadwinner in the household indicates higher income volatility. Children in the household increase the household's cautiousness and risk aversion.

5 Results

This section relates household characteristics with its choice of a mortgage contract with a fixed interest rate. As a first step, we construct a univariate linear regression. The goal of this regression is not to assert causality, but to measure the association between the short-term fixed mortgage rate (STFRM) as the dependent variable and one of the previously defined explanatory variables. Our dependent variable is an indicator, which can take only values 0 and

1. We use logit regression to predict the estimates. However, as a robustness test we used Ordinary Least Squares methodology, it did not significantly change the results.

Campbell and Cocco (2003) find that, under normal circumstances, customers should rationally choose STFRM. Our sample fits this pattern – 61 percent of mortgages had such a characteristic (Table 1). The authors also suggest that under more extreme circumstances, when the repayment may become a burden to the household, they should choose a safer option of a long-term fixed-rate mortgage (LTFRM). The estimates of most of the measures of financial constraints recorded in Table 2 support this finding. The households that have high repayments, no savings, less education or low income, choose to pay for insurance against shocks they are faced with in their monthly installments (Table 2).

The households that currently have at least one other financial obligation in addition to a mortgage are by 10.4 percentage points more likely to choose STFRM (Table 2, Column (4)). These may be either constrained or non-constrained households. The mortgage owners may be certain about their future income and take a loan in order to enjoy a more luxurious lifestyle. Poorer households may also choose STFRM because of the lower repayments in cases where their current consumption is so constrained that they are forced to take on additional obligations in order to survive. Next, we aim to identify which of the competing reasons is responsible for the positive effect of existing obligations on the choice of STFRM. Lower income per person makes a household more constrained. We use a proxy for this constraint an indicator if a household has less than 900 Litass (261 EUR) per person per month remaining after making their mortgage payment.² Coupling this variable with an indicator for other outstanding obligations helps us to choose between the two previously defined competing reasons. The positive estimate suggests that a household that has other obligations is more likely to choose STFRM (Table 2, Column (4)). However, if the need for other loans is the result of low residual income, the household is less likely to choose STFRM by 12.3 percentage points (Table 2, Column (4)). Having other obligations is positively related to STFRM because the better-off households take on additional loans to improve their lifestyle rather than to survive.

Next, we augment the multivariate linear model by adding other related factors to explain the choice of STFRM. The previously identified effects remain. We confirm Campbell and Cocco's (2003) suggestions that financially constrained households experiencing binding borrowing constraints should choose the safer option of LTFRM. Table 3 presents the estimates on the measures of financial constraints. To account for heteroscedasticity in cross-sectional data, the standard errors are estimated using the White heteroscedasticity-consistent covariance matrix estimator.

² According to Household Budget survey data this is the average cost of living in Lithuania

The probability of picking short-term fixed mortgage interest rates decreases for households with a high payment-to-income ratio. All things being equal, households using at least 40 percent of their income to serve the mortgage payments are by 20.8 percentage points less likely to choose STFRM (Table 3, Columns (3) and (4)). With 61 percent of households in our sample choosing STFRM, this effect is significant both statistically and economically. Secondly, a household that owns a mortgage with a high loan-to-value ratio is between 8.9 and 9.8 percentage points more likely to choose LTFRM when we control for the respondent's age and education (Table 3, Columns (2), (4) and (6)). Thirdly, a more constrained household that has no savings seeks a safer option and is by 11.3 percentage points more likely to fix its mortgage interest rates for a longer period (Table 3, Column (4)). People with no savings need a better cushion against risk, and tend to choose a less volatile LTFRM. The results still hold in the regressions where time varying controls are replaced by fixed yearly effects and with controls for market characteristics. Fourthly, we relate having other obligations to less constrained households. The financial institution assesses the likelihood of the household's future income being sufficient to serve the debt, and grants the household an additional loan. The households that currently have at least one other obligation in addition to a mortgage are between 9.3 and 10.3 percentage points more likely to choose STFRM (Table 3). Fifthly, the better-off borrowers with bigger housing values are less likely to choose STFRM. They are less inclined to spend money on buying an insurance against future interest rate shocks (Table 3).

Coulibaly and Li (2009) agree with Campbell and Cocco (2003). However, the former authors suggest that even financially constrained households should choose STFRM unless they are risk averse. We use having non-adult children as a contributing factor towards a household's risk aversion. Our following analysis relies on the assumption that families with dependent children are less inclined to take risks, since they are more vulnerable in the case of negative outcomes. We split our sample of households into two parts – the households with and without children – and make estimates using the same regression model. The estimates on the likelihood of choosing STFRM are not significantly different for risk averse and non-risk averse households (Table 6, Column (4)).

A household's monthly income determines whether it will be granted a loan. However, the income does not significantly affect the choice of interest rate type. It is payment-to-income ratio rather than income itself that determines the perception of a risk on a loan. The income level does not significantly affect the type of interest rates (Table 3).

Neither a household's composition, nor the age or education of adults responding to the survey, affect the choice of fixed-rate mortgage (Table 3). Theory suggests that age and education should influence one's choice of mortgage type. According to Campbell (2006), younger borrowers have more human capital, but an uncertain income from future labor,

whereas older borrowers have more certain financial capital. The former, especially the more sophisticated ones, should be less risk averse than the latter. However, we do not observe that either age or education have significant effects on the choice of mortgage interest rates. We can find several reasons for this. Firstly, in Lithuania younger people in their late twenties or thirties earn more than people in their forties or fifties. Secondly, 93 percent of the population of Lithuania has a secondary or higher education, compared with the EU-27 average of 74 percent. Thirdly, measurement errors could explain the lack of effect of education and age on the choice of interest rate type. Interviews were conducted with any adult person living in the household, not necessarily the one who made the decision regarding mortgage. Fourthly, the survey included questions about age and education in only two of the four years (2011 and 2012) of our sample. This factor decreases our sample size, increases standard errors, and decreases the significance of the estimates (Table 3, Columns (2), (4) and (6)).

The composition of the household – the numbers of children and adults – is not significantly related to STFRM. We used children in the household as a contributing factor towards risk aversion. Observed financial characteristics are more likely to explain the type of interest rate in the mortgage contract than the household composition (Table 3).

6 Robustness Tests

In addition to household characteristics, mortgage features vary according to economic cycles. Economic cycles are dependent on interest rate levels, household income expectations, and asset price expectations and marketing strategies of the financial institutions. Our sample covers the full economic cycle: the survey records households with loans originated from 1999 to 2013 (Figure 3). To control the macroeconomic influences on the choice of a housing loan interest rate, we divide up the sample according to the year of origin of the loan and analyze the effects separately. After the split, many of the coefficients become not significant (Table 4). We relate this effect to a substantial decrease in sample size by year. All the remaining significant estimates on likelihood of choosing STFRM keep the same signs (except for a positive sign for the *No Savings* indicator in the year 2004). This finding suggests that the effects defined in Table 3 remain relatively strong across economic cycles. Still, one may suspect that not only the household's risk factors, but also demand and supply of mortgages in a credit boom, affect a borrower's risk perception. Thus, we reduce our sample size and analyze only the credit expansion period between the years 2004 and 2007. The choice of fixed-rate mortgage does not depend on the economic cycle (Table 5, Columns (1) and (6)).

Some empirical papers use mortgage-to-income ratio to measure the financial burden of a loan on a household. We find the effect of this variable on STFRM is not significant (Table 4 Column (2)). We argue that this variable does not take into account the duration of the mortgage

contract. A household will find it more difficult to repay the same size of mortgage in five years rather than in forty years.

Even though the Lithuanian national currency, the Litas, is pegged to the Euro, and the exchange rate has never been adjusted, the choice of loan currency raises debates among borrowers. Taking a mortgage in Euros rather than in Litas theoretically raises currency risk, but lowers the volatility of the base rate. The Euro Interbank Offered Rate (EURIBOR) is less volatile than the Litas Interbank Offered Rate (VILIBOR) (see Figure 1). If a household chooses STFRM, it can benefit from the less volatile and lower level Euro interest rates. Households that choose to take a loan in Euros are by 12.2 percentage points more likely to choose STFRM. We are able to explain the strong positive correlation between choosing a mortgage in Euros and STFRM, but not the direction of the causality between the two (Table 5 Column (3)).

The estimated parameters may suffer from multicollinearity among explanatory variables. A rule of thumb suggests that a higher than 0.4 correlation between explanatory variables indicates a potential problem. An indicator of income per person after the loan payment and children per adult in the household are the tightest related variables with the correlation 0.348. It is expected that the higher number of dependents per adult is related to lower income per capita. However, these variables do not explain the same pattern. Income per person reveals the money on hand whereas the children per adult measure is more related to risk aversion. The correlations among the other explanatory variables are significantly lower. Another test for multicollinearity suggests examining what share of variance in one variable can the other explanatory variables explain. A share higher than 0.8-0.9 warns about a potential multicollinearity. Remaining variables explain only 0.33 of variance in a variable – Children per adult – and much less in the other cases.

Despite being representative, the survey that we use has a drawback. Our previous findings rely on the assumption that a household's characteristics did not significantly change between the time they took out the loan and the time they answered the questionnaire. However, this assumption may be a misrepresentation given that there are observations in our sample with a loan and a survey ten years apart. To reduce the measurement errors, we focus only on households that took out a mortgage more recently: those that took out a mortgage not more than five years before the survey, and those that took one out not more than three years prior to the survey. Excluding the cases with more than five years between a decision and observation decreases the sample size by 20 percent, but keeps the previously significant estimates still significant and not statistically different from the whole sample estimates (Table 5, Column (4)). Reducing the time to three years deletes 57 percent of observations, and eliminates the effects of the savings and loan amounts on the choices of mortgage interest rate (Table 5, Column (5)).

All the previously discussed regressions are controlled for the effects of the year when the loan was issued.

7 Conclusions

Campbell and Cocco predict that households prefer short-term to long-term fixed-rate mortgages unless they buy hardly affordable houses, are very risk averse or have varying income. To empirically identify the effect of binding borrowing constraints on the choice of the interest rate type we use data from a market where regulation hardly influences the borrower's choice.

Our results are in line with the theoretical predictions of Campbell and Cocco (2003). Despite the volatile environment of an emerging country, the majority of borrowers in Lithuania have mortgages with short-term fixed interest rates. Yet, we find that financially constrained borrowers are more likely to have stable long-term fixed-rate mortgages. They agree to commit to higher mortgage payments to hedge their future consumption against interest rate shocks. Households using at least 40 percent of their income to serve the mortgage payments are by 20.8 percentage points less likely to choose STFRM. A high loan-to-value ratio increases the likelihood of LTFRM agreement by about 9 percentage points. A more constrained household that has no savings seeks a safer option and is by 11.3 percentage points more likely to fix its mortgage interest rates for a longer period.

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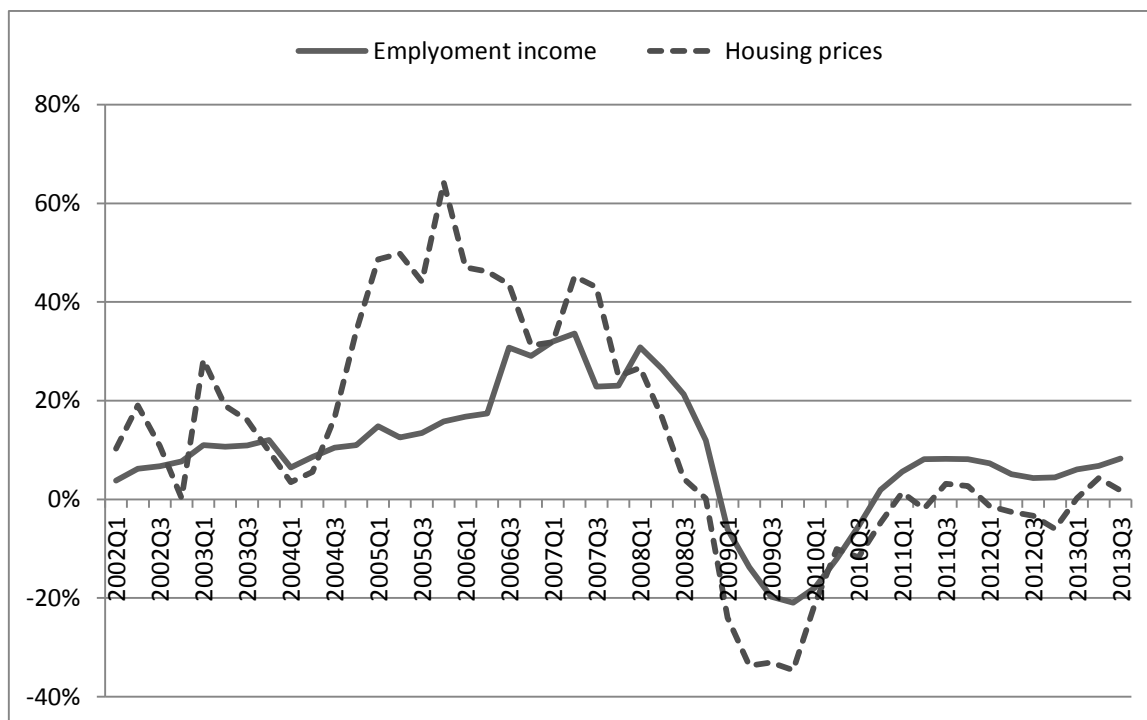


Figure 1. Annual change in employment income and housing prices in Lithuania, 2002-2013
(Source: Bank of Lithuania, Centre of Registers)

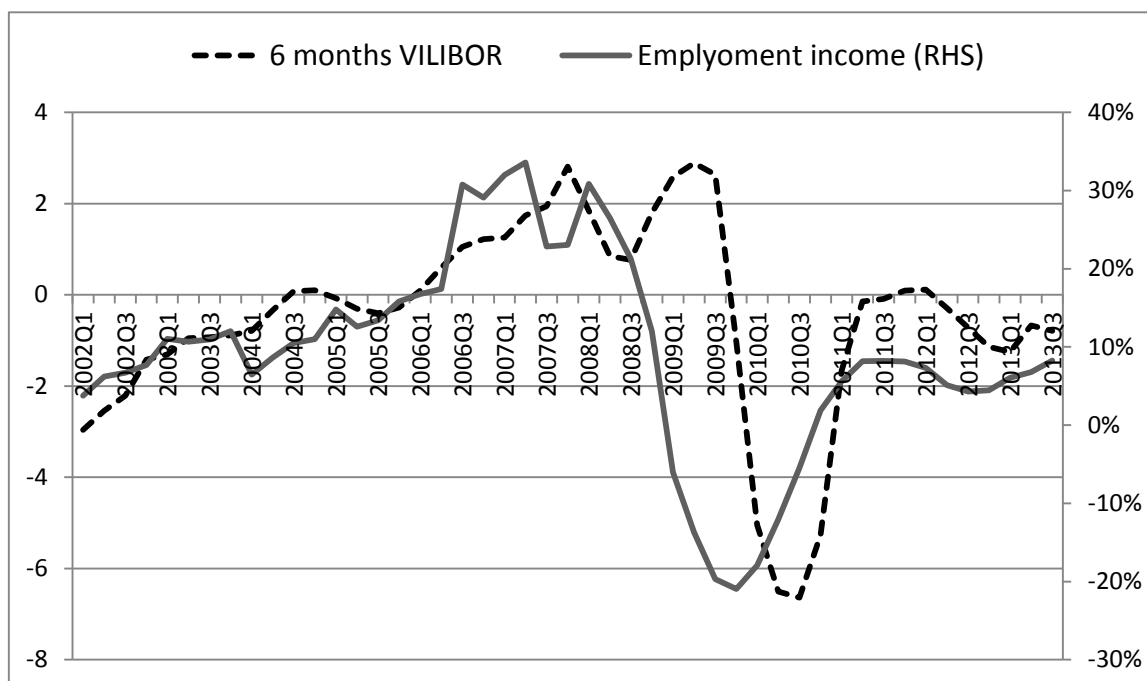


Figure 2. Annual change in employment income (in percent) and interest rates (in percentage points) in Lithuania, 2002-2013
(Source: Bank of Lithuania, National Statistics)

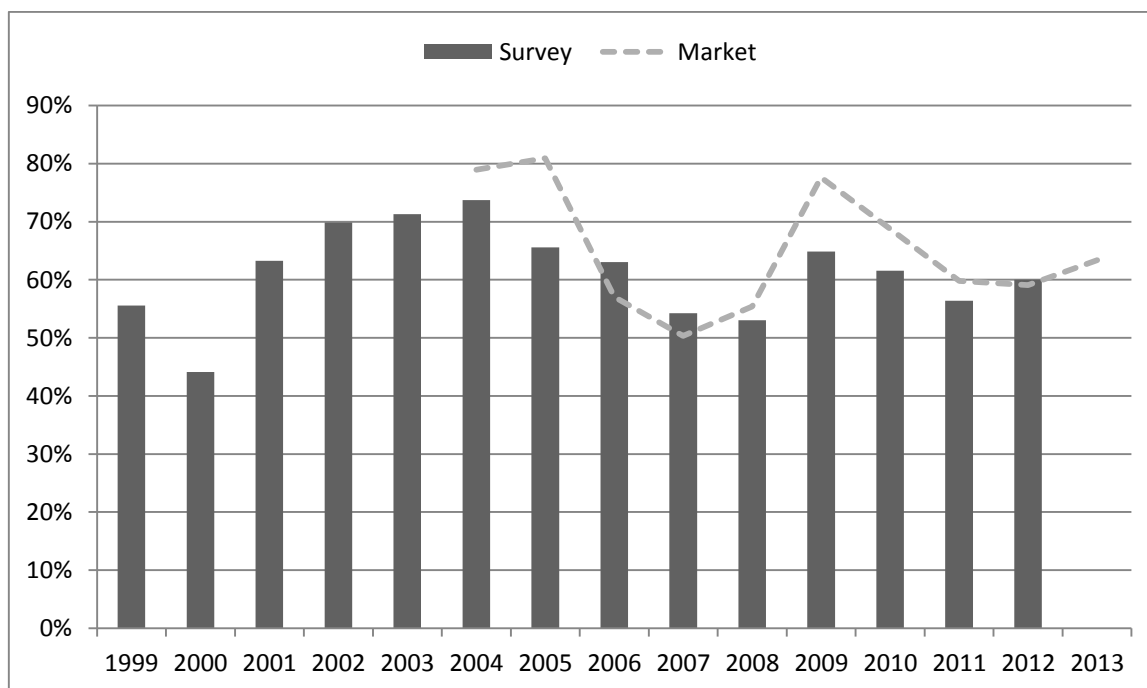


Figure 3. Share of STFRM loans in sample (number of households) and in the market (new lending volumes).

(Source of market data: Bank of Lithuania, available since October 2004)

Table 1: Descriptive statistics

Variable	Mean	St. Dev.	Observations
DShortTerm	0.61	0.49	1,429
PaymentToIncome	0.25	0.15	1,429
Loan	161,122	122,873	1,429
Education	0.75	0.43	1,429
Age	33.77	7.86	1,429
Obligations	0.25	0.43	1,429
NoSavings	0.12	0.33	1,429
LoanToValue	72.29	21.3	1,429
ChildrenPerAdult	0.46	0.46	1,429

Notes: *DShortTerm* indicates if mortgage interest rate is short term. *PaymentToIncome* is the monthly mortgage repayment- to-household income ratio. *Loan* is a loan amount in Litas on the day when it was taken. *Education* indicates that the respondent is a college graduate. *Age* is years of age of survey respondent. *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *LoanToValue* is a ratio of loan value to household value. *ChildrenPerAdult* is the number of children per adult living in a household.

Table 2: The relation between characteristics of a household and the mortgage interest rate type choice (univariate)

VARIABLES	(1) Short	(2) Short	(3) Short	(4) Short	(5) Short	(6) Short	(7) Short	(8) Short	(9) Short
HighPayment	- 0.294** * (0.108)								
HighLoanToValue		-0.026 (0.087)							
NoSavings			- 0.395** * (0.146)						
Obligations				0.450** * (0.114)					
Incomepp900xObligations				- 0.534** * (0.168)					
SingleAdult					0.166 (0.117)				
ChildrenPA						-0.037 (0.077)			
Young							0.089 (0.111)		
Education								0.234** * (0.079)	
Incomepp900									- 0.216* * (0.085)
Observations	2,514	2,514	1,052	2,496	2,776	2,774	1,506	2,775	2,512
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

The dependent variable is an indicator that the household has chosen short-term mortgage interest rates. *HighPayment* indicates that the monthly mortgage repayment-to-household income ratio is higher than 0.4. *HighLoanToValue* indicates that the ratio of mortgage-to-house value is higher than 0.7. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *SingleAdult* indicates that just one person aged 18 years or older lives in the household. *ChildrenPA* is the number of children per adult living in a household. *Young* is a dummy variable with the value of 1 if a respondent is an adult aged less than 34 years. *Education* indicates that the respondent is a university graduate. *Incomepp900* indicates that, after paying the monthly mortgage installment, a household had less than 900 Litas income per person remaining. *Incomepp900xObligations* is a measure of the interaction between *Incomepp900* and *Obligations*. Standard errors are shown in parentheses. They are calculated using a logit regression and controlled for the fixed effects of the year when the loan was issued. *, **, and *** indicate significant at 10%, 5%, and 1% level.

Table 3: The relation between characteristics of a household and the mortgage interest rate type choice (multivariate)

VARIABLES	(1) Short	(2) Short	(3) Short	(4) Short	(5) Short	(6) Short
HighPayment	-0.857*** (0.206)	-0.900*** (0.230)	-0.865*** (0.210)	-0.882*** (0.236)	-0.809*** (0.209)	-0.874*** (0.234)
HighLoanToValue	-0.235 (0.153)	-0.441** (0.172)	-0.252 (0.155)	-0.425** (0.175)	-0.220 (0.155)	-0.399** (0.175)
NoSavings	-0.456*** (0.166)	-0.268 (0.241)	-0.477*** (0.172)	-0.329 (0.248)	-0.466*** (0.169)	-0.287 (0.246)
Obligations	0.420* (0.223)	0.432* (0.246)	0.459** (0.226)	0.486* (0.251)	0.461** (0.226)	0.486* (0.251)
Incomepp900xObligations	-0.002 (0.377)	0.187 (0.442)	-0.051 (0.383)	0.177 (0.454)	-0.025 (0.385)	0.172 (0.459)
SingleAdult	0.124 (0.231)	-0.070 (0.275)	0.121 (0.235)	-0.129 (0.280)	0.077 (0.234)	-0.113 (0.277)
ChildrenPA	0.059 (0.156)	0.018 (0.207)	0.088 (0.158)	-0.006 (0.211)	0.076 (0.157)	0.032 (0.209)
Young		0.069 (0.170)		0.070 (0.174)		0.089 (0.173)
Education		0.063 (0.170)		0.036 (0.173)		0.059 (0.172)
LogValue	0.350*** (0.132)	0.348** (0.155)	0.364*** (0.134)	0.396** (0.159)	0.347*** (0.134)	0.388** (0.159)
LogIncome	-0.162 (0.211)	-0.196 (0.238)	-0.188 (0.216)	-0.238 (0.245)	-0.186 (0.216)	-0.270 (0.246)
Observations	820	675	820	671	810	668
Controls	None	None	Year FE	Year FE	Expectations	Expectations

The dependent variable is an indicator that the household has chosen short term mortgage interest rates. *HighPayment* indicates that the monthly mortgage repayment-to-household income ratio is higher than 0.4. *HighLoanToValue* indicates that the ratio of mortgage-to-house value is higher than 0.7. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *Incomepp900* indicates that, after paying the monthly mortgage installment, a household had less than 900 Litus income per person remaining. *Incomepp900xObligations* is measure of the interaction between *Incomepp900* and *Obligations*. *SingleAdult* indicates that just one person aged 18 years or older lives in the household. *ChildrenPA* is the number of children per adult living in a household. *Young* is a dummy variable with value of 1 if a respondent is an adult aged less than 34 years. *Education* indicates that the respondent is a university graduate. *LogValue* and *LogIncome* are respectively the logarithms of house value at the time of the purchase and the current household's monthly income.

White (1980) heteroskedasticity-consistent standard errors are shown in parentheses. They are calculated using a logit regression. *, **, and *** indicate significant at 10%, 5%, and 1% level.

Regressions in columns 3 and 4 are controlled for the fixed effects of the year when the loan was issued. Regressions in columns 5 and 6 are controlled for a measure of macroeconomic interest rate expectations – 6 months EURIBOR and VILIBOR, 5 years IRS, standard deviation of 6 months EURIBOR level.

Table 4: The relation between characteristics of a household and the mortgage interest rate type choice by a loan issue year

VARIABLES Year	(1) Short 2003	(2) Short 2004	(3) Short 2005	(4) Short 2006	(5) Short 2007	(6) Short 2008
HighPayment	-2.382 (1.658)	-2.549** (1.082)	-0.918 (0.730)	-0.829** (0.408)	-0.306 (0.431)	-1.356*** (0.525)
HighLoanToValue	1.204 (1.346)	0.387 (0.813)	0.106 (0.513)	-0.307 (0.318)	0.314 (0.318)	-0.774** (0.377)
Obligations	1.575 (1.783)	-0.673 (1.007)	0.489 (0.711)	1.062** (0.494)	0.769* (0.454)	0.061 (0.536)
Incomepp900xObligations		-0.672 (1.606)	0.488 (1.184)	-0.783 (0.817)	-1.103 (0.788)	1.279 (1.075)
SingleAdult		1.427 (1.341)	0.100 (0.772)	0.205 (0.462)	-0.395 (0.443)	-0.489 (0.604)
ChildrenPA	-2.020 (1.295)	0.674 (0.872)	0.310 (0.393)	0.096 (0.346)	0.427 (0.368)	-0.173 (0.411)
LogValue	-0.090 (0.957)	1.268* (0.759)	0.691 (0.531)	0.492* (0.281)	0.258 (0.256)	0.343 (0.330)
LogIncome	0.531 (1.599)	-2.674** (1.334)	-0.872 (0.834)	-0.452 (0.440)	-0.219 (0.449)	-0.241 (0.482)
NoSavings	-0.883 (1.190)		-0.855 (0.546)	-0.528 (0.336)	-1.227*** (0.339)	-0.092 (0.457)
Observations	33	54	90	199	210	138

The dependent variable is an indicator that the household has chosen short term mortgage interest rates. *HighPayment* indicates that the monthly mortgage repayment-to-household income ratio is higher than 0.4. *HighLoanToValue* indicates that the ratio of mortgage-to-house value is higher than 0.7. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *Incomepp900* indicates that, after paying the monthly mortgage installment, a household had less than 900 Litas income per person remaining. *Incomepp900xObligations* is a measure of the interaction between *Incomepp900* and *Obligations*. *SingleAdult* indicates that just one person aged 18 years or older lives in the household. *ChildrenPA* is the number of children per adult living in a household. *LogValue* and *LogIncome* are respectively the logarithms of house value at the time of the purchase and the current household's monthly income.

Standard errors are shown in parentheses. They are calculated using a logit regression. Each column uses observations of loans taken out that year only. *, **, and *** indicate significant at 10%, 5%, and 1% level.

Table 5: The relation between characteristics of a household and the mortgage interest rate type choice (robustness tests)

VARIABLES	(1) Short	(2) Short	(3) Short	(4) Short	(5) Short	(6) Short
HighPayment	-0.809*** (0.199)		-0.687*** (0.203)	-0.623*** (0.218)	-0.738** (0.313)	-0.672*** (0.241)
HighLoanToValue	-0.274* (0.153)	-0.341** (0.160)	-0.299* (0.155)	-0.258 (0.170)	-0.315 (0.239)	-0.112 (0.187)
NoSavings	-0.469*** (0.171)	-0.514*** (0.169)	-0.418** (0.173)	-0.753*** (0.194)	0.220 (0.330)	-0.714*** (0.205)
Obligations	0.403* (0.217)	0.535** (0.218)	0.370* (0.219)	0.610** (0.245)	0.324 (0.344)	0.522** (0.261)
Incomepp900xObligations	0.049 (0.366)	-0.111 (0.368)	0.132 (0.370)	-0.120 (0.408)	0.389 (0.630)	-0.268 (0.430)
SingleAdult	0.149 (0.233)	0.002 (0.229)	0.114 (0.234)	-0.021 (0.255)	-0.267 (0.348)	0.114 (0.271)
ChildrenPA	0.090 (0.158)	0.093 (0.156)	0.088 (0.160)	0.130 (0.189)	-0.258 (0.258)	0.303 (0.195)
LogValue	0.308*** (0.117)	0.189 (0.146)	0.238** (0.119)	0.280** (0.132)	0.277 (0.178)	0.303** (0.148)
MortgageToIncome		-0.016 (0.045)				
EUR			0.529*** (0.157)			
Observations	820	820	820	661	353	560
Year FE	YES	YES	YES	YES	YES	2004-2007

The dependent variable is an indicator that the household has chosen short-term mortgage interest rates. *HighPayment* indicates that the monthly mortgage repayment-to-household income ratio is higher than 0.4. *HighLoanToValue* indicates that the ratio of mortgage-to-house value is higher than 0.7. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *Incomepp900* indicates that, after paying the monthly mortgage installment, a household had less than 900 Litass income per person remaining. *Incomepp900xObligations* is a measure of the interaction between *Incomepp900* and *Obligations*. *SingleAdult* indicates that just one person aged 18 years or older lives in the household. *ChildrenPA* is the number of children per adult living in a household. *LogValue* is the logarithm of house value at the time of the purchase.

MortgageToIncome is a ratio of mortgage amount-to-monthly income of a household at the time of survey. *EUR* has a value of 1 if the loan currency is in EUR and 0 if in LTL. Regressions in columns 4 and 5 are controlled for the loans issued not longer than 5 and 3 years prior the interview. Regression in column 6 is controlled for the loans issued between the years 2004 and 2007. Standard errors are shown in parentheses. They are calculated using logit regression with year fixed effects. *, **, and *** indicate significant at 10%, 5%, and 1% level.

Table 6: The relation between characteristics of a household and the mortgage interest rate type choice (risk aversion test)

	(1)	(2)	(3)	(4)
VARIABLES	Short	Short	Short	(2)-(3)
HighPayment	-0.866*** (0.210)	-1.133*** (0.341)	-0.718** (0.282)	-0.415 (0.331)
HighLoanToValue	-0.251 (0.155)	-0.401 (0.256)	-0.157 (0.201)	-0.244 (0.458)
NoSavings	-0.464*** (0.170)	-0.588** (0.288)	-0.492** (0.220)	-0.096 (0.792)
Obligations	0.447** (0.225)	0.362 (0.315)	0.638* (0.340)	-0.276 (0.560)
Incomepp900xObligations	-0.015 (0.378)	0.895 (1.295)	-0.326 (0.471)	1.220 (0.300)
SingleAdult	0.134 (0.234)	-0.016 (0.324)	0.376 (0.377)	-0.392 (0.411)
LogValue	0.365*** (0.134)	0.232 (0.220)	0.427** (0.178)	-0.195 (0.479)
Constant	-2.528 (2.246)	2.121 (3.293)	-3.145 (2.607)	
Observations	820	320	497	
R-squared				
Year FE	YES	YES	YES	
Children	YES AND NO	NO	YES	

The dependent variable is an indicator that the household has chosen short term mortgage interest rates. *HighPayment* indicates that the monthly mortgage repayment-to-household income ratio is higher than 0.4. *HighLoanToValue* indicates that the ratio of mortgage-to-house value is higher than 0.7. *NoSavings* indicates that the household has no savings of any kind (cash or deposits). *Obligations* is equal to 1 if the household has other obligations; 0 if it does not have. *Incomepp900* indicates that, after paying the monthly mortgage installment, a household had less than 900 Litas income per person remaining. *Incomepp900xObligations* is a measure of the interaction between *Incomepp900* and *Obligations*. *SingleAdult* indicates that just one person aged 18 years or older lives in the household. *LogValue* is the logarithm of house value at the time of the purchase.

Regression in column 2 is controlled for households without children, in column 3 – with children, column 4 the difference between the estimates in columns 2 and 3. Standard errors are shown in parentheses in columns 1-3, the probability that the two coefficients are not equal to each other. They are calculated using logit regressions with year fixed effects. *, **, and *** indicate significant at 10%, 5%, and 1% level.