Mortgage Choice and Inflation Experiences in the Eurozone[*]

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Abstract

In the Eurozone, households' mortgage preferences vary widely, both within and across countries. This persistent heterogeneity in the choice between an adjustable rate mortgage (ARM) and a fixed rate mortgage (FRM) two decades after introducing a common currency is a puzzle. We argue that these patterns relate to the long-lasting effect of personal experiences of high-inflation periods. Analysing rich household data across 9 countries, we show that higher lifetime experienced inflation predicts significantly lower probability of holding an FRM: a 1 log-point increase in experienced inflation predicts a 71% decrease in the odds of holding an FRM. We relate our findings to existing theories on household mortgage risk management and argue that Eurozone prepayment penalties heighten the 'inflation risk' associated with FRMs. We also find that past personal inflation experiences are associated to risk aversion: households with histories of high and volatile inflation report lower willingness to take financial risk.

Keywords: experience effects, household surveys, inflation, mortgage choice

JEL Classifications: D14, D83, D84, D91, E31, G41, G51

1   Introduction

After more than two decades under a common monetary policy, Eurozone economies still exhibit considerable heterogeneity in households' choice between fixed rate mortgages (FRM) and adjustable rate mortgages (ARM). Countries such as France or Germany have over 90% of FRM while Portugal and Spain exhibit less than 20% in our representative survey data of mortgages taken after joining the common currency.[1] The heterogeneity also prevails within country, varying across time and age groups. While institutional inertia and supply factors explain part of these patterns, the persistence of the heterogeneity remains a puzzle (Campbell, 2013). Accounting for socio-economic and mortgage characteristics, the usual suspects in the literature, does not suffice to explain it.

Understanding the persistence of the heterogeneity in households' mortgage choice matters. Buying a house is the largest financial decision of most families, and the associated mortgage remains the largest liability on their balance sheet for decades. From a macroeconomic perspective, households with an ARM can benefit from reductions in interest rates, resulting in a stronger transmission mechanism of monetary policy under a dominance of ARM compared with FRM (Di Maggio et al., 2017; Garriga et al., 2017). These differences in housing finance are particularly interesting in the Eurozone, which admits a uniform monetary policy on countries with considerable heterogeneity in their shares of FRM.

In this paper, we show that personal experiences of high-inflation periods prior to joining the Eurozone are an important determinant of households' financing choices, which in turn contribute to the observed heterogeneity in FRM shares. More specifically, using representative household-level data from 9 countries we find that, on average, higher past experienced inflation reduces households' likelihood of holding an FRM. This result is remarkably robust, although the direction of the effect is different to the one found in Botsch and Malmendier (2023), in which US individuals who experienced the 1970s Great Inflation were found to be more likely to hold FRMs later on.

Our research connects two concepts to explain this seemingly surprising result. First, it builds on the idea from the seminal paper of Campbell and Cocco (2003) that mortgage choice is a risk management exercise for households. Real payments on an ARM tend to be stable, as interest rate movements compensate for changes in the rate of inflation. However, movements of inflation throughout the life of the mortgage represent an important uncertainty for an FRM. If inflation goes up, the real value of the payments declines and the borrower benefits while the lender suffers, but the converse is true if inflation

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[1]Data from the Eurosystem Household Finance and Consumption Survey covering Austria, Belgium, France, Germany, Greece, Italy, Luxembourg, Portugal and Spain. See Online Appendix A.

decelerates. When refinancing is costless, as it is the case in the US, households can protect themselves from the risk of falling inflation by refinancing, and thus FRMs function as a one-sided bet that protect households against high inflation in the future without any risk.[2] On the other hand, if there are prepayment penalties, as it is the case in our countries of study, borrowers will have to make higher real payments if inflation declines. This is what has been defined as a wealth risk or inflation risk inherent to an FRM.

The existence of both of these channels —inflation hedge and inflation risk— make our setup an ideal laboratory to test for the role of inflation experiences. In particular, to balance these two channels, households need to form expectations about the future path of real payments and, consequently, future movements of inflation. The second concept of our research hypothesis thus concerns expectation formation and attitudes towards risk. We build on the idea proposed by an extensive literature on experience effects in macroeconomics and finance, as reviewed by Malmendier (2021), in which it has been established that (1) past personal experiences affect households' expectations and risk attitudes, and (2) more recent experiences tend to be over-weighted.

Our main data source is the rich micro-data from the ECB's Household Finance and Consumer Survey (HFCS), from which we obtain households' characteristics and details on their mortgage contract. For each household in the sample we then construct a measure of lifetime experienced inflation following Malmendier and Wellsjo (2023). We test our hypothesis exploiting variation in inflation experiences across and within countries, across time and age groups. When comparing households that take a mortgage in a given country-year, we find that a 1 log-point increase in experienced inflation predicts a 71% decrease in the odds of holding an FRM. This finding is statistically significant and economically relevant: for a household with 62.5% probability of choosing an FRM (the average share of FRM in our sample), a 1 log-point increase in experienced inflation predicts a decrease in the probability of holding an FRM to 32.1%. Our results thus suggest that in the Eurozone the *inflation risk* channel dominates households' decisions.[3] Since this risk channel is predicted to be more prevalent in contexts of high inflation volatility, we re-run our analysis using a measure of experienced *volatility* of inflation.[4] The results are consistent with our hypothesis.

In our HFCS data, we observe the outcome of households' mortgage choices, which are equilibrium objects influenced by various supply and demand factors. However, Alber-

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[2]Institutional setups are discussed in Online Appendix B. In our countries there are varying but significant degrees of prepayment penalties, which make refinancing costly (Badarinza et al., 2018).

[3]Online Appendix C illustrates the inflation risk through a simulation exercise, and demonstrates how different beliefs (based on different experiences) about the path of inflation might alter households' assessment about the financing of their mortgage.

[4]Both measures are positively correlated, households who experienced high inflation also experienced high volatility, making it challenging to isolate the inflation hedge from the inflation risk.

tazzi et al. (2024) found that 72% of the heterogeneity in Eurozone mortgage choices is explained by demand factors. This finding is unsurprising, as the adoption of a common monetary policy eliminated currency risk (Kalemli-Ozcan et al., 2010), deepened financial integration (Fornaro, 2022), and led to the convergence of inflation rates, thereby removing most obstacles to supplying FRMs in Eurozone countries (Badarinza et al., 2016). Consequently, our analysis focuses on understanding the demand side: households' mortgage choices. Nonetheless, by leveraging the richness of the micro-data, we conduct various robustness checks to ensure that our results are not driven by supply constraints. Our findings hold when controlling for the interest rate spread in each country, banking and credit measures, country-year fixed effects, and across different bins of loan-to-value ratio, debt-to-income ratio, and individual interest rates paid on the mortgage. We also examine the prevalence of experience effects on a country-by-country basis, revealing some interesting heterogeneity in the direction of the results. Overall, our findings remain robust across a wide range of controls and inflation measures: experiencing higher inflation (either in levels or volatility) predicts a lower likelihood of holding an FRM for European households.

What could be the mechanism linking experiences and behaviour? Natural candidates include expectations about inflation and its volatility, as well as individuals' risk attitudes. We show that countries where households have high inflation expectations and significant uncertainty about future inflation are also characterised by high historical inflation and volatility. With the availability of richer micro-data, we then focus our analysis on risk attitudes. Specifically, we investigate whether experiencing higher and more volatile inflation affects households' risk attitudes and thus their evaluation of risks associated with financial instruments. If the inflation risk channel is indeed a significant driver of the negative relationship between households' experienced inflation and their choice of FRM, then we expect to find that those who experienced higher inflation also report a lower willingness to take financial risks. The evidence supports this idea.

Contribution to the literature. Our paper contributes to three strands of literature. First, we connect with extensive research concerning households' mortgage choices. The seminal theoretical model in this area, developed by Campbell and Cocco (2003), frames the choice between ARMs and FRMs as a risk management exercise in contexts of uncertain inflation, income risk, and borrowing constraints.[5] We link the inflation risk and inflation hedge channels outlined in this framework with households' experienced inflation and test their role across and within European countries, extending beyond macroeconomic conditions, demographics, and socio-economic characteristics.

Second, we contribute to the literature focused on the European mortgage market.

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[5]For a survey on households' mortgage choices, see Campbell (2013) and Gomes et al. (2021).

Related to our work, Albertazzi et al. (2024) use bank-level information from twelve countries in the euro area, along with aggregate macroeconomic time series capturing country-level household and macro conditions, to investigate heterogeneity in mortgage choice. While their focus is on the bank or supply side, our focus is on the household or demand side. Another closely related paper is by Ehrmann and Ziegelmeyer (2017), which uses the HFCS database to identify the role of the macroeconomic environment in European households' mortgage choices. Both of these papers examine the role of *country-level* inflation and inflation volatility; thus, our findings differ and complement them. Firstly, Albertazzi et al. (2024) find that historical volatility of inflation correlates with aggregate shares of ARMs even after decades following the introduction of the euro —a pattern also shown in Campbell (2013); Badarinza et al. (2018). Secondly, Ehrmann and Ziegelmeyer (2017) finds that historical inflation is not an important determinant for households' mortgage choices. By constructing individual-level measures of lifetime experienced inflation, we overcome the limitations of aggregate data and document an important role of experienced inflation in households' mortgage choices, thus also offering an explanation for the puzzling persistence of ARM shares in countries with historically high inflation: households still rely on their past inflation experiences.

This approach also makes our paper closely related to the literature studying the effects of personal macroeconomic experiences on household behaviour, as surveyed by Malmendier (2021). Our paper is closest to Botsch and Malmendier (2023), who analyses mortgage choice in the US, arguing that the long shadow of the Great Inflation of the 1970s can explain the dominance of FRMs there. Despite similarities in approach, the institutional setups that define the risks differ substantially. In the US, where prepayment is costless, FRMs are free of inflation risk and become more attractive when inflation is higher. In the Eurozone, however, FRMs are no longer a one-sided bet on rising inflation: EU borrowers are exposed to downside risks should inflation fall. This makes our setup an ideal and unique laboratory to test both channels at play, in line with the workhorse model of Campbell and Cocco (2003). Moreover, while the Botsch-Malmendier paper examines the effects of an extreme shock such as the 1970s 'Great Inflation,' our study aims to capture the impact of long-term exposure to certain price dynamics, excluding any extreme shocks, and we find that these dynamics are indeed relevant. Finally, we analyse how the role of lifetime experiences changes depending on mortgage characteristics, past hyperinflation, the correlation between unemployment and interest rates, and lifetime experiences of unemployment. We also provide novel evidence on whether early lifetime experiences (impressionable years hypothesis) or recent lifetime experiences (recency bias) are more relevant for explaining current mortgage choices.

The rest of the paper is structured as follows. Section 2 explains the data. Section 3 reports the empirical strategy and main results. Section 4 discusses robustness exercises

and further determinants, while Section 5 investigates potential mechanisms. Section 6 concludes.

2 Data and Experience Measure

Our sample consists of approximately 16,000 households who took their mortgages between 2002 and 2017 from 9 European countries —Austria, Belgium, France, Germany, Greece, Italy, Luxembourg, Portugal, Spain— all of whom share a common currency.

ECB Household Finance and Consumer Survey. Our main data source is the Eurosystem Household Finance and Consumption Survey (HFCS), a household level microdata conducted by the European Central Bank (ECB) in three different waves: 2010, 2014 and 2017. The goal of the HFCS is to collect harmonised data across the Eurozone that is representative not only at the aggregate level but also at the country level. The HFCS provides rich micro-data on household characteristics, including income and balance sheet information, and it offers detailed insights into real estate participation and mortgage contracts.

Despite the availability of only three waves, we can trace back each mortgage to its origination year. Our dependent variable is a binary variable that takes value 1 if household i in country j took a FRM in year t. We also obtain age, gender, marital status, employment status and education of the household head. We calculate the age at the time of taking the loan, as this allows us to control for variation related to life cycle patters. We also control for quintile of income and wealth by country to capture the affordability aspect of each type of financing, and for mortgage characteristics such as the length, the relative size, whether it refinances a previous mortgage, and the debt-to-value ratio and loan-to-income ratio.

We also control for additional risks that may influence households' mortgage choices. For example, we expect that employed, highly educated households with higher income or wealth are less vulnerable to the payment risks inherent in ARMs (fluctuations in nominal interest rates). Moreover, we account for whether employed households are on temporary or permanent contracts, as those with temporary contracts might be more susceptible to income volatility and, consequently, greater payment risk. For robustness, we also consider households' perceived income growth and income expectations.

Since we model the household decision at the time of mortgage take-out (instead of the time of the survey), we limit the sample to recently taken mortgages —mortgages taken at most ten years before each survey— and we use *quintiles* of income and wealth, as it makes these variables less prone to movements over time.[6] We also restrict the sample to

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[6]There is high persistence in income and wealth distributions in Europe (Franzini and Raitano, 2009).

even more recent mortgages —last five years, and last year— and apply other robustness checks that assure that households' characteristics are not driving our results. We also exploit the fact that households are asked about the interest rate they are currently paying on their mortgage and use this for robustness exercises.

Macroeconomic Data. The macroeconomic environment and market conditions are crucial in determining the prevalence of FRMs vs ARMs. To account for this, we collect the time series of a set of country-specific macroeconomic variables. From OECD, we collect data for country-specific unemployment rates and GDP growth at the time of mortgage take-out. We expect ARMs to become less attractive in a context of high unemployment, as the latter should affect the stability of income expectations. Similarly, high GDP growth could incentivise ARMs. The historical inflation data is taken from Reinhart and Rogoff (2009), who provide historical time series of consumer price indices until 2010, and extended until 2017 using data from FRED. We use this to construct our measure of household experienced inflation, and to control for the level of inflation on the year of mortgage take-out.

We construct an interest rate spread between FRM and ARM at the time of mortgage take-out in each country using data from the Statistical Data Warehouse of the ECB. To control for different credit standards across countries and time, we resort to the Bank Lending Survey conducted by ECB. We use an indicator for credit standards that measures the time series variation of the internal guidelines and loan approval criteria of a bank for each country in our sample. This variable controls for heterogeneous supply among countries and time, affecting the actual share of FRM that banks are willing to provide.

Measuring Experiences. To test our hypothesis we follow Malmendier and Wellsjo (2023) and construct a measure of experienced inflation over each household head's lifetime by calculating a weighted average of experienced annual inflation, measured in year-on-year percentage changes in headline CPI, from the year of birth to the year of mortgage takeout.

The experienced inflation for household i, in country j, and year t is defined as

$$\pi_{i,j,t} = \frac{\sum_{k=1}^{age_{i,t-1}} w_{i,t}(k)\pi_{j,t-k}}{\sum_{k=1}^{age_{i,t-1}} w_{i,t}(k)} \qquad \text{where} \qquad w_{it}(k) = \frac{\text{age}_{it} - k}{\text{age}_{it}} \tag{1}$$

where $w_{it}(k)$ are linearly declining weights from the year before the mortgage take-out to the year of birth. This weighting function implies that more recent experiences receive relatively higher weight, yet experiences earlier in the household's life still matter, thereby retaining important heterogeneity due to variations in historically experienced inflation. This choice of weights is consistent with previous work on experience effects (Malmendier and Nagel, 2011), and in Online Appendix D.3 we show that it also represents the best fit to our data.

We also implement an alternative measure of experienced inflation. Instead of focusing on the level, we look at experienced inflation volatility from year of birth until the year of origination of the mortgage. We calculate this measure in two ways. First, for each year and household, we calculate the standard deviation of inflation until that year, and replace the level in equation 1 for this standard deviation. This gives us a weighted experienced volatility of inflation equivalent to the weighted experienced level of inflation. Alternatively, we calculate households experienced volatility of inflation as the standard deviation of inflation from the year they were born until the year before taking the mortgage.

Online Appendix A presents summary statistics for our final dataset. The heterogeneity in our measures of experienced inflation emerges from differences in inflation experiences across time, countries and also across age groups within countries. Figure A.4 shows this variation graphically. Appendix A.3 illustrates how we use our data to construct these experience measures, and how they would change if we were to change the weighting function.

3   Inflation Experiences and Mortgage Choice

This section investigates whether differences in past inflation experiences help predict household choice of ARM vs. FRM, beyond the influence of other known determinants.

Country-level Analysis. Previous empirical studies have documented a stylised fact: economies with higher ARM shares are characterised by higher inflation volatility before the introduction of the euro (Albertazzi et al., 2024; Badarinza et al., 2018).[7] Thus, as a first exercise, we aggregate our household-level experience measures into country averages and construct FRM shares using the survey weights provided to make it representative of the population. We then weight countries by the average population across survey years (obtained from the World Bank), and regress the country-level experience measure on the FRM share, controlling for the interest rate spread, as it has been the most emphasised factor in previous studies.

The relationship between the average experienced inflation and countries FRM-shares is illustrated in Figure 1, and the regression tables are presented in Online Appendix D. We find a negative and significant relationship between average experienced inflation (in levels and volatility) and the FRM-share, which holds in the cross section (with time fixed effects) and also in the time series (with country fixed effects). These results suggest that the previously documented correlations in aggregate data might be attributable to

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[7]Online Appendix A shows that countries with the lowest FRM shares are characterised by higher historical inflation and volatility of inflation, suggesting that the dynamics are different from that of the US.

households' reliance on their past experiences. We now explore this in more detail.
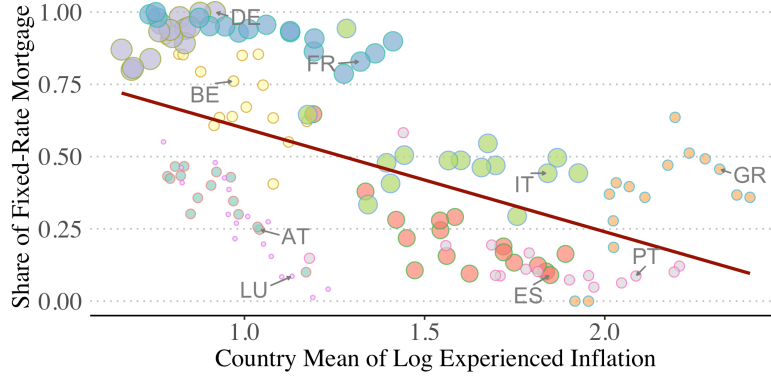

Figure 1: Relation between FRM share and experienced inflation, OLS regression at country level

This figure plots the share of FRMs on the y-axis against the country mean of log experienced inflation on the x-axis. Each dot represents a country and year, with colours differentiating countries. The size of the dots reflects the size of the country, as measured by the average population obtained from the World Bank. The fitted regression line from the equation $ShareFRM_{jt} = \alpha_0 + \beta_0 AvgExperience_{jt} + e_{jt}$ is shown in red.

Household-level Analysis. Our micro-data allows us to go beyond aggregate correlations. Using the rich household-level data from the HFCS, we implement the following logit specification:

$$Prob(FRM_{ijt}|X) = \Lambda(\alpha + \beta \log \pi_{ijt} + X_i'\gamma + \psi_t + Z_{jt}'\theta + \delta_j) \tag{2}$$

where Λ represents the cumulative logistic function. The dependent variable FRM_{ijt} takes value 1 if household i in country j opts for an FRM in year t. The key independent variable, π_{ijt}, measures the household's experienced inflation (level or volatility) up until the year the loan is taken, as described in Equation 1. The vector X_i' includes the mortgage duration and various household characteristics that are standard in the literature, such as age at loan take-out, gender, marital status, employment status, educational attainment, and the quintile rankings of net wealth and household gross income (both adjusted within country and survey wave). Z_{jt}' captures country-specific macroeconomic conditions at the time of the mortgage origination that could influence the choice between an FRM and an ARM. These conditions include the inflation rate, unemployment rate, GDP growth, the interest rate spread between ARMs and FRMs, and prevailing credit standards. δ_j denotes country fixed effects, accounting for any persistent heterogeneity among countries, while ψ_t are time fixed effects, capturing temporal trends that might influence the availability or preference of households for either mortgage type. For example, the adoption of the euro may have facilitated banks' access to long-term funding (ECB, 2011).

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Our source of variation in experienced inflation comes from differences across households from different countries but also across individuals within a country, by age and year. We use the HFCS multiple imputation data, which allows us to use the full sample despite missing data for some households.[8] Standard errors account for the multiply imputed nature of the data, following techniques by Rubin (2004). We use the HFCS household weights that are representative of each country and the EU population (inverse probability of being sampled and non-response). Results are robust to using probit or linear probability models.

We report coefficients, standard errors, and odds ratios for our main analysis in Table 1. Column (1) presents results for the baseline case, in which only demographic characteristics and mortgage duration length are included as controls. In Column (2) we add country specific macro conditions that might affect the supply of each ARM vs FRM. For example, banks in countries with lower inflation might have a better ability to provide FRM.

Despite our efforts to control for country-specific factors at the time of mortgage origination, it is reasonable to suspect that household decisions might still be influenced by historical institutional and cultural dependencies. To account for this, in Column (3) we incorporate country fixed effects, which control for all factors that vary across countries but remain constant over time. This approach effectively eliminates the average differences in experienced inflation across countries, focusing solely on the predictive power of experienced inflation within each country. In Column (4), we further refine our analysis by adding origination-year fixed effects. This adjustment helps to rule out any potential time trends that might influence the likelihood of choosing an FRM in any given year, or the ability of banks to provide them. Our most stringent model specification appears in Column (5), where we introduce country-year fixed effects, thus comparing households who take their mortgage within the same country and year.

Our analysis shows that households who experienced higher inflation throughout their lives are less likely to have an FRM relative to those with lower experienced inflation. The estimated coefficient remains fairly similar across the first four specifications and it is significant at the one percent level. Column (5) controls for confounding factors but also eliminates some relevant variation in the measure of experienced inflation. The fact that we still find a significant effect highlights the important role of this measure as a determinant of mortgage choices. Using the estimates in Column (5), we find that a 1 log-point increase in experienced inflation predicts a 71.6% decrease in the odds of holding an FRM (since $0.284 - 1 = -0.716$). This effect is not only statistically significant

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[8]For details on imputation methodology, see HFCS User Guide (ECB, 2020). Most missing variables are income and wealth. In Online Appendix D we provide a description on the calculation of standard errors.

but also economically relevant. To illustrate this, consider the average share of FRM in our sample: 62.5%. Then, for a household with 62.5% probability of choosing an FRM, a 1 log-point increase in experienced inflation predicts a decrease in the odds ratio to $0.284 \times \frac{0.625}{1-0.625} = 0.473$ which corresponds to a $32.1\% (= 0.473/(1+0.473))$ probability of choosing a fixed-rate mortgage.

Dep. Var: FRM (dummy)	(1)	(2)	(3)	(4)	(5)
(Intercept)	3.538***	4.584***	1.241**	0.290	−5.224
	(0.554)	(0.614)	(0.632)	(0.774)	(8.010)
Experienced Inflation (log)	−2.790***	−2.070***	−2.117***	−1.959***	−1.259**
	(0.118)	(0.125)	(0.278)	(0.519)	(0.499)
Odds ratio	0.06	0.126	0.120	0.141	0.284
Demographic and Mortgage Controls	Yes	Yes	Yes	Yes	Yes
Country Macro Conditions at t	No	Yes	Yes	Yes	No
Country FE	No	No	Yes	Yes	No
Time FE	No	No	No	Yes	No
Country-Time FE	No	No	No	No	Yes
Pseudo R^2	0.357	0.321	0.490	0.487	0.470
Observations	15220	13218	13218	13218	15220

Table 1: Inflation Experiences and Household Mortgage Decisions

The table presents coefficients and odds ratios from logit regressions with robust standard errors, ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Each column refers to a different specification where controls are added sequentially. Demographic Controls include age when taking the loan, gender, marital and employment status, educational attainment, quintile of net wealth and quintile of household gross-income. Mortgage Controls refer to length of the mortgage. Country-specific conditions at loan take-out include inflation rate, unemployment rate, GDP growth, the spread between FRM and ARM and credit standards. Multiple imputation techniques and survey weights are used throughout. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations.

The strong negative relationship between personal experienced inflation and the likelihood of holding an FRM holds within country and also across countries, even after controlling for a rich set of individual and macro controls that could affect households' choices and banks' supply. These include the relative price between FRM and ARM, credit standards set by banks in each country at each year and, importantly, current inflation level when taking the loan. The robustness of our estimates position experienced inflation as an important determinant of households' mortgage financing.

Overall, we find strong evidence in support of experience effects. However, quantitatively, our results contrast with the empirical findings on a US sample by Botsch and Malmendier (2023), where higher experienced inflation correlates with a higher likelihood of choosing an FRM. As discussed in Online Appendix B, FRM holders in the US are barely exposed to any risk, yet they can benefit if inflation increases. In the US, choosing

an FRM is effectively a one-sided bet due to the specifics of the mortgage market. On the other hand, in our countries of study, the existence of prepayment penalties lead to the existence of an inflation risk: if inflation decelerates or becomes volatile, FRM holders may loose in real terms. This channel is especially relevant in environments with high inflation volatility. Thus, we aim to investigate whether our results can be interpreted through this lens: European households who have experienced higher inflation also experienced higher inflation volatility, leading them to prefer an ARM over an FRM (after accounting for pricing and the extensive set of controls previously described). To this end, we calculate the experienced *volatility* at the time of mortgage origination and repeat our analysis. This measure shows an average correlation of 0.685 with our baseline measure of experienced inflation.[9] This suggests that, on average, households who experienced higher inflation also experienced higher inflation volatility in our sample. Table 2 presents coefficients, standard errors, and odds ratios for the analysis using the experienced volatility measure.

Dep. Var: FRM (dummy)	(1)	(2)	(3)	(4)	(5)
(Intercept)	3.123***	5.189***	0.923	−0.634	−5.434
	(0.525)	(0.622)	(0.629)	(0.752)	(8.039)
Experienced Volatility (log)	−1.413***	−0.543***	−0.551***	−0.367**	−0.322*
	(0.112)	(0.109)	(0.175)	(0.182)	(0.186)
Odds Ratio	0.243	0.581	0.576	0.693	0.725
Demographic and Mortgage Controls	Yes	Yes	Yes	Yes	Yes
Country Macro Conditions at t	No	Yes	Yes	Yes	No
Country FE	No	No	Yes	Yes	No
Time FE	No	No	No	Yes	No
Country-Time FE	No	No	No	No	Yes
Pseudo R^2	0.272	0.281	0.487	0.488	0.471
Observations	15220	13218	13218	13218	15220

Table 2: Inflation Volatility Experiences and Household Mortgage Decisions

The table presents coefficients and odds ratios from logit regressions with robust standard errors, ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Each column refers to a different specification where controls are added sequentially. Demographic Controls include age when taking the loan, gender, marital and employment status, educational attainment, quintile of net wealth and quintile of household gross-income. Mortgage Controls refer to length of the mortgage. Country-specific conditions at the time of the loan include inflation rate, unemployment rate, GDP growth, the spread between FRM and ARM and credit standards. Multiple imputation techniques and survey weights are used throughout. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations.

Coefficients remain negative and significant, suggesting that households who experienced

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[9]Additionally, we calculate experienced inflation volatility as the standard deviation of inflation that each household has experienced from their birth until the year before taking the mortgage. This measure correlates at 0.77 with our measure of experienced inflation.

higher volatility of inflation have a lower likelihood of holding an FRM. More specifically, a 1 log-point increase in experienced volatility of inflation predicts a decrease on the probability of holding an FRM from 62.5% (the average in our sample) to 55%, considering our most restrictive results in Column (5). Our main finding thus remains robust to a vast array of controls and measures of inflation: experiencing higher inflation (either levels or volatility) predicts a lower likelihood of holding an FRM for European households.

Online Appendix C reports regression results in detail. We find that older respondents are more likely to hold an FRM, and the higher a household is on the wealth distribution, the less likely she is to choose an FRM. This is consistent with the idea that richer households can more easily bear the payment risk inherent in an ARM.

4   Robustness and Further Determinants

We conduct several additional exercises and robustness checks to guarantee that our results are not driven by mortgage characteristics or supply-constrained households. Online Appendix D presents detailed results and regression tables, while we here describe the findings.

Spread between FRM and ARM. The interest rate term spread serves as a measure on the price differentials between FRM and ARM in each country and at each point in time. As expected, the higher the spread the lower the likelihood of choosing an FRM, as it becomes more expensive compared to an ARM. On the other hand, when the spread is low, FRMs become more attractive as individuals might want to lock the relatively low interest rates irrespective of past experiences. Indeed we find that for mortgages taken when the spread is low (i.e. belongs to the 25th percentile) past experiences play no role.

Mortgage Characteristics. We observe that loans with longer duration are associated with a lower probability of taking an FRM,[10] and that when credit standards are tightened, the probability of holding an FRM is reduced. We also control for whether the household has more than one mortgage on the main residence, whether the current loan refinances a previous one, and the initial amount of debt. The coefficient on experienced inflation remains significant and close to the one presented above.

Debt-to-Income and Loan-to-Value. Conditional on country-specific conditions and time fixed effects, we have assumed that households are free to choose between the two types of financing. This might not be the case for households with high debt-to-income ratios (DTI) and/or high loan-to-value ratios (LTV). To account for this, we (1) run our regressions again but this time controlling for quartiles of DTI and LTV, (2) split the

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[10]The length of the mortgage might increase the price of an FRM, as for longer mortgages, the insurance aspect of FRM may become too expensive and households can end up with a decision favouring ARMs.

sample into quartiles of LTV, as those in higher quartiles might have less freedom to choose their financing instrument and therefore experiences might play less of a role. The role of past inflation experiences remains negative, significant, and relatively constant across quartiles.

Recent Mortgages and Individual Level Interest Rates. Although we have controlled for the country level spread between FRM and ARM at the time of mortgage take out, this might mask some important heterogeneity at the individual level. We exploit the fact that the HFCS asks individuals about the interest rate they currently pay on their mortgages and we limit our sample to individuals who took their mortgage at most one year before they are surveyed. We work under the assumption that the interest rate hasn't changed since they first took the mortgage a year ago. We believe this is a reasonable assumption for FRM but also for ARM who generally do not adjust before one year. Online Appendix D shows the results using this sample and controlling for the interest rate each household pays on the mortgage. Alternatively, we split our sample of recently taken mortgages into interest rate quartiles and we test the role of heterogeneous experiences of inflation among households who pay similar interest rates. In all exercises the main finding holds: higher experienced inflation is associated with lower likelihood of holding an FRM.

Heterogeneity by Country. The empirical investigation suggests that, on average, the inflation risk inherent in an FRM prevails and thus higher experienced inflation makes FRM less attractive. Notwithstanding, country-by-country dynamics can be of interest to ensure that it is not the institutional characteristics of certain countries that drive the results. Moreover, European countries have been through different experiences that might also shape how inflation impact households' choices.

We investigate two hypotheses by re-running our analysis on a country-by-country basis. First, people who live in countries that underwent periods of hyperinflation might be more concerned about the dangers and risks of rising inflation, as opposed to its volatility (Ehrmann and Tzamourani, 2012). Even if households in our sample haven't experienced hyperinflation personally, such traumatic events can be transmitted through generations (Braggion et al., 2024). In our sample, Germany and Greece experienced hyperinflation during the 1920s and 1940s respectively. Thus we hypothesised that the inflation hedge prevails in those countries: higher experienced inflation in levels (which can be associated with the prevalence of an inflation hedge) leads to higher likelihood of holding an FRM. Figure 2a gives support to this hypothesis.

Second, we have argued that FRM are less attractive for people who experienced higher inflation because of their inflation risk, while ARMs can serve as an insurance against such concern. Importantly, the attractiveness of such insurance depends on how the short term interest rate correlates with the business cycle —which we proxy with the unemployment

rate (Albertazzi et al., 2024). If the correlation is negative, short term interest rates are low when unemployment is high, and ARMs can provide higher protection as they benefit borrowers in bad times. With this in mind, we hypothesise that ARMs are most attractive when experienced volatility of inflation is high and the correlation between short term interest rates and unemployment is negative. To test this, we first calculate average correlations and average experienced inflation in levels and volatility for each country in our sample. Germany stands out: German households have not only experienced relatively low inflation volatility but also a very high positive correlation between short term interest rates and unemployment of approximately 0.7. This contrasts with other countries in our sample, where such correlations are strongly negative (see Table D.22 in Online Appendix D). We then analyse the role households' experienced volatility in each country, with the results illustrated in Figure 2b. It can be observed that higher experienced volatility predicts lower likelihood of holding an FRM in almost all countries except Germany, where indeed ARMs do not represent a good insurance against inflation risk because of the higher and positive correlation between unemployment rates and short term interest rates.
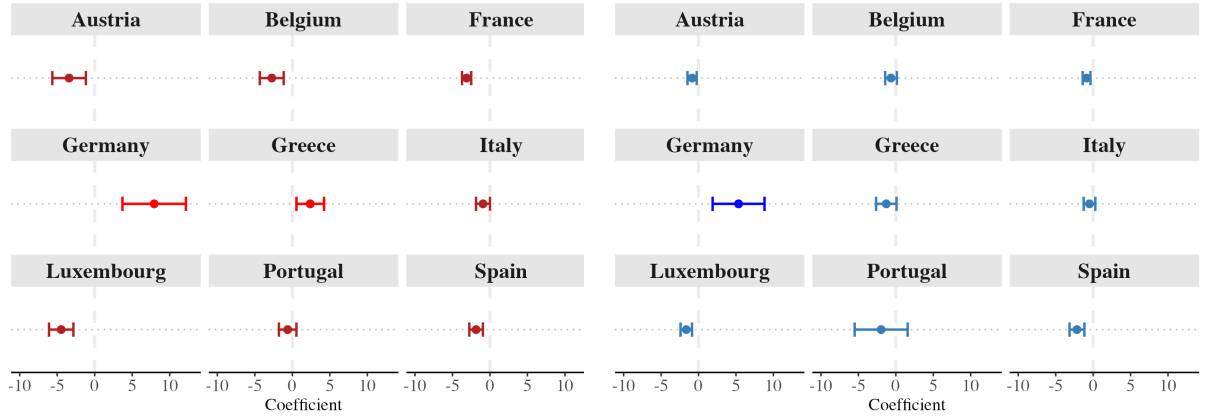
(a) Role of Experienced Inflation by Country **(b)** Role of Experienced Volatility by Country

Figure 2: Experiences and Mortgage Choice by Country

The figure plots logit coefficients and confidence intervals for regressions of FRM share on experienced inflation and experienced volatility respectively for each country, controlling for household characteristics, length of mortgage and interest rate spread at the time of the mortgage.

Interestingly, Greece is the only country where the effect of experienced inflation has a different sign compared to the effect of experienced volatility. Greece experienced hyperinflation, and we observe that higher experienced inflation is associated with a higher likelihood of choosing an FRM. However, Greece is also characterised by a negative correlation between unemployment and short term interest rates, and we find that higher experienced volatility is associated with a lower likelihood of an FRM. These findings might be related to the fact that in Greece, the inflation experience measures are weakly

correlated, allowing us to isolate the inflation hedge from the inflation risk channels.[11]

Overall, the main result holds across countries with some interesting country specific effects. We believe this highlights the importance of investigating experience effects in conjunction with other experiences and country-specific developments.

Which Experiences? This paper focuses on the role of personal inflation experiences measured using the headline CPI, and it relies on the idea that recent experiences receive a higher weight. Here we discuss some alternatives and their potential implications.

Headline CPI versus Personal Bundles. Throughout the paper we have focused on the role of headline CPI and used it to construct measures of lifetime experience, with the aim of exploring the effect of prolonged exposure to certain price patterns. We indeed find that heterogeneity in these past personal experiences are an important determinant of households' mortgage choices across and within countries today. Beyond this inflation measure, the literature has shown that households' inflation perceptions and expectations are influenced by contemporaneous price changes in their personal grocery bundle, which might differ from the representative one (Cavallo et al., 2017; D'Acunto et al., 2021). While data availability prevents us from testing for this additional channel, we conjecture that accounting for the prices experienced during grocery shopping would induce even more heterogeneity in experiences of inflation and potentially help explain some of the remaining heterogeneity in FRM shares, especially within countries.

Inter-generational Transmission of Traumatic Events. Throughout the paper we have focused on personally experienced inflation, but the literature suggests an additional role for experiences that go far beyond one individuals' lifetime. For instance, in our setup, the inter-generational transmission of the consequences of a traumatic event such as a hyperinflation can be relevant. The results in the country-by-country exercise provide suggestive evidence for this hypothesis: individuals' who live in countries that experienced a hyperinflation are more concerned about the consequences of rising prices and thus higher experienced inflation is associated with higher likelihood of holding an FRM (as it provides an inflation hedge).

Recency Bias versus Impressionable Years Hypothesis. Our baseline weighting function with linearly declining weights builds on the literature on experience effects and the recency bias: what happens recently is more available to us and thus plays a more important role, although experiences far into the past are still relevant. Alternatively, social psychology argues that experiences early in our lives can leave a stronger imprint. For example, the impressionable years hypothesis suggests that core beliefs and attitudes are formed during the years of greater mental plasticity, i.e. between 18 and 25 years old

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[11]In Greece, the correlation between experienced inflation and experienced inflation volatility is relatively low and closer to 0.

(Krosnick and Alwin, 1989; Dohmen et al., 2012; Gavresi and Litina, 2023; Bordo and Istrefi, 2018). To test for whether experienced inflation during the impressionable years play an important role, we modify our weighting function such that early experiences in life receive a higher weight.
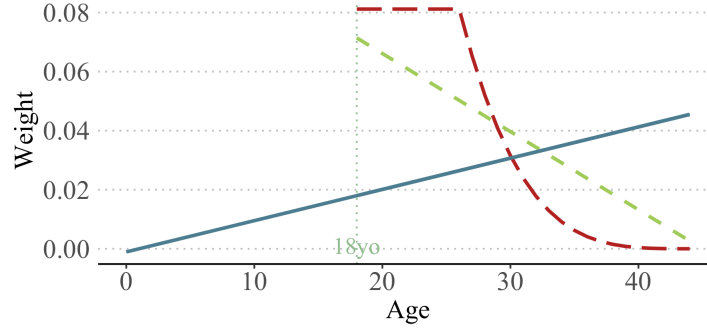

Figure 3: Baseline Weighting Function

The figure illustrates different weighting functions. The solid line represents a weighting function with linearly declining weights from the year of mortgage take out till birth, capturing the recency bias. The dashed lines represent weighting functions that assign (1) higher weight to 18 years old and then linearly decreasing till mortgage take out, (2) higher weight to years between 18 and 25 and then decreasing faster till mortgage take out, capturing the impressionable years hypothesis.

The solid line in Figure 3 plots the weighting function with linearly declining weights, while the dashed lines illustrate two alternative measures in which the impressionable years receive higher weight (Online Appendix D.3 presents details and further alternatives).

We then construct alternative measures of experienced inflation in which impressionable years are over-weighted and repeat our analysis. Table 3 shows the results. We find that when no controls are included, all measures of experience are relevant determinants, while our baseline measure provides the best fit in terms of R-squared. Interestingly, once we add controls, only our baseline experience measure retains its importance. This suggests that experienced inflation during the impressionable years is not an important determinant of heterogeneity in mortgage choices today, as those measures are absorbed by other standard controls like country and time fixed effects. Importantly, our baseline measure of individuals' lifetime experiences with linearly declining weights is still an important determinant of their FRM choice.

Dep.Var.: FRM	(1)	(2)	(3)	(4)
(Intercept)	4.093***	5.517***	2.268***	2.007***
	(0.145)	(0.287)	(0.077)	(0.071)
Experienced Inflation Measures:				
Recency Bias:				
Linearly Decreasing w	−2.792***			
	(0.100)			
Impressionable Years:				
Linearly Increasing w from 18yo			−1.450***	
			(0.053)	
Higher w for 18-25yo				−1.183***
				(0.046)
Controls	N	N	N	N
R^2	0.257	0.185	0.145	0.120
Observations	15225	15225	15221	15223

Panel B: Full Controls

Dep.Var.: FRM	(1)	(2)	(3)	(4)
(Intercept)	0.290	−0.392	−0.736	−0.790
	(0.774)	(0.808)	(0.760)	(0.766)
Experienced Inflation Measures:				
Recency Bias:				
Linearly Decreasing w	−1.959***			
	(0.519)			
Impressionable Years:				
Linearly Increasing w from 18yo			−0.267	
			(0.238)	
Higher w for 18-25yo				−0.244
				(0.190)
Controls	Y	Y	Y	Y
R^2	0.487	0.488	0.488	0.488
Observations	13218	13218	13216	13217

Table 3: Alternative Experienced Inflation Measures and FRM

The table presents regression coefficients from individual-level logit regressions of FRM on different measures of experienced inflation, with robust standard errors, ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$. Panel A does not include controls, while Panel B includes year fixed effects, country fixed effects, and demographic and mortgage controls.

Other Macro Experiences: Unemployment. Throughout the paper we have focused on the role of inflation experiences, as these connect directly with the inflation risk channel

described in Campbell and Cocco (2003). Besides this, lifetime unemployment experiences might be relevant, as these can affect households' expected income. For instance, Ehrmann and Ziegelmeyer (2017) show that households who live in countries with high and volatility unemployment rate are more likely to select FRMs, as their future income might be more unstable. We thus contribute to these findings by constructing an *individual-level measure* of lifetime unemployment experience and testing its relevance. Table D.14 in Online Appendix D presents the regression estimates. Our results show that beyond current unemployment rates (which are controlled for), lifetime experiences of higher unemployment rates are associated with higher likelihood of holding an FRM, and this channel goes beyond our baseline finding about the role of inflation experiences.

5   Inflation Risk Channel

What could be the mechanism linking past experiences to contemporaneous mortgage choices? Natural candidates are expectations about inflation and its volatility, as well as individuals' risk attitudes. Despite the lack of long-term micro-data on the inflation expectations of European households for our study period, we provide suggestive evidence of the link between historical experiences and households' inflation expectations using aggregated data from the recently introduced ECB's Consumer Expectations Survey. Moreover, using the HFCS, we can test for another complementary mechanism: personal experiences of inflation might not only affect inflation expectations but also the willingness to take financial risk.

Inflation Experiences and Beliefs. Extensive work has documented a strong relationship between inflation expectations and memories of past experiences (see Malmendier, 2021, for a survey). In the Eurozone, this relationship between personal experiences and expectations translate into strong heterogeneity within and across countries —households have experienced different inflation patterns throughout their lives and their country history.

To explore the precise link between experiences, expectations and mortgage choice we would need expectations data for each of our households during our period of study, which unfortunately is not available. Nevertheless, we exploit the availability of the Consumer Expectations Survey collected by the ECB and show that countries in which households have the highest inflation expectations and uncertainty about inflation today are also the countries who have historically experienced higher and more volatile inflation, as can be observed in Figure 4. This suggests that memories of past experiences contribute to the observed heterogeneity in inflation expectations in the Eurozone.
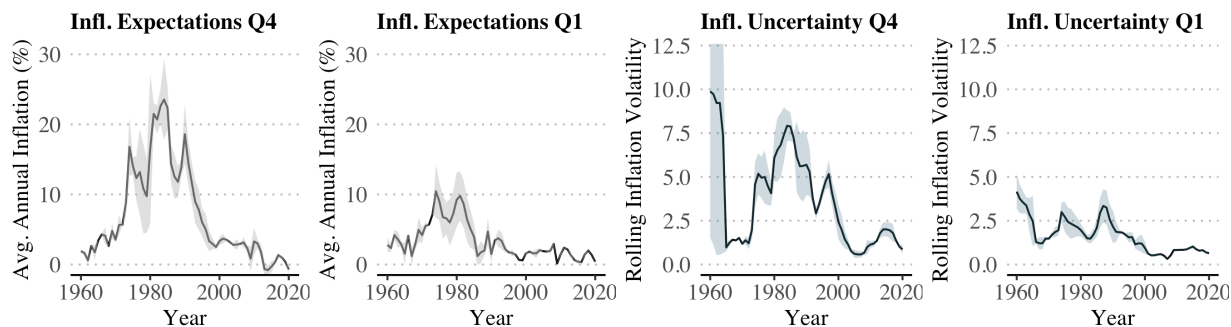
Figure 4: Historical Inflation and Volatility by Current Inflation Expectations and Uncertainty

The figure shows the historical inflation patterns for different groups of countries. Using the expectations data from the CES, we divide countries into quartiles depending on their levels of inflation expectations and inflation uncertainty (see Figure A.5 in Online Appendix A). The first (second) figure shows average annual inflation for the countries with the highest (lowest) inflation expectations today. The third (fourth) panel shows rolling inflation volatility for the countries with the highest (lowest) inflation uncertainty today.

Inflation Experiences and Risk Attitudes. Households who experienced higher inflation and higher volatility might be more worried about future volatile inflation, as it could translate into volatile real payments on their biggest liability. In such a context, ARM provides an insurance against such inflation risk, while an FRM does not. If this inflation risk channel is an important driver of the relation between experienced inflation and mortgage decisions, those who experienced higher inflation (level and volatility) should also be less willing to take financial risk.

We asses this hypothesis using a measure of reported willingness to take financial risk from the HFCS. We construct a variable that takes value one if households are willing to take average or above average risk, and zero if they are not willing to take any financial risk. Figure 5 plots the average experienced inflation of households on the left, and the average experienced volatility on the right, for those who report taking above-average or average risk (in green) and those taking no risk at all (in red). The x-axis refers to the year when the mortgage was taken. For example, all households that took mortgages around 2005 have a higher experienced inflation than households who took a mortgage in 2015. Moreover, a clear pattern can be observed from the raw data when looking at risk attitudes: on average, households who are not willing to take any financial risk experienced higher inflation (in levels and volatility) than households who take average or above average risk. Online Appendix D shows that this pattern also holds when we exploit our household level data and include the full set of controls.
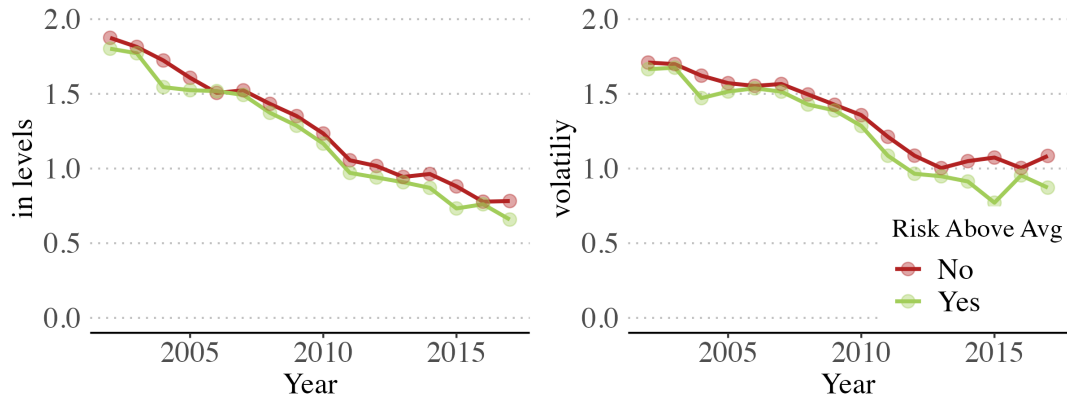
20

Figure 5: Average Experienced Inflation by Level of Risk Attitude

The figure on the left-hand side plots the average experienced inflation for households who took out a mortgage in each year of our sample, while the figure on the right-hand side depicts the experienced volatility. The red dotted line indicates an average or lower willingness to take financial risks, and the green dotted line a higher than average willingness to take financial risks.

Overall, we do find evidence that households who experienced higher inflation are less willing to take financial risk, which might induce a preference for an ARM as it serves as an insurance against the inflation risk inherent to an FRM. In line with this result, we also find that households who experienced higher inflation hold lower shares of mutual funds over total financial assets, and lower shares of stocks over total financial assets (see Table D.26 in Online Appendix D).

This exercise does not aim to capture a unique causal path from experiences to risk attitudes and then choices, but rather present suggestive evidence that this could be one of the mechanisms. Besides affecting risk attitudes, experiences are likely affecting expectations of the level and volatility of inflation (as suggested by Figure 4), which we think would be an important avenue for future research.

6   Conclusion

Previous literature has shown that the current share of ARM is positively correlated with historical volatility of inflation before the introduction of the euro, leading to an interesting open question: *"Why are mortgage markets in Europe still ARM-dominated long after the introduction of the euro?"* (Campbell, 2013). Our study of households' personal experiences of inflation sheds light on this initially puzzling fact. We find that households' past inflation experiences significantly influence their mortgage choices, with those who have experienced higher and more volatile inflation being less likely to hold an FRM. We attribute this to the increased inflation risk associated with FRMs, exacerbated

by Eurozone prepayment penalties. Additionally, country-specific factors such as the correlation between nominal interest rates and the business cycle, and past hyperinflation experiences, further impact the prevalence of inflation risk. Furthermore, our findings suggest that households with higher inflation experiences also exhibit lower willingness to take financial risk, highlighting the role of risk attitudes in mortgage decisions.

Moving forward, exploring the interplay between past experiences, financial behaviour, and expectations about future inflation will be crucial in understanding mortgage markets in Europe. The persistent and robust effect of past lifetime inflation experiences on households' beliefs and behaviours implies that more communication and enhanced credibility might be necessary to mitigate the backward-looking component induced by these lifetime experiences.

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