Rent or Buy? Inflation Experiences and Homeownership within and across Countries*

Ulrike Malmendier† Alexandra Steiny Wellsjo ‡
UC Berkeley, NBER, and CEPR UC San Diego

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Abstract

We show that past inflation experiences strongly predict homeownership decisions within and across countries. First, novel survey data reveals inflation protection to be a key motivation for homeownership, especially after personally experienced high inflation. Second, using household data from 22 European countries, we find that higher personal exposure to historical inflation predicts significantly higher homeownership rates. We estimate similar associations among immigrants to the US who experienced different inflation in the past but face the same US housing market. As predicted by a model of experience-based learning, the effects are strongest in countries with predominantly fixed-rate mortgages.

JEL Codes: R31, E03, G02, D03, D14, D83, D84, E21, G11

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†Department of Economics and Haas School of Business, University of California, Berkeley, 501 Evans Hall, Berkeley, CA 94720-3880, ulrike@berkeley.edu.

‡Rady School of Management, University of California, San Diego, 9500 Gilman Dr, La Jolla, CA 92093, awellsjo@ucsd.edu.

1 Introduction

Participation in the housing market varies widely, both across and within countries. Within Europe, for example, less than half of all households own their home in Germany and Austria, compared to 85% or more in Lithuania, Slovakia, and Croatia. Only 57% of households own their home in France, but 82% do in neighboring Spain. There are also sizable cross-sectional differences within countries. In Italy, for example, 48% of 30-year-olds own their home, but 79% of 60-year-olds. In the Netherlands, instead, the homeownership rate is nearly identical for 30- and 60-year-olds.

What explains these puzzling differences? Why do households with similar demographics and in similar financial situations make systematically different tenure decisions? Clearly, institutions play an important role, as do house prices, housing supply, and demographics.[1] In this paper, we identify a novel and economically meaningful additional determinant of homeownership decisions both within and across countries: We show that the history of past macroeconomic realizations experienced by the population of potential homeowners, and especially inflation experiences, strongly predict investment in the housing market even decades later, above and beyond the influence of contemporaneous policies and institutions. Within the literature on experience effects, we are the first to show that the effect of past exposures is strong enough to influence individuals even as they move to different countries with different market conditions and macroeconomic histories.

Our argument builds on the notion that past experiences of political, institutional, and economic conditions exert a long-lasting influence on attitudes and beliefs (Alesina and Fuchs-Schündeln, 2007; Luttmer and Singhal, 2011; Giuliano and Spilimbergo, 2014). In our context, the conjecture is that exposure to high inflation triggers the desire to protect financial wealth from devaluation and encourages home purchases, as first argued by Malmendier and Nagel (2016). Our key research question is whether we can detect a long-lasting influence of past inflationary periods on housing-markets participation, both across and within countries, and beyond the influence of other known determinants of individual tenure decisions.

[1] Prior evidence includes Andersen (2011), Andrews and Caldera Sánchez (2011), Andrews et al. (2011), Chiuri and Jappelli (2003), Clark and Dieleman (1996), Doling (1973), Fisher and Jaffe (2003), Follain and Ling (1988), Gwin and Ong (2008), Haurin et al. (1997), Henderson and Ioannides (1987), Hilber (2007), Earley (2004), Ioannides (1987), Painter et al. (2001), and Sinai and Souleles (2005).

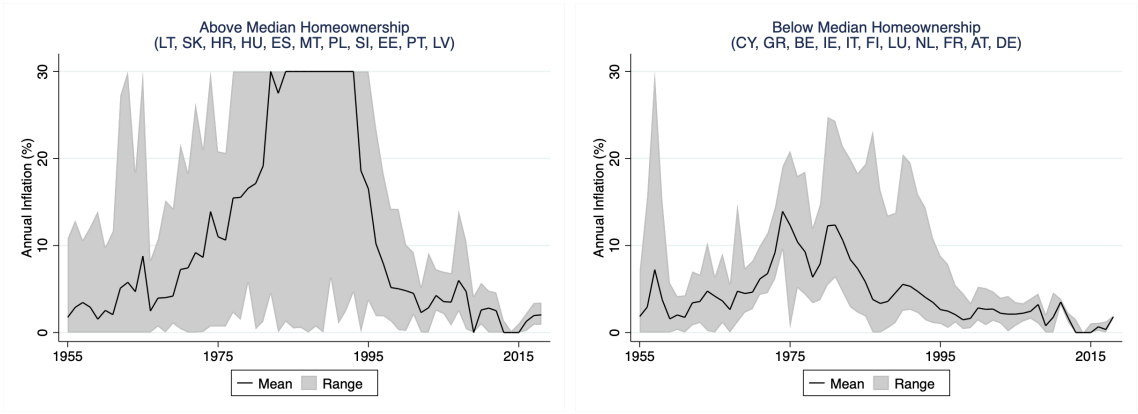


Figure 1. Inflation history above and below median homeownership rate

Note: Inflation data sources described in the text. Above and below median homeownership based on average country homeownership rate across all three HFCS waves. Figure plots the mean and range of inflation across listed countries. Inflation for chart capped above at 30% and below at 0%.

We present two types of motivating evidence for this conjecture. On the macro level, consider the relation between homeownership and historical inflation across Europe. The left graph of Figure 1 plots annual inflation for European countries with above-median homeownership rates (averaging 81%); the right graph shows inflation in those countries with below-median homeownership (averaging 56%).[2] The graphs illustrate that high-homeownership countries have witnessed significantly higher historical inflation over the past 60 years, which is the time period homeowners in the data have personally lived through.

On the micro level, our second piece of motivating evidence comes from a homeownership survey that we fielded in several European countries. We asked 700 homeowners in Austria, Germany, Ireland, Italy, Portugal, and Spain what they believe to be good reasons for buying a home. Out of 10 options, shown in Figure 2, inflation protection was selected by 50% of respondents, ranking second among all options (after "peace of mind") and significantly more often than "house prices are likely to increase." If we take the motivations to protect against inflation and rent price increases together, concerns about price increases dominate all other categories (72% of respondents selected at least one of these two options). Moreover, when asked about their personal homeownership decision, a third of all respondents say that concerns about inflation impacted their own decision to buy, with a higher rate among

[2] Data from the 2008-2018 Household Finance and Consumption Surveys, discussed in detail below.

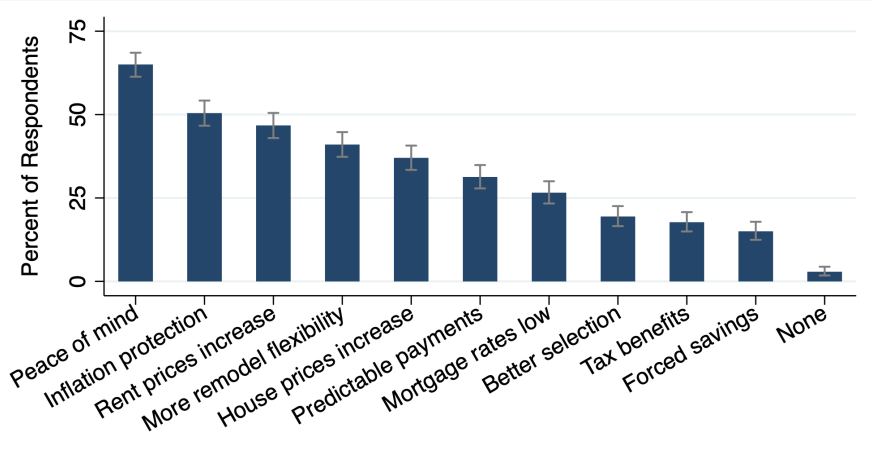


Figure 2. What do you think are good reasons for buying a home?

Note: Respondents were asked to select all options that apply. Order of options was randomized. Figure shows percent of respondents selecting each option and 95% confidence intervals. Survey responses from 700 homeowners in Germany, Ireland, Italy, Portugal, and Spain. See Appendix B for more details.

homeowners who personally experienced high inflation (see Appendix Figure B1).[3] In other words, regardless of whether real estate is indeed a suitable inflation hedge, as proposed in the classic Gordon (1962) growth model and as some authors argue empirically,[4] households *believe* it to be true and important.

With this motivation in mind, we present a simple theoretical framework that links histories of past inflation, beliefs about future inflation, and homeownership. Building on recent formalizations of experience-based learning (cf. Collin-Dufresne et al. (2017), Malmendier et al. (2020), and Schraeder (2016)), we assume that the histories of inflation an individual has personally experienced, both in general and in house prices, shape her beliefs about future realizations.

The model illustrates two channels through which high inflation expectations induce a higher likelihood of homeownership: (1) the desire to protect oneself against high inflation and (2) the perceived attractiveness of a fixed-rate mortgage. The first channel mirrors our survey results that households perceive real estate as an inflation hedge: When they experience an inflationary period, they anticipate higher future inflation, and therefore higher

[3] 283 respondents report experiencing high inflation, and 391 not. See Appendix B for more details.

[4] Empirical tests of whether real estate and real estate investment trusts (REITs) act as inflation hedges have mixed results; cf. Anari and Kolari (2002), Brounen et al. (2014), Case and Wachter (2011), Fama and Schwert (1977), and Liu et al. (1997).

real rates of return on real estate, compared to non-inflation hedging assets. Similarly, if past experiences in the housing market induce households to anticipate higher future house prices, they are more likely to purchase a home.

The second channel reflects that individuals who overestimate future inflation also expect higher nominal interest rates in the future, and therefore perceive fixed mortgage rates to be low in real terms. As a result, they are more likely to purchase a home if they can finance it with a fixed-rate mortgage. The second channel also generates our second model prediction: In countries with predominantly variable-rate mortgages, the link between prior exposure to inflation and the decision to purchase a (mortgage-financed) home should be weaker.

We note that the latter prediction points to a belief- rather than preference-based model of experience effects.[5] At the same time, most of the empirical analysis and conclusions about the role of past lifetime experiences for tenure decisions are independent of the relative roles of a belief- versus preference-based channel.

We test the model predictions using tenure choices of households from 22 European countries, surveyed in the European Central Bank's Household Finance and Consumption Survey (HFCS), and among immigrants to the US from 62 countries, surveyed in the American Community Survey (ACS). We collect historical inflation, house-price, and other macroeconomic data for these countries from Reinhart and Rogoff (2009), the International Monetary Fund, Global Financial Data, Apostolides (2011), Bocharnikova (2021), Hanke et al. (2020), Michal (1960), the European Bank for Reconstruction and Development, the World Bank, the Federal Reserve Bank of Dallas, Knoll et al. (2017), Jordà et al. (2019), the Jordà-Schularick-Taylor Macrohistory Database (Jordà et al., 2017), the Bank of Portugal, the Penn World Tables, and the Maddison Project Database (Bolt and Van Zanden, 2020). We calculate each individual's macroeconomic experiences as a weighted average over their lifetime so far, using the learning-from-experience parameter estimates of Malmendier and Nagel (2016).

Our identification utilizes variation in individual exposure to inflationary periods across four dimensions: age, country, survey year, and the year of immigration (if living in the US). In our analyses, we explore each dimension separately and, in addition, their interactions. For example, within a country, the age profile of experiences may vary over time.

[5] There is also direct evidence on a belief-based mechanism in the prior empirical literature on experience effects, including Malmendier and Nagel (2016), Malmendier et al. (2021), Malmendier and Shen (2017), Botsch and Malmendier (2020), and Kuchler and Zafar (2019). Similarly, other work explores the implications of potential homeowners not being fully rational, e. g., Glaeser and Nathanson (2017).

In the HFCS data, we estimate the relation between individual inflation experiences and homeownership both across and within countries.

Across countries, experienced inflation predicts a significantly higher likelihood of homeownership, controlling for a wide range of household demographics as well as housing-market and macroeconomic conditions. In our preferred specification, a one log-point increase in experienced inflation is associated with a 10 pp increase in the likelihood of ownership for the average household. This effect is large. Given that the standard deviation of log experienced inflation in the sample is 0.7, a one standard deviation change in log experienced inflation is associated with an 8 pp increase in the likelihood of ownership.

The cross-country analysis also allows us to leverage the variation in housing markets to test additional predictions of the model. We find that experienced inflation is a stronger predictor of ownership in countries with more fixed-rate financing. We also find suggestive evidence that experienced inflation is more predictive of tenure choice in countries with a higher correlation between inflation and real house-price growth. Moreover, the effect is stronger among singles than couples, who may differ in their experiences.

Within country, experienced inflation remains a significant predictor of homeownership. The specification controlling for country-time fixed effects fully removes average differences in inflation exposure across countries and over time, even though they are a large source of valid variation. The advantage of this estimation is that it rules out differences across housing markets and other potential general-equilibrium effects as the sole link between inflation histories and homeownership. Relying exclusively on the smaller within-country-time variation, our estimates imply that a one log-point increase in experienced inflation predicts a 4 pp increase in the predicted probability of homeownership for the average household. Since the average within-country standard deviation of experienced inflation only amounts to 0.3 log-points, the economic magnitudes in standard deviation units is smaller. The 4 pp estimate corresponds to a 3.3 within-country standard deviation change, while the 10 pp estimate in the cross-country analysis corresponds to a 1.4 standard deviation change. To the extent that the country-time fixed effects remove valid identifying variation in experiences, along with potential confounds, these estimates plausibly provide for a lower bound on the influence of past inflationary periods on homeownership decisions.

The ideal experiment to estimate the true impact of inflation experiences on homeownership would compare two households who differ only in their inflation experiences and who

choose to rent or buy in the same housing market. Our second set of analyses, using data from the American Community Survey (ACS), allows us to study immigrant households with different experiences from their countries of origin, who all make tenure choices in the same US housing market. This sample consists of 1.4M households who immigrated to the US, 485,012 of which immigrated from high-income countries like those in the HFCS data. We find that personal inflation histories significantly predict homeownership decisions. Among immigrants from high-income countries, a one log-point increase in experienced inflation predicts a 9 pp increase in the likelihood of ownership for the average household. Expressed in standard deviations, a one standard deviation increase in experienced inflation (0.4 log-points) corresponds to a 4 pp higher likelihood of ownership.

Despite the large differences between the HFCS and ACS samples, the estimated magnitudes are strikingly similar: a one log-point increase in experienced inflation (e.g., from 2 to 5.4%) predicts a 9-10 pp increase over the average homeownership rate of 65%.

These magnitudes are large, both relative to other factors in our data and to other estimates in the literature. For example, for the average household in the HFCS data, a one standard deviation change in log experienced inflation predicts roughly twice the change in homeownership as a one standard deviation change in current inflation or real house-price growth conditions. In terms of other benchmarks, the estimated relationship is 1.3 times the predicted change in homeownership from having a child and 0.7 times the predicted change from getting married. Among immigrants to the US, a one standard deviation change in log experienced inflation predicts a change in homeownership about half the size of speaking English and the same as the predicted change from having a child.

In terms of other estimates in the literature, Bailey et al. (2018) find that a 5 pp change in friends' experienced house-price growth predicts a 3.1 pp increase in the likelihood of transitioning from renting to owning over a two-year period. In experimental evidence, Bottan and Perez-Truglia (2020) find that a 1 pp increase in house-price expectations causes a 2.63 pp reduction in the probability of selling within 12 weeks. And Malmendier and Nagel (2016) estimate that a 1 pp increase in learning-from-experience inflation forecast predicts a 0.67 pp increase in one-year inflation expectations and a 0.3 standard deviation increase in fixed-rate mortgage positions.[6] Our estimates are similar in magnitude.

[6] For the effect sizes of other factors in the literature, see, for example, Andrews and Caldera Sánchez (2011), Andrews et al. (2011), Earley (2004), Fisher and Jaffe (2003), Gwin and Ong (2008), Hilber (2007).

How do we interpret the estimated relationship between inflation experiences and homeownership decisions? Broadly speaking, the results support the hypothesis that macroeconomic shocks have a lasting impact on economic decision making. The personal experience of seeing prices increase and the purchasing value of money fall appears to instill a willingness to invest in housing. Moreover, the robustness of the results to the inclusion of country-time fixed effects, as well as their robustness across data sets, address alternative explanations based on housing market features and other possible confounds.

At the same time, other lifetime experiences may play a role, too. For example, countries with higher inflation over the last 20 years have had lower GDP per capita. So far, we focused on inflation experiences for two reasons: first, because of the responses to our survey questions about motivating reasons for home purchases, and second, because of the evidence in prior literature that links inflation experiences to inflation beliefs, interest-rate beliefs, home purchases and mortgage decisions (Botsch and Malmendier, 2020; Malmendier and Nagel, 2016; Malmendier et al., 2021). Though we cannot easily disentangle inflation experiences from all other macroeconomic experiences, we address the role of other potential experience effects by constructing similar lifetime experience measures for real house-price growth, real GDP per capita, real long-term interest rates, and employment rates. We show that our results are robust to including these additional measures in the estimation. The relation between these new experience measures and homeownership, instead, varies in sign and significance across estimations. For example, real house-price experiences predict homeownership in the European data, but the association is smaller in magnitude than that of experienced inflation and does not replicate in the sample of immigrants to the US.

The dominant role of inflation experiences, relative to the influence of real house-price experiences, is interesting and perhaps surprising. We show that it is neither driven by the more limited availability of historical house-price data (compared to inflation data) nor by the direct impact of house-price growth on affordability. Moreover, the result is consistent with the findings in our survey. More respondents consider inflation protection and rent-price increases as a good reason to buy a home than house-price increases (see Figure 2). That is, inflation might truly outperform real house-price growth as motivating factor for home purchases, possibly because inflation experiences are more salient than real house price changes.

The key takeaway is that individual exposure to past inflation is a powerful predictor

of tenure choice, also relative to past real house-price movements. Past inflation conditions experienced by the cohorts of potential homeowners appear to be a significant factor in explaining the large differences in housing markets across countries and across cohorts.

Relation to previous literature. Our paper relates to the literature on the determinants of tenure choice, which we can broadly classify as market factors and household characteristics. Among the market factors, homeownership has been linked to tax benefits, rent prices, transaction costs, housing supply, and other government policies. Several of these papers argue that historical influences have a long-lasting impact on housing markets. For example, Earley (2004) links the cultural tradition of passing property through family in Southern Europe to high homeownership rates today. Andrews et al. (2011) argue that differences in historical mortgage-market reforms help explain persistent cross-country differences in the availability of mortgages. Our approach differs from these prior studies of historical influences in that we focus on a person's lifetime experiences, controlling for current macroeconomic conditions, institutions, regulations, and country-specific cultural influences.

Household-level characteristics that have been linked to homeownership include demographics (age, marital status, presence of children, and employment status), financial status (income, wealth, and access to mortgage debt), and preferences over types of home (e.g., apartment vs. single-detached unit, location, and home size).[7] Our analyses are robust to controlling for a vast array of both household and market determinants.

Our paper also builds on the growing literature on experience effects, which shows that life experiences of macroeconomic events such as high inflation or stock returns have significant impacts on expectations and financial decisions. Most closely related is the paper by Ampudia and Ehrmann (2017), who also use household data from the HFCS. They exploit its cross-sectional variation to demonstrate that experiencing higher stock-market returns is associated with increased self-reported tolerance of financial risk and stock-market participation. Relative to the results estimated on US data by Malmendier and Nagel (2011), European households tend to weight recent experiences more highly, i. e., exhibit stronger recency bias. They also find that "extreme" experiences have lasting effects on behavior. Relating specifically to inflation, Malmendier and Nagel (2016) find that higher lifetime experienced inflation leads to higher inflation expectations and fixed-rate mortgage positions

[7] See for example Andersen (2011), Andrews and Caldera Sánchez (2011), Bailey et al. (2019), Bracha and Jamison (2012), Collins and Choi (2010), and Drew and Herbert (2013).

as well as lower holdings of assets that pay nominal fixed-rates (bonds). Botsch and Malmendier (2020) show that inflation experiences also predict future interest-rate expectations and the choice of fixed- vs. adjustable-rate mortgage financing. Using a structural model and detailed mortgage-contract data, the authors estimate that homeowners who have experienced 1 pp higher inflation are willing to pay 6 to 14 basis points more of interest for a fixed-rate mortgage. While Botsch and Malmendier (2020) focuses on empirically tracing out and quantifying the welfare costs associated with the stark prevalence in fixed-rate mortgages, conditional on home buying, the key research question in our paper is concerned with household tenure choice. Ehrmann and Tzamourani (2012) find that the experience of hyperinflation has a lasting effect on beliefs about the importance of price stability and Dräger and Lamla (2018) find that exposure to high or volatile inflationary periods leads to less anchoring of long-run inflation expectations. We note that in our data, the results are not driven by households who experienced hyperinflation.

A considerable body of literature has also explored the effects of house-price experiences on house-price beliefs.[8] Most notably, Kuchler and Zafar (2019) find that personal experiences of house-price growth lead to higher house-price expectations and perceptions of housing as a good investment.[9] Experiences of past house-price growth have also been linked to the timing of first home purchases (Agarwal et al., 2016). Additionally, households use past house-price changes to update their beliefs about housing market risk, with owners updating their beliefs faster than renters (Adelino et al., 2018). Past housing returns seem to influence housing investment beyond their impact on stated beliefs, with individuals who are less certain about their expectations relying more heavily on past returns than their own beliefs when making investment decisions (Liu and Palmer, 2021). Bailey et al. (2018) find that house-price growth in long-distance Facebook friends' zip codes increases an individual's expectations of house prices in their own zip code. These effects translate into a greater probability of transition from renting to home ownership, larger property purchases, and higher purchase price. Lower house-price expectations are also associated with higher mortgage leverage choices (Bailey et al., 2019). These effects can affect house-price cycles, with rising mortgage leverage linked to falling prices and a "deflationary feedback loop,"

[8] See Kuchler et al. (2022) for a recent summary of the literature on housing market expectations.

[9] Kuchler and Zafar (2019) also find that more volatile experiences of house prices lead to a greater dispersion of house-price beliefs.

while overly optimistic house-price expectations can lead to overvaluation of real estate and housing booms (Duca et al., 2021).[10]

The rest of the paper proceeds as follows. Section 2 presents a simple theoretical framework demonstrating how inflation and house-price experiences can influence tenure choice. Section 3 describes the data sets we employ. Section 4 presents analyses of the relationship between individual macroeconomic experiences and homeownership. Section 5 concludes.

2 Theoretical Framework

We present a stylized model of household tenure choice to demonstrate how experiences of inflation and real house-price growth can influence the decision to rent or buy a home.

Real estate has classically been viewed as an inflation hedge, for example, in the seminal Gordon growth model (1962). Our model embeds the possibility of experience-based belief formation into Gordon's theoretical setting to analyze the perceived attractiveness of real estate as a real asset, as well as the perceived attractiveness of fixed-rate mortgages.

Consider an agent born at time t who lives for one period. The agent is endowed with wealth w_t and consumes all of her wealth at $t+1$. We distinguish between nominal and real values, and denote inflation from t to $t+1$ as π_{t+1}. Agents have log utility.

The decision of interest is the choice between buying and renting a home to live in. Households maximize expected real terminal wealth subject to the constraint that they must either rent or own a home from t to $t+1$. Any wealth not spent on housing is invested in an alternative asset, which pays a nominal interest rate n_t. This assumption implies that housing is the only inflation-protected investment opportunity. We discuss below how our results differ in the presence of alternative inflation hedges. (See Appendix C for details on these and other results.)

[10] See Duca et al. (2021) for a detailed discussion of the drivers of house-price cycles and their effect on the economy at large.

Rent. If the agent decides to rent her home, her expected utility is

$$\begin{aligned} E_t\left[U_{t+1}(R)\right] &= E_t\left[u\left(\frac{w_{t+1}(R)}{1+\pi_{t+1}}\right)\right] \\ &= \log\left((w_t - h_t)(1+n_t)\right) - E_t[\log(1+\pi_{t+1})], \end{aligned} \tag{1}$$

where h_t is the rental price at t and $w_{t+1}(R)$ is the nominal wealth in $t+1$ conditional on renting.

Buy. If the agent decides to buy a home, she pays the current house price M_t at time t, and sells the house at price M_{t+1} at time $t+1$. The change in house prices in each period can be decomposed into inflation in the price of consumption π and an exogenous housing-specific component g, $M_{t+1} = M_t(1+\pi_{t+1})(1+g_{t+1})$, where g_{t+1} is the *real* house-price growth between t and $t+1$. In the simplified model, we assume that g is an exogenous process orthogonal to inflation, i. e., we abstract from home prices reacting to supply and demand. This could be the case, for example, if there is a large price-setter willing to buy and sell homes, rent them out, and lend at prices and rates that do not vary with demand. The simplification allows us to illustrate the main effects of experience-based learning without complicating the model. (Below, we discuss the implications of prices reacting to demand.) Note, though, that *nominal* house-price growth, $(1+\pi)(1+g)$, is correlated with inflation by construction; only the additional (*real*) house-price growth g on top of inflation is orthogonal to the level of inflation.

We assume the agent can finance a home purchase by borrowing amount $m_t \leq M_t$. Under a fixed-rate mortgage, she borrows at a nominal rate n_t^f, and repays $(1+n_t^f)m_t$ in $t+1$. Under a variable-rate mortgage, she borrows at a real rate r_t^v, and repays $(1+r_t^v)(1+\pi_{t+1})m_t$.[11] We analyze each scenario separately.

[11] In practice, variable-rate mortgages take many forms; here we assume the nominal rate adjusts one-for-one with inflation.

Under fixed-rate financing, the expected utility of ownership is given by

$$E_t\left[U_{t+1}(FR)\right] = E_t\left[u\left(\frac{w_{t+1}(FR)}{1+\pi_{t+1}}\right)\right] \tag{2}$$
$$= E_t\left[\log\left(\frac{M_t(1+\pi_{t+1})(1+g_{t+1}) - m_t(1+n_t^f) + (w_t-(M_t-m_t))(1+n_t)}{1+\pi_{t+1}}\right)\right]$$

where $w_{t+1}(FR)$ is expected nominal wealth in $t+1$ conditional on buying and financing with a fixed-rate mortgage at the prevailing prices.

The equation highlights the two channels through which expected inflation affects the value of homeownership. The first is the classic real-asset motivation: If house prices move with inflation, investment in real estate protects households from high inflation in the future. As inflation rises, the real value of the alternative investment is reduced while the real value of the home stays constant. The second motivation comes from a desire to borrow at a fixed-rate when inflation is high. With a nominal fixed rate, the *real* mortgage rate, $(1+n_t^f)/(1+\pi_{t+1})$, is decreasing in inflation. Therefore, homeownership is attractive as it allows households to borrow "cheaply."

Under variable-rate financing, the corresponding expression for the expected utility of ownership (relegated to Appendix Section C.1) reveals that the real-asset motivation remains the same, but not the latter channel: households no longer benefit from fixed-rate borrowing at what they expect to be a low real rate.

Household Beliefs. At time t, the agent observes rental price h_t, house price M_t, mortgage rate n_t^f or r_t^v, current inflation π_t, and current (real) house-price growth g_t.

We allow beliefs to be influenced by agents' personal experiences: They believe that future inflation and (real) house-price growth will be more similar to what they have experienced in the past than rational learning implies. For our purposes, it suffices to assume that the inflation beliefs of an agent who has experienced high inflation at time t first-order stochastically dominate beliefs of an agent who has experienced lower inflation at time t. Similarly, an agent who has experienced higher real house-price growth at t has beliefs about g_{t+1} that first-order stochastically dominate the beliefs of an agent who has experienced lower g_t. As we assume π and g are uncorrelated, we also assume that households form beliefs about π and g independently. That is, changes in beliefs for one parameter do not affect

beliefs about the other.[12] Agents take rent and mortgage rates as given and do not use them to draw inferences about future inflation or house-price growth.

Under these assumptions, experiences influence homeownership through expectations. While the beliefs channel is indeed well-documented in the experience-effects literature (e.g., Malmendier and Nagel, 2016; Kuchler and Zafar, 2019), it is possible that other channels are at work, like changes in preferences for inflation protection. The empirical analysis is not tied to the expectations channel and allows experiences to influence homeownership through either beliefs or preferences.

The empirical analysis will also account for previously documented features of experience-based learning, including the weighting function used in experience-based learning models such as Malmendier et al. (2020). It will also allow for all other historical data to matter; the key feature is that lifetime experiences receive some extra weight.

Prediction 1. *Homeownership is increasing in experienced inflation.*

Proof. An increase in experienced inflation at time t shifts beliefs about $(t+1)$ inflation to a first-order stochastically dominant distribution. Hence, homeownership is increasing in experienced inflation if the expected utility difference between owning and renting is increasing in expected inflation. We check whether this difference is positive for any given realization of future inflation and future house-price growth, $\frac{\partial U(buy)-U(rent)}{\partial \pi_{t+1}} \geq 0 \ \forall \pi_{t+1}, g_{t+1}$, separately for each of the two mortgage types:

$$\begin{aligned} \frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(FR) - U_{t+1}(R)\right]\Big|_{\pi,g} &= \frac{M_t(1+g)}{w_{t+1}(FR|\pi,g)} \qquad (3) \\ &> 0 \ \ \forall \pi, g. \\ \frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(\,VR) - U_{t+1}(R)\right]\Big|_{\pi,g} &= \frac{M_t(1+g) - m_t(1+r_t^v)}{w_{t+1}(\,VR|\pi,g)} \qquad (4) \\ &> 0 \ \ \forall \pi, g \ \ s.t. \ \ M_t(1+g) > m_t(1+r_t^v). \end{aligned}$$

where $w_{t+1}(FR|\pi,g)$ and $w_{t+1}(\,VR|\pi,g)$ is the wealth in $t+1$ under fixed- and variable-rate financing, respectively.

[12] We note that this assumption is consistent with the domain-specificity of the relationship between experiences and beliefs found in other work. Kuchler and Zafar (2019) find that recent (nominal) house-price experiences predict house-price expectations, but not inflation expectations more broadly.

Under fixed-rate financing, the derivative is positive for all possible realizations of future inflation and future house-price growth. Under variable-rate financing, the derivative is positive under our assumption that $M_t(1+g) > m_t(1+r_t^v) \ \ \forall\ g$. Thus, the expected utility difference is also increasing in experienced inflation. We simulate the model in Appendix Section C.2 to confirm that this prediction is robust to a broader parameter space. □

Our second prediction hones in on the difference between variable- and fixed-rate financing.

Prediction 2. *Among households with comparable wealth, the effect of experienced inflation is weaker for households who only have access to variable-rate mortgages.*

Proof. We compare the magnitudes of the point-wise derivatives in equations (3) and (4). Assuming $(t+1)$-wealth is similar when financing with either mortgage ($w_{t+1}(FR) \approx w_{t+1}(VR)$ for any π and g), homeownership will react more to experienced inflation under fixed- than variable-rate financing as (3)-(4) $\approx m_t(1+r_t^v) > 0$. We show that this prediction also holds without the similar-wealth assumption using simulations under a broad range of conditions in Appendix Section C.2. □

Thus far, we have focused on the effect of past periods of inflation on housing markets. Our model also makes a clear prediction about the effect of past house-price growth.

Prediction 3. *Homeownership is increasing in experienced real house-price growth.*

Proof. The utility of ownership is strictly increasing in g, while the utility of renting is independent of g (see Appendix C.1). Therefore, a first-order stochastic dominating shift in beliefs about g unambiguously increases homeownership. □

In Section 4, we test these three predictions, relaxing some of the simplifying theoretical assumptions of our model. For example, we control for household characteristics that may shift the relative utility of ownership (e. g., family structure) or ability to buy (e. g., income and wealth). We also control for factors that may shift the relative cost of ownership, including tax benefits, tenant protections, and interest rates. Controlling for variation in homeownership rates due to these factors, we test whether prior macroeconomic realizations have a long-lasting effect on homeownership by exploiting variation in the exposure to past

macroeconomic realizations and in access to different types of mortgages across cohorts and countries.

To capture households' access to variable- versus fixed-rate mortgages in Prediction 2, we would ideally measure the supply of different types of mortgages. Our empirical proxy will rely on the prevalence of variable-rate mortgages in a country.

We also note that, while variable-rate financing shuts down the cheap-borrowing motivation for ownership, we can further shut down the real-asset channel by allowing for inflation-protected investment other than housing. In Appendix Section C.1, we show that, with an alternative inflation hedge, Prediction 1 continues to hold for fixed-rate financing, through the perceived cheap borrowing motivation, but there is no predicted relationship under variable-rate financing. Therefore, in the presence of alternative inflation hedges, Prediction 1 is weakened (homeownership is only weakly increasing in experienced inflation) while Prediction 2 remains robust.

This discussion implies yet another prediction of our model: the effect of experienced inflation should be weaker in markets with access to alternative inflation hedges. To empirically test this prediction, we would need a convincing measure of households' access to alternative inflation hedges and its variation over time and across countries. Lacking such a measure we leave further exploration of this prediction to future research.

Model Extensions. The predictions are robust to relaxing several of our simplifying model assumptions.

First, in Appendix C.1, we extend the set-up to include a cost of ownership c which captures, for example, maintenance costs or property taxes.

Second, while the analysis in the main text assumes that the value of the house tomorrow is greater than the outstanding loan, we show in simulations in Appendix Section C.2 that our predictions are robust to a larger parameter space, including "housing crisis" scenarios.[13]

Third, we consider the implications of relaxing the assumption that π and g evolve through exogenous, independent processes. In a general equilibrium setting, changes in anticipated inflation affect housing demand, which in turn can affect real house prices, resulting

[13] We identify the bounds of the parameter space where each prediction holds, and then demonstrate the robustness of the predictions under a variety of alternative assumptions about the distribution of inflation beliefs and alternative levels of risk-aversion. We also use the simulations to demonstrate that these patterns do not hold if past inflation affects only the variance of inflation beliefs.

in systematic correlation between π and g. Prior literature highlights three main channels through which changes in anticipated inflation affect housing demand. Our model already accounts for the first, increased inflation expectations raising the demand for homeownership through the hedging motive. The second is mortgage tilt, which arises when, in anticipation of future inflation, mortgage suppliers raise interest rates in the present period, decreasing housing demand (e.g., Kearl, 1979). Third, tax benefits in the form of (nominal) mortgage interest deductions increase the tax subsidy for ownership during inflationary periods (e.g., Hendershott and Shilling, 1982). In settings where all three channels are present, the relationship between experienced inflation and housing demand (or prices) is ambiguous, depending on which of these effects dominates (e.g., Goodwin, 1986; Follain, 1982).

Empirically, we find that inflation π and real house-price growth g have a moderate *negative* correlation over time within a country.[14] That is, when inflation is high, nominal house prices do not increase as much as general prices. A general equilibrium model that accounts for this correlation would require an additional set of assumptions about how households perceive this correlation and how experiences change their beliefs. One way to model this would be to allow households to use inflation experiences as a noisy signal for g. If households have accurate beliefs about the negative correlation between π and g, high inflation experiences will lower expectations of g. In aggregate, this would bias down our estimate of the relationship between experienced inflation and homeownership. If beliefs about the correlations between π and g vary across countries, as we see in the data, we would predict that experienced inflation will be a stronger predictor of homeownership in countries with a more positive correlation between π and g.[15] We test this empirically in Section 4.1.

We conclude by emphasizing again that, empirically, all of these general equilibrium effects do not appear to matter for our findings since, as we show, our findings are robust to focusing on the variation in experiences and ownership within the *same* housing market, where prices, rents, taxes, and rates are the same.

[14] From 1976-2007, the average correlation across the 12 HFCS countries with data is -0.24, with a standard deviation of 0.27. In all countries but Germany, the correlation is negative.

[15] We thank an anonymous referee for the suggestion of this prediction.

3 Data and Empirical Measures

3.1 Data Sets

Household Finance and Consumption Survey (HFCS). We obtain three waves of household-level microdata from the Eurosystem's Household Finance and Consumption Survey (HFCS). Conducted by the European Central Bank (ECB), the HFCS collects harmonized data on finances and consumption across the euro area that is representative at both the euro-area and the individual country level. The target population is all private households and their current members residing in the national territory. The first wave was conducted in 2008-2011 (primarily in 2010) and includes 15 countries: Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain. The second survey wave was conducted in 2011-2015 (primarily in 2014) and, in addition to the 15 countries from the first wave, also includes Estonia, Ireland, Latvia, Hungary, and Poland. The third survey was conducted in 2016-2018, covers all earlier countries with the exception of Spain, and adds Croatia and Lithuania.

Table 1, Panel A, shows the summary statistics of household characteristics in the merged HFCS data, based on the microdata from each country and weighted to be representative both within and across countries. Our sample includes 220,605 households across 22 countries. 62% of households are homeowners, or own their main residence. The average household head is 52 years old. 55% of household heads are male, and 45% have children. 54% of household heads are married (or in a consensual union on a legal basis), 24% are single, and the remaining heads are widowed or divorced. The highest level of education attained by the household head is measured using the International Standard Classification of Education (ISCED-97), with 27% of household heads at the tertiary level (college in the US), 44% at the upper secondary level (high school in the US), and 29% at the lower secondary level or below. 56% of household heads are employed, 6% unemployed, and the remainder retired or out of the workforce.

We measure net wealth and total gross income at the household level, converting all monetary values to 2010 euros using country-year-specific inflation.[16] The average net wealth is about EUR 200,000, and the average household income is about EUR 37,000. In our

[16] For missing survey dates, we assume the survey was conducted at the start of the fielding period.

analyses, we will use deciles of wealth and income, calculated across survey respondents. (We test the robustness of our analyses to several alternative specifications of wealth and income, described in Section 4.3.) We focus on HFCS household heads aged 20-80 at the time the surveys were conducted, and include all households surveyed, regardless of where the household head was born.[17] Our main results are robust to limiting analyses to natives.[18]

In the Appendix, we also show homeownership by country. The leftmost column of Appendix Table A1 reveals the wide variation in homeownership across the 22 HFCS countries, as also illustrated graphically in Appendix Figure A1. For example, less than half of households own their main residence in Austria and Germany, while homeownership rates are above 80% in countries like Croatia, Slovakia, Hungary, and Spain. The middle columns of Appendix Table A1 indicate housing-market characteristics for each country, which comes from data sources discussed below.

The rightmost columns of Appendix Table A1 summarize our measure of the prevalence of variable-rate (relative to fixed-rate) mortgages (PVR). It is calculated, separately for each country-wave, as the sum of all adjustable-rate mortgages on households' main residences (in euros outstanding at the time of the survey) divided by the sum of all mortgages.[19] The second-to-last column displays the percentage of mortgage-euros in adjustable-rate mortgages, averaged across waves using the sum of household weights. In the last column, the measure is normalized to have mean 0 and variance 1.

We note that, to test Prediction 2 of our theoretical model, we would ideally measure the "availability" (supply) of fixed- and variable-rate mortgages. Practically, our proxy is an equilibrium measure of the prevalence of variable-rate mortgages. We also note the implicit assumption that variable-rate mortgages are linked to inflation (e.g., targeting a real interest rate), and recognize that there are other forms of variable rates.

American Community Survey (ACS) Data. We obtain data on households in the 2006-2020 American Community Survey (ACS) from IPUMS (2022). This sample allows us to hold the housing market constant while varying macroeconomic histories due to dif-

[17] For 6% of households, we have only 5-year age buckets and use the midpoint of the age bucket.

[18] The identification of natives is not available in all country-waves. When available, the data identifies about 90% of household heads as natives. Also note that the ECB does not provide the country of origin for non-natives. This data is available in the ACS and the focus of our empirical tests there.

[19] This measure is not defined for Finland, where all mortgage rates are reported as unknown.

ferent countries of origin. We consider several different samples of immigrants: First, for comparison to the HFCS data, we consider all individuals aged 20-80 who immigrated to the US from one of these countries. Second, we expand the sample to include immigrants from other high-income countries. These include additional European countries as well as countries from other regions like Chile, Uraguay, Japan, Korea, Australia, New Zealand, and Canada. Finally, we expand the sample even further to include all countries with historical inflation data.[20] This largest sample consists of 1.4M immigrant household heads from 54 countries, of which 19 are the HFCS countries, 17 are other high-income countries, and 18 are low- to moderate-income countries.[21]

To construct the experience measures, we use information on the head of household's birth country, age, and year immigrated to the US. Demographic controls include age, gender, marital status, educational attainment, and employment status of the household head, children in the home, and total household income. Unlike the HFCS data, the ACS does not survey households on their total wealth. To capture the level of assimilation among immigrants, our analyses control for the number of years the immigrant has been in the US, measures of English proficiency, and citizenship status.

These data are summarized in Panel B of Table 1 separately for immigrants from the HFCS countries, all high-income countries, and from all countries with historical data.

Note that despite the vastly different sample selection of the HFCS from the ACS sample (namely, Europeans in their home countries versus immigrants to the US), the similarities in household characteristics across the two samples are striking. The close match in terms of demographics such as age, gender, or marriage status might reflect country-of-origin effects as individuals in both samples come from the same countries.

Among immigrants from the HFCS countries, the average household head is 55 years old. 54% are male and 36% have children living in the household. The average household income, expressed in 2010 USD, is about 88,000. 58% of household heads are married (31% to a native spouse), 13% are single, and the remaining are widowed or divorced. In terms of educational attainment, 39% are college-educated (have 4+ years of college), 51% are high

[20] Calculating experienced inflation for immigrants aged 20-80 requires historical data back to 1927.

[21] We include a small number of household heads who immigrated in the implied birth year (calculated as the survey year minus age) or in the year prior to implied birth year (which we assume is due to the timing of the survey relative to birth date, and we treat as immigrating in the birth year). We exclude 452 household heads whose year of immigration is more than 1 year earlier than the implied birth year.

school-educated (completed grade 12), and 10% have not completed high school. 63% are employed, 3% unemployed, and the remainder retired or out of the workforce. The average immigrant has spent 37 years in the US. 78% are American citizens (54% naturalized and 24% born to American parents). 46% speak only English, 35% speak English very well, 13% well, and 6% do not speak English (or not well).

The demographics of immigrants from all high-income countries, shown in the second set of columns in Panel B, are similar to those from the HFCS countries. Immigrants from the high-income sample are somewhat less likely to be citizens, are slightly more educated, and earn more than immigrants just from the HFCS countries.

In the larger sample from all countries in the ACS with historical inflation data, summarized in the third set of columns in Panel B, immigrants are younger, have spent less time in the US, speak worse English, and are less likely to be citizens than the more selected samples. They are more likely to have children and to be married, but less likely to be married to a US native. They are slightly less educated, more likely to be employed, and have lower household incomes.

For comparison, Appendix Table A2 also summarizes the characteristics of US natives in the ACS data.[22] While there are large differences, for example, in English fluency and the likelihood of being married to a US native, many demographics of the US natives are similar to immigrants from HFCS and other high-income countries, including homeownership. Homeownership, defined in the ACS as owning the property where surveyed, is 73% among US native respondents compared to 74% and 71% among immigrants from HFCS and all high-income countries, respectively. Homeownership is lower among immigrants from all countries (61%).

The ACS provides weights designed to be representative of the US population. As we focus on differences across individual immigrants, rather than population estimates of immigrants in the US, we assign all immigrants equal weight. The results are robust to weighting the data.

Inflation Data. Our primary source of historical inflation data is Reinhart and Rogoff (2009), who provide time series of consumer price indices (CPI) for a large number of coun-

[22] For comparison on equal footing, we present the US native summary statistics weighting each respondent equally, rather than weighting to be representative of the US population.

tries until 2010. We extend the data to 2020 using inflation data from the International Monetary Fund (IMF). We note that the calculation of the CPI by the Bureau of Labor Statistics is meant to capture housing costs (Greenlees and McClelland, 2008) and has historically included house prices, while its more recent design targets housing consumption rather than investment.

For several countries not included in the Reinhart and Rogoff data, we use alternative historical inflation data. For Cyprus and Malta, we use data from Apostolides (2011) for inflation from 1922-1938 and Global Financial Data (GFD) from 1943 on for Cyprus and from 1947 on for Malta. For Luxembourg, we obtain GFD inflation data extending to 1922. For countries formerly part of the Soviet Union (Estonia, Latvia, and Lithuania), we obtain GFD for the individual countries when possible, and data from the Soviet Union when the individual series are not available. For the Soviet/Russian data, we use GFD before 1969, World Bank data from 1970-92, Reinhart and Rogoff data from 1993 to 2010 and World Bank data again from 2011-20. For Estonia, we use Soviet inflation data from 1941-1960 and Estonian data obtained from Bocharnikova (2021) from 1961-88. For Lithuania and Latvia, we use Soviet data from 1941-1988. For the transition years in the late 1980s/early 1990s, we obtain data from the European Bank for Reconstruction and Development's 2000 Transition Report until GFD data becomes available in 1991 for Estonia and 1992 for Lithuania and Latvia. Similarly, for Croatia and Slovenia, we use GFD data for Yugoslavia until 1943. We use GFD data from 1952 on for Croatia. For Slovenia, we use GFD from 1952 to 1992 and IMF data after.[23] For both Slovakia and the Czech Republic, we use GFD data from the Czech Republic until 1948 and cost-of-living index data from Michal (1960) from 1949-59. For Slovakia, we use GFD data from 1964 and for the Czech Republic from 1960.[24] For Poland, we are able to partially fill a gap in the Reinhart and Rogoff data from 1941-44 using data from Hanke et al. (2020).

Expanding the set of countries for the analysis of the ACS data, we use the historical inflation data from Reinhart and Rogoff where possible and fill in any missing data from the IMF or World Bank as needed. For countries with any gaps in the inflation series, we

[23] To create a data series for immigrants in the ACS data from Yugoslavia, we take the average of the available inflation data from 2004-20 from Bosnia and Herzegovina, Croatia, North Macedonia, Montenegro, Serbia, and Slovenia.

[24] To create a data series for immigrants in the ACS data from Czechoslovakia, we take the average of the Slovakia and Czech Republic series.

linearly interpolate missing values over inflation rates or CPI when available.

We summarize the sources of our inflation data in Appendix Table A3.

House-Price Data. We obtain our house-price indices from several sources.

For data in recent years, we use real house-price indices available from the Federal Reserve Bank of Dallas from 1975 onward.[25] From HFCS countries, this includes data from Belgium, Croatia, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Slovenia, and Spain. From the additional ACS countries, this includes Australia, Canada, Colombia, Denmark, Japan, Korea, New Zealand, Norway, South Africa, Sweden, Switzerland, and the United Kingdom.

The house-price index for each country is chosen (by the Dallas Fed) to be most consistent with the quarterly US house-price index for existing single-family houses produced by the Federal Housing Finance Agency, and is seasonally adjusted. With this data, we cannot compare relative house prices across countries so, instead, we compare house-price growth. Using the fourth quarter index values, we calculate annual house-price growth in each country.

We supplement this more recent data with historical data on house prices from Knoll et al. (2017), Jordà et al. (2019), and the Jordà-Schularick-Taylor Macrohistory Database (Jordà et al., 2017). Using these data, we are able to construct measures of lifetime experiences of real house-price growth for 17 countries. From Knoll et al. (2017), we obtain nominal house-price indices for Finland, France, Germany, the Netherlands, Australia, Canada, Switzerland, Denmark, United Kingdom, Japan, Norway, and Sweden. From Jordà et al. (2019), we obtain the nominal capital gain on housing for Belgium, Italy, and Spain. From the Jordà-Schularick-Taylor Macrohistory Database (Jordà et al., 2017), we obtain the nominal house-price index for Ireland. We convert the nominal house-price data to real house-price growth using the inflation data described above.

For Portugal, the only country with long-run historical data not in the Federal Reserve data, we use recent data on nominal house-price growth from the Bank of Portugal, which we convert to real terms using the inflation data.

We linearly interpolate over the house-price indices to fill any gaps in the series.

These sources for historical real house-price data are also in Appendix Table A3.

[25] The authors acknowledge use of the data set described in Mack et al. (2011).

Finally, when we control for current macroeconomic conditions with real house-price growth, we use additional data on real house-price growth from Eurostat to fill data for the survey years in the HFCS countries for which the house-price data described above is not available.

Macroeconomic Indicators. To control for other macroeconomic experiences, we collect data on three other indicators for which sufficient historical data is available for our sample countries. We obtain historical real GDP per capita from the Maddison Project Database (version 2020) (Bolt and Van Zanden, 2020).[26] We obtain nominal long-term interest rates from the Jordà-Schularick-Taylor Macrohistory Database (Jordà et al., 2017), which we convert to real rates using our constructed inflation series. And we calculate employment rates from the Penn World Tables (Feenstra et al., 2015) as the total number of persons engaged divided by the total population. When available, this data starts only in 1950.

For each of the data series, we linearly interpolate over any missing data years.

Housing Market. We obtain country-level measures of housing-market characteristics as of approximately the time of the ECB surveys, summarized in the middle columns of Appendix Table A1. We normalize all comparative housing market measures to have a mean of 0 and variance of 1 in our sample.

From Andrews et al. (2011), we obtain comparative measures of tenant protection, rent control, and tax benefits to homeowners, as well as transaction costs calculated as the average cost associated with purchasing a home. We obtain annual price-to-rent ratios from the OECD for 11 of the HFCS sample countries. The baseline for each country is set equal to the country's long-run average price-to-rent ratio, where long-run is defined as starting in 1980 or all available data if the data begins after 1980.

3.2 Measures of Exposure to Past Inflation

To measure past inflation experiences, we calculate the weighted averages of annual inflation over each individual's life so far. We follow prior literature in incorporating recency bias by

[26] For the Maddison data shown graphically, sources include Stohr (2016), Kammerer et al. (2012), Prados De la Escosura (2017), Baffigi (2011), Fukao et al. (2015), Grytten (2015), Schön and Krantz (2016), the Total Economy Database (TED) published by the Conference Board, and the US Census Bureau's International Database.

assigning experiences in the most recent past the highest weights. In our main specification, we let weights decrease linearly down from the year before the survey to zero at birth. That is, experienced inflation of household i as of year t is

$$\pi_{i,t} = \frac{\sum_{k=1}^{age_{i,t}-1} w_{i,t}(k)\pi_{t-k}}{\sum_{k=1}^{age_{i,t}-1} w_{i,t}(k)} \quad \text{with weights} \quad w_{i,t}(k) = age_{i,t} - k.$$

In a robustness check, we implement a modified version of Malmendier and Nagel (2016), where individuals use their past inflation experiences to recursively estimate an AR(1) model of inflation to generate one-year inflation forecasts, and extend it to longer forecasting horizons appropriate for homeownership decisions.[27]

For HFCS households, we calculate these measures using the past inflation of their country of residence. For ACS households, we use inflation in their birth country from the year of birth to the year of immigration to the US, and US inflation thereafter.

Table 2 shows the summary statistics of actual historical inflation from 1930-2018 for each of the HFCS countries as well as experienced inflation of all households in each country (of origin) in the HFCS and ACS data. Both rates average in the single digits for the majority of countries. While about 30% of countries feature much higher rates, the respective populations account for a small fraction of the sample, as illustrated in Figure 3. The left panel shows the distribution of lifetime average inflation for HFCS households. While the vast majority of households (88% unweighted and 92% of the weighted sample) has experienced inflation under 10%, the distribution has a long right tail. (Appendix Figures A2 and A3 show the country-by-country histograms.) To reduce the influence of these outliers in our analyses, we apply a log transformation to the household measure of experienced inflation, $\ln(\pi)$. The resulting distribution is shown in the right panel of Figure 3 for the HFCS sample.

We note that, relative to alternative approaches that also address the influence of outliers, like winsorizing the data, the log transformation still allows for differences between individuals at high inflation levels to affect the estimation. The embedded non-linearity is

[27] The AR(1) model is not immediately applicable here as homeownership decisions are likely based on beliefs about inflation over longer periods, and extending the AR(1) model to a long-term inflation forecast requires taking a stance on the relevant forecast horizon (e.g., inflation over 5, 10, 20 years) as well as how individuals forecast forward, e.g., whether they iterate the AR(1) forward, apply the 1-year forecast to all future periods, anticipate learning in the future, etc. For these reasons, we leave this approach as a robustness exercise, see Appendix Section D.

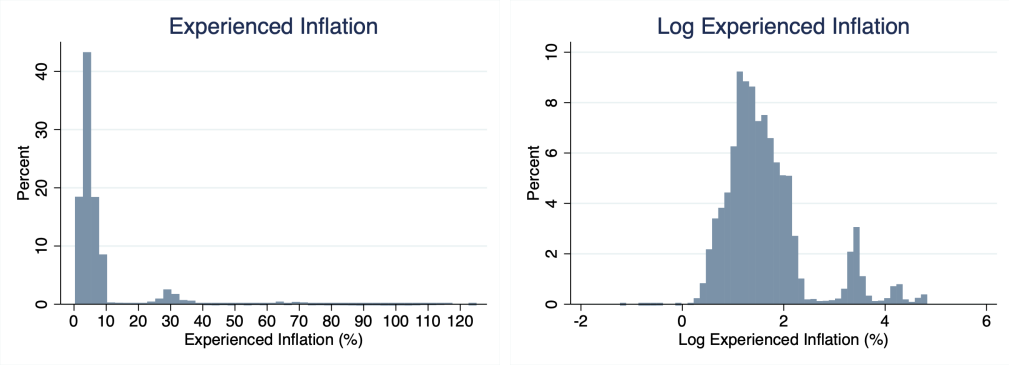


Figure 3. Distribution of Experienced Inflation

Histograms plot the distribution of experienced inflation (left) and log experienced inflation (right) in the HFCS sample.

psychologically appealing as differences at low inflation levels (e. g., 2% vs. 5%) intuitively matter more than same-size differences at high inflation levels (say, 12% vs. 15%). Finally, we may also want to underweight differences at high inflation levels since there is likely more measurement error during times of rapid inflation. Empirically, we find the log specification to be a good fit for the data, which we discuss more below.

Table 2 also reveals that, in some countries, inflation histories experienced by the current population differ substantially from the long-term historical averages. For example, while inflation in Italy averages at 11.3% over the last 90 years, the weighted average of inflation the Italian population has been exposed to over their respective lifetimes is only 4.9% in the HFCS data. Vice versa, the lifetime experiences of people in Lithuania have been higher (31.5% in the HFCS) than average historical inflation (19.8%). The same pattern is visible in the ACS data, albeit with some common exposure to US inflation folded into the average. Across individuals in all countries, experienced inflation averages at 6.3% in the HFCS sample and 7.1% in the ACS sample of immigrants from the HFCS countries.

We construct parallel measures for house prices and other macroeconomic experiences. As described in Section 3.1, the data here is more limited. In analyses with these alternative experiences, we limit the samples to years and age ranges for which we can construct complete lifetime experience measures.

We note one assumption implicit in the construction of our measures, namely, that we allow households to continuously update based on their experiences and to re-evaluate their tenure status. An alternative assumption is that, once a household has purchased a home,

they will not re-evaluate their tenure status based on their most recent inflation exposure, i. e., that homeownership is sticky. In Section H, we use SHARE data, which identifies when individuals first become homeowners, to test whether prior experiences predict when individuals first purchase their home.

4 Empirical Analysis

In this section, we test the predictions derived in Section 2. First, we demonstrate that households who have lived through periods of higher inflation are more likely to be homeowners (Prediction 1) within and across European countries using the HFCS data. We then show that the relationship with experienced inflation is weaker in countries with predominantly variable-rate financing (Prediction 2) and in married households with mixed experiences. Finally, we test Prediction 3 on the relationship between experienced house-price growth and ownership. To further separate experienced inflation from other macroeconomic experiences, we show that the impact of experienced inflation is robust to controlling for experiences of real GDP per capita, real long-term interest rates, and employment in addition to current macroeconomic conditions.

The HFCS sample provides for variation across housing markets and allows us to test all three predictions and the additional implications of the model outlined in Section 2. The ACS data does not provide for variation across housing markets, so we cannot test Prediction 2, nor the conjecture about the correlation between inflation and home-price growth affecting the strength of experience effects. However, the ACS analysis of tenure decisions in the same housing market not only shows the robustness of the other findings and implications in a different sample, but also addresses concerns about confounding general equilibrium effects that may cause housing markets to systematically vary with macroeconomic experiences.

4.1 Within and Across European Markets (HFCS)

Aggregate stylized facts. Before leveraging the wealth of information in the household-level HFCS data, we examine whether Prediction 1 holds in the aggregate: Does the population average of inflation experiences predict aggregate homeownership across countries? We collapse the HFCS data into country averages, using the survey weights representative of

the population. We then weight countries by average population across survey years (from the World Bank).

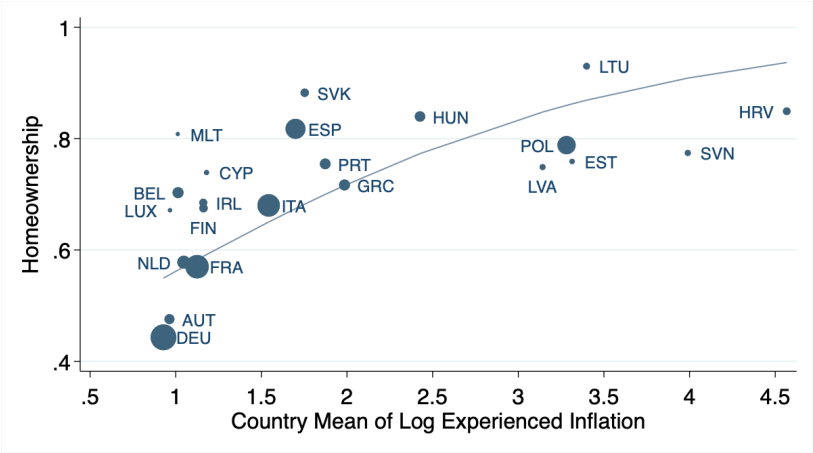


Figure 4. Aggregate homeownership rates by experienced inflation

Scatter plot of country average of log experienced inflation (x-axis) and homeownership rate (y-axis). Size indicates relative population. Line shows the population-weighted logit fit of a regression of homeownership on country average of log experienced inflation.

Figure 4 shows the resulting relationship graphically. The scatter diagram plots the country averages of log household experienced inflation on the x-axis and homeownership rates (percent of households living in owner-occupied housing) on the y-axis, where the size of a point is proportional to the population. The plot reveals a positive relationship between experienced inflation and homeownership, which we confirm by fitting a logit regression to the country-level averages (estimated odds ratio of 1.99 (s.e. 0.43)). The scatter plot also validates the choice of a log transformation to measure experienced inflation. In addition to minimizing the influence of high-inflation outliers, it accounts for non-linearity in the relationship between homeownership and experiences. (We will discuss the empirical fit of the log specification more below.)

The magnitude of the estimated correlation is large. For example, the roughly one log-point increase in experienced inflation in Greece relative to the Netherlands is associated with a 14 pp higher homeownership rate. This correlational evidence motivates the controlled individual-level analyses that follow.

Testing Prediction 1: Household inflation experiences and homeownership. Turning to the detailed household-level data, we relate individual differences in past exposure to inflation to homeownership, controlling for household characteristics, housing market features, and other time- and country-specific effects. In these analyses, we have variation in experiences both across individuals in different countries and also across individuals within a country, by age and survey year.

The dependent variable is a binary indicator of whether the household owns their primary residence.[28] The key independent variable is the log of household experienced inflation, calculated using the household head's age, country, and survey year as described above.

We control for a rich set of demographics that are plausibly related to homeownership including gender, having children, marital status, educational attainment, employment status, decile of net wealth, and decile of household gross income.[29] In addition, we include different sets of controls and fixed effects that remove potential confounds but also valid sources of variation in experienced inflation, namely, combinations of controls for age, survey wave (time), and cross-country differences. Age, time, and country are, on the one hand, the primary sources of identifying variation in experienced inflation. On the other hand, they are also the source of confounds. For example, in our analyses controlling for age and survey wave, we remove the average differences in experiences across age groups and over time, but also common lifecycle and global market changes. In our analyses with country fixed effects, we remove a key source of variation in country-specific average experiences, but also cultural and market differences that may affect homeownership. As we show, even with all of these controls, there is remaining variation in experiences within a country over time. (See Appendix Section E for a discussion of the sources of variation in experienced inflation using the comparison of Germany and Greece as an illustrative example.)

We use the HFCS multiple-imputation data and the corresponding estimation techniques from Rubin (2004) to include the full imputed sample in our analyses, despite some households having missing data. In all analyses, we use the HFCS household weights that are representative of each country and the EU population (inverse probability of being sampled and non-response).

In Table 3, we report the odds ratios and standard errors from logit regressions, where

[28] Our main results also hold if we define the dependent variable as owning any property.
[29] Wealth and income are converted to 2010 euros, and deciles are calculated across the entire sample.

we vary the set of controls and fixed effects to be increasingly stringent.[30] Coefficients are shown as odds ratios (exponentiated coefficients), so that an estimate above 1 indicates a positive relationship and an estimate below 1 a negative relationship. Standard errors for analyses of the HFCS data are clustered at level of variation in experienced inflation, namely the country × cohort × survey-wave level.

In column (1), we start from a model that includes demographic controls, but none of the controls or fixed effects that also capture variation in experienced inflation, i. e., age, time (survey wave), or country. We estimate a strong and highly significant relationship between experienced inflation and homeownership, with an odds ratio of 2.71. The estimated relation remains very similar when we include a quadratic effect of age (i.e., age and age squared) and control for time with survey wave fixed effects in column (2), with an odds ratios of 2.83. Applied to the average homeownership rate of about 65% in our sample, these ratios imply that a 1 log-point increase in experienced inflation (e.g., from 2% to 5.4%) predicts an increase in the odds ratio to 5.03-5.26, which corresponds to an 83-84% probability of ownership, or an increase of 18-19 pp.

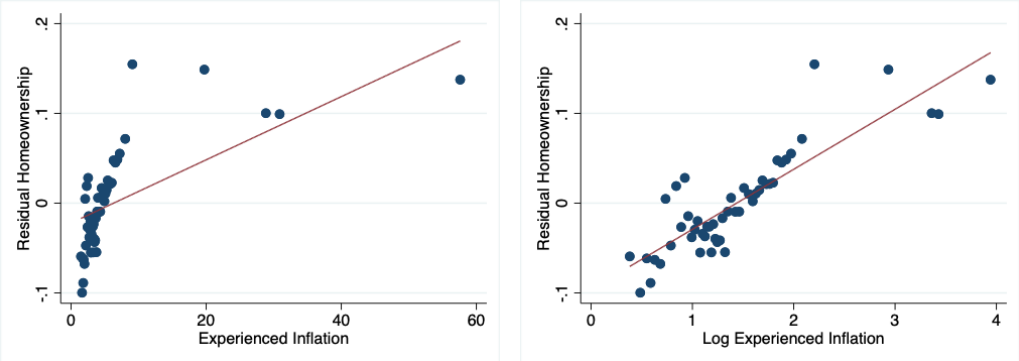
The robustness of the estimates across these two specifications indicates that, after removing average accumulated experiences at a given age and at a given point in time, there is still sufficient identifying variation to estimate the relation between inflation experiences and homeownership off of deviations from the average age profile across countries and over time, and of deviations from the average time profile across countries and age groups.[31] In fact, we report (at the bottom of Table 3) the R^2 from a regression of log experienced inflation on all control variables and fixed effects in the specification. Adding quadratic age controls and time fixed effects, the R^2 only increases from 0.29 to 0.36, leaving substantial variation in experiences that is orthogonal to our controls.

Before turning to the estimations with additional sets of fixed effects, we utilize the regression model of column (2) to probe the log transformation of our experience measures. In Figure 5, we show binned scatter plots of homeownership and experienced inflation, controlling for household demographics and variation over time. Specifically, we calculate residual homeownership as the difference between actual and the predicted probability of homeown-

[30] The results are robust to probit and OLS specifications.

[31] For example, in a country where inflation has increased over time, younger cohorts will have higher experienced inflation than older cohorts, while the opposite is the case in a country where inflation has decreased over time.

ership (based on the logit regression from column (2)). Figure 5 plots the average residual homeownership by bins of (a) experienced inflation and (b) log experienced inflation, with the linear fits plotted in red. The data show a non-linear relationship, with residual homeownership increasing steadily up to about 10% experienced inflation, after which the relationship flattens. As show in (b), the log relationship fits the data well.



(a) Experienced Inflation (b) Log Experienced Inflation

Figure 5. Binned Scatter Plots of Residual Homeownership and Inflation Experiences (HFCS)
Binned scatter plots of measures of experienced inflation (x-axis) and residual homeownership (y-axis) in the HFCS data. In both plots, residual homeownership is calculated as the difference between actual homeownership (1 or 0) and the predicted likelihood of ownership estimated from a logit regression of ownership on all demographic controls and survey-wave fixed effects. The x-axis is experienced inflation in (a) and log experienced inflation in (b). Households are divided into bins by ranking of their experienced inflation level. For each bin, we plot the average of the x- and y-axis variables. Line shows the linear fit. All calculations are weighted by the HFCS representative weights.

We now turn to estimations that include additional sets of controls and fixed effects to address the concerns about confounds due to country-specific differences in housing markets. We start from including country-level measures of tenant protection, rent control, tax benefits to homeowners, buyer transaction costs, and price-to-rent ratio in column (3).

We continue to estimate a large relationship: a one log-point increase in experienced inflation is associated with an increase in ownership from 65% to 85%. (Note that the sample in this column differs as the controls are available for only 11 of our 22 countries.[32]) The new controls also allow us to benchmark the estimated magnitude: From a baseline of 65%, one standard deviation increase in rent control is associated with a decrease in homeownership down to 58%; in tax benefits with an increase in homeownership to 74%; in

[32] In this subsample, the estimated odds ratio is 5.54 without housing market measures.

buyer transaction costs with a decrease in homeownership to 60%; and in price-to-rent ratio with a decrease in homeownership to 60%. Controlling for the other factors, a one standard deviation increase in tenant protection does not affect homeownership. In other words, the roles of these housing-market features are similar or smaller in magnitude than the role of inflation experiences. We also note that these housing-market conditions themselves might be a function of aggregate inflation experiences. For example, countries with low inflation histories might have strong rental markets with tenants lobbying for more protections and rent control. Indeed, the R^2 from the regression of log experienced inflation on the controls is 0.82 in this specification, leaving less experience-induced variation to predict homeownership.

In column (4), we return to the full set of countries and control for contemporaneous macroeconomic conditions that may influence homeownership across countries and over time. Controlling for inflation, real house-price growth, real GDP per capita, and employment in the survey year, experienced inflation is still significantly correlated with homeownership: a one log-point increase in experienced inflation is associated with an increase in homeownership from 65% to 75%. This effect is large also when benchmarked against the additional macroeconomic controls. For example, a one log-point increase in experienced inflation predicts an increase in homeownership about three times as large as a one standard deviation increase in current inflation and real house-price growth. (In this specification, the R^2 from the regression of log experienced inflation on the controls is 0.72. This implies that there is moderate remaining variation in experiences, but significantly less than the specifications in columns (1) and (2).)

Next, we address concerns about unobserved differences across regions, such as the historical influence of communism in Eastern Europe. In column (5), we include regional fixed effects for the Baltics (Estonia, Lithuania, Latvia), other Eastern countries formerly in the Soviet sphere of influence (Croatia, Hungary, Poland, Slovakia, and Slovenia), and the Western countries.[33] While controlling for average differences in homeownership across regions, this specification still allows for variation in experiences across countries within a region. We find that a one log-point increase in experienced inflation is associated with an increase in homeownership from 65% to 79%.

In columns (6) and (7), we go one step further and eliminate any country differences

[33] In Appendix Table A4, we show that our results are robust to excluding the Baltics and other Eastern countries, with or without Germany.

as a source of identification by including either country and time (i. e., survey-wave) fixed effects, or even country × survey-wave fixed effects. These specifications remove average differences in homeownership across countries or country-waves. As such, they also eliminate the average differences in experienced inflation across countries (or country-waves) as a source of identification and only tests whether inflation exposure predicts homeownership *within*-country. Given the relatively short sample period, we thus have little remaining variation in inflation experiences; the R^2 from the regression of log experienced inflation on the demographic controls and these fixed effects is 0.96 in both columns, leaving much less variation that is orthogonal to the controls.

In these specifications, the estimated odds ratios of experienced inflation are 1.07 and 1.18, respectively, and either insignificant or (in the more stringent country-wave fixed effects specification) significant at the 5% level. In terms of economic magnitude, a one log-point increase in experienced inflation is associated with an increase in the odds of homeownership by 2% and 4%, respectively.

In summary, we estimate a significant correlation between individuals' exposure to past inflation and homeownership in almost all specifications. The magnitudes vary across the empirical models reflecting the different sources of identifying variation. The estimated 18-19 pp increase in columns (1) and (2) provides an upper bound if experienced inflation is confounded with other cross-country determinants of homeownership; but it is also conceivable that these other determinants themselves are influenced by inflation experiences (as in the low inflation/strong tenant market example above) and that we would want to include their influence in our estimates. The estimates with country-wave fixed effects in column (7), instead, remove a substantial portion of the meaningful variation in inflation experiences across countries. We interpret the estimated 4 pp increase as a lower bound of the true relationship between experienced inflation and homeownership. Finally, the specification in column (4), which controls for current macroeconomic conditions including inflation and real house-price growth, strikes a middle ground. It allows us to use variation in experienced inflation of people across countries with similar macroeconomic conditions at the time of the survey. Coincidentally, the magnitude of this estimate falls almost in the middle of the two extremes; a 1 log-point increase in experienced inflation predicts a 10 pp increase in homeownership. In standard deviation units, a one standard deviation increase in log experienced inflation predicts an 8 pp increase in homeownership (see column (1) of Appendix Table D1).

Illustration. Before we move on to the additional predictions and implications of the experience-effect hypothesis, we illustrate the magnitude of the estimated associations by calculating the implied counterfactual homeownership rate if a country had had a different inflation history. The hypothetical counterfactual abstracts, of course, from general equilibrium considerations and serves merely as a back-of-the envelope calculation, though we do account for differences in population age structures and the macroeconomic conditions at the time of the survey. For this exercise, we apply the estimate from column (4) of Table 3.

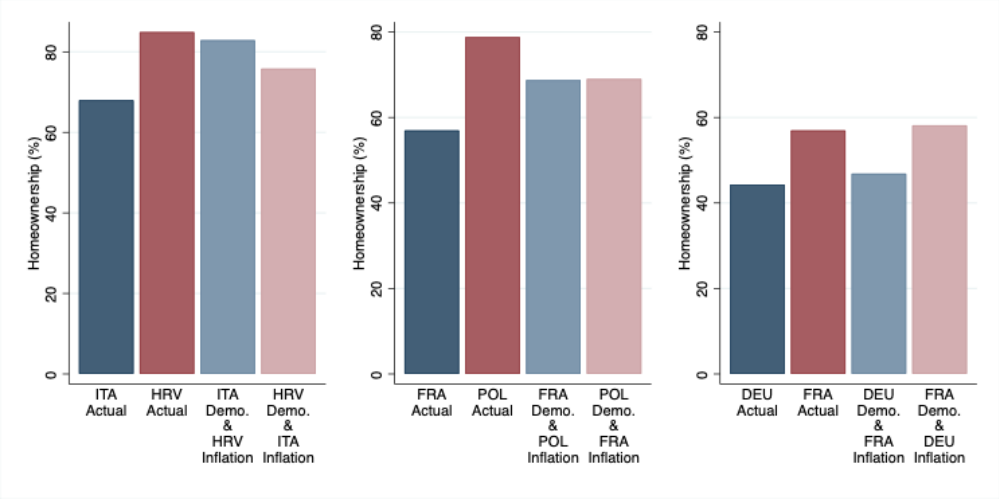


Figure 6. Hypothetical homeownership rates with alternate inflation histories

Actual homeownership from the HFCS data. Hypothetical homeownership rates calculated using the model estimated in Table 3, column (4), assuming another country's inflation history.

Figure 6 provides three examples. The left panel shows how homeownership in Italy and Croatia would change if we switched their inflation histories. Italy has moderate homeownership of 68% (first bar) and a correspondingly moderate inflation history, while Croatia has much higher homeownership of 85% (second bar) and and a high inflation history. Had Italians experienced Croatia's inflation history, our estimates would predict a substantial 15 pp increase in homeownership (third bar). Likewise, had Croatia had Italy's inflation history, we would predict a 9 pp drop in homeownership (fourth bar). Homeownership rates in both countries would thus be substantially closer.

As a second example, consider France and Poland, shown in the middle. Their homeownership rates differ by 22 pp. Our model predicts that the gap would completely close if each country had the other's inflation history.

Finally, we pick an example where the hypothetical change in inflation histories would neither switch nor even out the cross-country differences in homeownership. For Germany and France, our model predicts that a large gap in homeownership would persist if inflation histories were switched. Even here, though, we see a substantial role of experienced inflation, with an 11% reduction in the homeownership gap.

Within-Household Heterogeneity in Inflation Experiences. The hypothesis that past experiences shape beliefs and household financial decisions has several additional implications for homeownership decisions. One is that the predictive power of past inflation experiences of the household head should be weaker when decisions are made jointly by two people with potentially different experiences, e. g., in couples. This prediction further distinguishes the experience-effect hypothesis from alternative explanations. If the correlation between experiences and homeownership is driven by unobserved correlations with market factors or financing opportunities, it is not clear why the relationship would vary across single and married household heads.

In column (1) of Table 4, we test this hypothesis by interacting log experienced inflation with an indicator for being married. We limit the sample to married and single households heads, excluding those who are widowed or divorced. We find that indeed the estimated odds ratio on the interaction between experienced inflation and married is less than 1, implying that the effect of experienced inflation is weaker among married household heads.[34]

Testing Prediction 2: Access to Fixed-Rate Financing. Another prediction of the model is that the relation between inflation histories and homeownership is weaker in countries with variable-rate mortgage financing. Homeownership still provides an inflation hedge in that case, but mortgage financing is not perceived as more advantageous by those who have lived through periods of high inflation. Instead, all potential home buyers agree on the (real) cost of mortgage financing.

[34] We note that this result does not replicate in the ACS data, discussed in Section 4.2. Here the pattern reverses, possibly because the marital status of immigrants reflects an unobserved level of commitment to a future in the US. If single immigrants are less likely to plant roots, they will be unlikely to buy a home, regardless of their inflation experiences. Indeed, only 32% of singles own in the ACS data, compared to 53% in the HFCS data. Singles are also significantly less likely to become US citizens; 50% of married household heads but only 30% of singles have been naturalized.

We test this prediction by including the normalized measure of the prevalence of variable-rate mortgages (PVR) as well as its interaction with households prior exposure to inflation in column (2). We find that while inflation experiences continues to predict an increased likelihood of homeownership, the effect is attenuated in countries with higher PVR, as indicated by the estimated odds ratio below 1 for the interaction.

As discussed in Section 3.1, PVR is an imperfect measure of supply. For example, the composition of mortgages might affect *access* to financing and thus the homeownership rate. Or, vice versa, homeownership rates might influence the composition of mortgages in a country, e. g., if marginal homeowners are more likely to have variable-rate mortgages. Both channels could explain the positive coefficient estimate on the level effect of PVR (in column 2). At the same time, these channels and confounds are unlikely to affect the interaction effect of PVR and inflation experiences. That is, while the available data does not allow us to distinguish between the above-mentioned (and other) channels, the interaction coefficient corroborates the hypothesis that past inflation histories have significant influence on the composition of real-estate markets within and across countries.

Testing Prediction 3: House-Price Histories and Homeownership. In addition to experienced inflation, prior experiences to rising or falling real-estate prices, on top of inflation, may also predict homeownership (Prediction 3). As illustrated in the model in Section 2, and consistent with findings in the literature (Kuchler and Zafar, 2019), households that have lived through periods of high real house-price growth might believe that house prices will continue to grow in the future and therefore value ownership. Experienced real house-price growth may also influence preferences for homeownership, in addition to beliefs.

Historical data on house prices is scarcer than historical data on inflation and only allows us to construct a measure of experienced real house-price growth for 9 of the HFCS countries. We further limit this analysis to household heads age 20-68 in order to construct complete lifetime experience measures for the entire sample. We do not apply the log transformation since, unlike experienced inflation, a non-negligible fraction of households have experienced *negative* real house-price growth (see Appendix Figure A4). We standardize all experience measures within the sample so that we can compare magnitudes.

To ensure that the analysis of house-price experiences and its comparison to the (general) inflation experiences are not affected by the more restricted data, we first replicate our main

results on the subsample with available house-price data. As shown in column (1) of Table 5, our estimation results are robust. A one standard deviation increase in log experienced inflation predicts an increase in ownership from 65% to 80%. This magnitude is larger than in the full sample, with an estimated odds ratio of 2.10 compared to 1.44 under the same specification (with the standardized experience measure) in the full sample, as shown in column (1) of Appendix Table D1.

Turning to the explanatory factor of interest, in column (2), we add the measure of real house-price growth experiences. We find that homeownership is significantly predicted by past house-price growth experiences, consistent with Prediction 3. The estimated magnitude is meaningful, albeit smaller than that of experienced inflation. We find that a one standard deviation increase in experienced real house-price growth predicts an increase in the probability of homeownership from 65% to 70%. The effect of experienced inflation remains larger and statistically significant.

Why is the relation between ownership and real house-price experiences weaker than that with inflation experiences? After all, prior exposure to price changes in the housing market seems most relevant to beliefs about future home prices. Since the magnitude on the inflation-experiences coefficient remains similar to the full sample, we have no reason to believe that the weaker relationship is due to the more limited sample.

One possible explanation could be their direct impact on affordability: fewer people can afford to become homeowners when they have lived through periods of high house-price growth and housing is more expensive. However, as we will show in our analyses of the ACS data, differences in affordability cannot fully explain the weaker relationship with house price experiences as we see the same pattern among immigrants to the US (see Section 4.2).

Another possibility, then, is that inflation-hedging truly outperforms speculation based on real house-price growth as a motivating factor for home purchases. After all, that is precisely what with the findings in our survey suggest: More respondents consider inflation protection and rent-price increases good reasons to buy a home than they do house-price increases (see Figure 2). One reason for the focus on general inflation, rather than real house-price changes, could be that households are more familiar with the prices of goods frequently purchased and pay relatively little attention to changes in house prices (cf. D'Acunto et al. (2021) and Georganas et al. (2014)). If anything, they may be aware of the price appreciation of their prior home, a parent's home, or, as in Bailey et al. (2018), of their friends' homes. Moreover,

renters may pay even less attention to housing markets (consistent with the findings of Adelino et al. (2018)), attenuating the impact of house-price experiences on transitions from renter to owner. As a result, inflation could plausibly have a larger impact on beliefs about, or affect preferences for, inflation protection. In fact, in the (limited) data on expectations in the HFCS, we find no relationship between house-price experiences and house-price expectations, nor between inflation experiences and house-price expectations, but confirm that inflation experiences significantly predict inflation expectations. (See Appendix Section F for a more detailed discussion.) Given our limited expectations data in the HFCS, and the contrast with existing findings (Kuchler and Zafar, 2019), we leave it for future work to fully explore the links between experiences and expectations.

A similar logic applies to the preference channel. People who have lived thorough high inflation and seen family members unable to pay their rent may have a stronger desire to protect themselves from high inflation in the future. For the reasons described above, these preference channels may be stronger for experienced inflation than house-price growth. In fact, the weak link between housing market experiences and preferences for homeownership is consistent with survey evidence from the US after the Great Recession, which suggests that housing market experiences are correlated with beliefs, but not with preferences for homeownership (Collins and Choi, 2010; Drew and Herbert, 2013).[35]

All of these explanations for the weaker explanatory power of house-price experiences on housing decisions would be interesting to explore if data becomes available. In either case, inflation histories emerge as a strong influence on tenure decisions, even after taking house-price growth into account.

Correlation between inflation and real house-price growth. The house-price data allows us to test an additional implication of the experience-effects model, which we discussed in Section 2. Namely, if households use inflation experiences to inform expectations about future real house-price growth, then we should see a stronger relationship between experienced inflation and homeownership in countries with a more positive (or less negative) correlation between inflation and real house-price growth.

To test this, we estimate the correlation between inflation and real house-price growth

[35] Collins and Choi (2010) find that local foreclosure rates predicted renters' expectations about future price growth and foreclosure rates, but not intentions to buy a home in the future. Drew and Herbert (2013) do not find strong correlations between house-price experiences and preferences for ownership.

from 1976-2007 (the year prior to the start of the HFCS surveys), in the 12 countries for which we have recent house-price data. We include this correlation in our baseline specification and interact it with our measure of experienced inflation (column (3) of Table 4).

As predicted, experienced inflation is a stronger predictor of homeownership in countries with a higher correlation between inflation and real house-price growth. However, we note that this finding is specific to recent measures of the correlation between inflation and real house-price growth. The results do not replicate in the smaller subset of countries for which we can calculate long-run correlations between π and g (starting in 1926) and corresponding individual lifetime experiences of the correlation.

Other Macroeconomic Histories and Homeownership. In addition to inflation and house-price experiences, other macroeconomic experiences may influence homeownership. As with house-price data, the challenge in controlling for these experiences is in having sufficient long-run data to calculate measures of lifetime experiences.

In column (3) of Table 5, we include measures of experienced real GDP per capita and real long-term interest rates, which are available for the entire subsample with experienced real house-price growth. We find that experienced inflation is the strongest predictor of homeownership, with a one standard deviation increase in log experienced inflation predicting an increase in homeownership from 65% to 76%. The correlation with experienced real house-price growth remains similar to that estimated in column (2). We estimate a significantly negative relationship between experienced real GDP per capita, with a one standard deviation change correlated with a reduction in homeownership from 65% to 54%. This would be consistent, for example, with experiences of low GDP per capita causing households to invest in a home as opposed to the stock market. We estimate no significant relationship between experienced real long-term interest rates and homeownership.

Appendix Figure A6 shows these relationships graphically with binned scatter plots of residual homeownership and these experience measures.

In columns (4) and (5), we consider another subsample (14 HFCS countries) for which we can calculate measures of experienced employment rates. Employment data is available only from 1950, so we limit this analysis to households aged 20-55. We first replicate our main result in column (4); the relation between experienced inflation and homeownership remains similar (odds ratio of 1.90). In column (5), we add experienced real GDP per capita

and the experienced employment rate. We find that a one standard deviation increase in experienced employment rates is associated with an increase in predicted homeownership from 65% to 77%. The magnitudes of the relationships with experienced inflation and real GDP per capita are similar to the other specifications.

There are several hypotheses for the observed relationships between homeownership and macroeconomic experiences, which we discuss below after estimating similar relationships in the ACS data. The key conclusion we draw from this table is that the magnitude of the relationship between inflation experiences and homeownership remains stable across specifications, ruling out these other macroeconomic experiences as driving the observed relationship.

Overall, the results in this section demonstrate that there is a significant relationship between inflation experiences and homeownership, even after controlling for a rich set of demographics, differences across housing markets, current macroeconomic conditions, and other macroeconomic experiences.

4.2 Within the US Housing Market (ACS)

The cross-country nature of the analysis of the previous section is a strength in that it provides variation in macroeconomic experiences along multiple dimensions and allows us to test more subtle predictions of the model about differences across housing markets – both of which help to support the hypothesis that inflation experiences influence homeownership choices. It also presents a challenge in differentiating inflation experiences from other cross-country differences. In this section, we address these concerns by comparing immigrants to the US with different experiences who make tenure choices in the same housing market, using the American Community Survey (ACS).

Testing Prediction 1: Household inflation experiences and homeownership. We start from testing whether there a positive relationship between past inflationary periods that immigrants to the US have experienced and their likelihood of becoming a homeowner, even after they have left their home country and face an *identical* housing market in the US.

In these analyses, we consider several samples. First, to compare most directly to the HFCS results, we limit the analysis to immigrants to the US from our HFCS countries. The

data also allow us to expand the analysis to include immigrants from other countries with potentially more diverse experiences. In the second set of analyses, we expand the sample to include immigrants from other high-income countries, like those in the HFCS. Finally, we expand the analysis to the broadest set of countries with available inflation data.

In Table 6, we report the results from logit regressions of homeownership on past exposure to inflation. As with the HFCS data, we apply a log transformation to the lifetime weighted average of experienced inflation. Unlike the HFCS data, we have a large number of outliers of immigrants who have lived through very high inflation. For example, in the full set of ACS countries, 28% have experienced inflation above 10, compared to 8% in the HFCS data and 10% of ACS immigrants from HFCS and other high-income countries. To minimize the influence of these very large outliers, we winsorize our measure of experienced inflation at 10% prior to taking the log transformation. Additionally, there are a small number of immigrants with experienced deflation. For these immigrants, we winsorize experienced inflation at the smallest positive value prior to applying the log transformation. We include indicators for these immigrants capped above and below.[36]

In all regressions, we control for age and age-squared, gender, educational attainment (below high school, high school, and four or more years of college), employment status (employed, unemployed, and not in the labor force), marital status (single, married, widowed, or divorced), whether the household head is married to a US native, has children living in the home, and the decile of household income, where income is adjusted for inflation over the survey years and deciles are calculated out of our entire ACS sample (including US natives). In addition to the demographic controls, we control for years lived in the US (years and years-squared), English proficiency (English only, speaks very well, well, and not well/none), and citizenship status (naturalized, born to American parents, and non-citizen). In regressions with the full set of countries, we also include indicators for the country-of-birth income level. In all regressions, we include fixed effects for the survey year. We equal-weight all immigrants in the sample and report standard errors clustered at the level of variation in experienced inflation, by country-of-birth $\times$ cohort $\times$ immigration year $\times$ survey year.

In columns (1) to (3) of Table 6, we first analyze the data for immigrants from the HFCS

[36] In Appendix D, we show the robustness of our results to alternative ways of adjusting for outliers. Specifically, rather than applying the log transformation, we winsorize inflation in each year before averaging or winsorize experienced inflation at the 95th percentile.

countries. In column (1), we find that a one log-point increase in experienced inflation predicts a 30 pp increase in the odds of ownership among immigrants to the US, or an increase from 65% to 71%.

In column (2), we include as an additional control the homeownership rate among other (non-immigrant) households in the same state, metropolitan status, and year.[37] This estimation addresses the concern that the positive estimate of past exposure to inflation might be explained by immigrants with higher inflation experiences moving to places in the US with higher homeownership rates. The coefficient estimate of the additional control confirms that immigrants are indeed more likely to own a home if they move to a place with a higher homeownership rate. However, conditional on the (native) homeownership rate in their location and year, immigrants with higher experienced inflation are still more likely to own a home. In fact, the magnitude and significance of the coefficient remain very similar.[38] Appendix Figure A7 shows this relationship graphically with binned scatter plots of residual homeownership and log experienced inflation for this and the parallel specifications in columns (5) and (8).

In column (3), we find that the results are similar when including country-of-birth fixed effects. In this specification, we are identifying the relationship with experienced inflation solely off of differences in personal exposure across household heads born in the same country. Unlike the HFCS data, where the inclusion of country fixed effects removed a significant fraction of the identifying variation, the ACS data provides substantial variation in inflation experiences after controlling for country of birth, based on the time of immigration to the US. The R^2 from the regression of the winsorized measure of log experienced inflation on the controls in this specification is 0.64 (compared to 0.96 in the HFCS specification with country fixed effects).

The odds ratio of 1.37 implies that a one log-point change in experienced inflation is associated with an increase in ownership from 65% to 72%, or an increase of 7 pp. We note that this magnitude is in the range of those estimated using the HFCS data, despite the rather

[37] Metropolitan status has 5 levels: (1) in metropolitan area and in central/principal city, (2) in metropolitan area and not in central/principal city, (3) in metropolitan area and central/principal city status indeterminable (mixed), (4) not in metropolitan area, and (5) metropolitan status indeterminable (mixed).

[38] The results are robust to including finer geographic controls (county fixed effects) instead of the non-immigrant homeownership rate. With few immigrants per county in many cases, we leave this as a robustness exercise.

different context (European inhabitants versus immigrants to the US). The predicted 7 pp change is slightly smaller than the 10 pp estimate controlling for macroeconomic conditions in the HFCS analysis. This might reflect that country-of-birth fixed effects in the ACS analysis are controlling for cross-country differences beyond the macroeconomic context, like cultural differences. The 7 pp change is slightly larger than the 4 pp estimate in the model with country-time fixed effects in the HFCS. This might reflect that the country-fixed effects remove additional (possibly valid) identifying variation in average experiences across countries. In the ACS, the additional source of variation in experiences based on the timing of immigration allows us to better separate differences in macroeconomic experiences from other cross-country differences.

In columns (4) to (6), we expand the sample to include immigrants from 17 other high-income countries. The magnitude of the estimated association is similar to those in the sample of HFCS immigrants, with odds ratios ranging from 1.31 to 1.56 (compared to 1.30 to 1.37 in the sample of immigrants from HFCS countries). In the specification with country-of-birth fixed effects (column 6), we estimate that a one log-point increase in experienced inflation is associated with an increase in the likelihood of ownership from 65% to 74%, or a 9 pp increase.

Finally, in columns (7) to (9), we further expand the analysis to include immigrants from 18 low-and moderate-income countries. In this broader sample, the estimated relationship between experienced inflation and homeownership varies across specifications. Without country fixed effects, we find no relationship or a negative relationship with homeownership. In the specification with county fixed effects, we estimate a positive relationship with a one standard deviation increase in experienced inflation associated with an increase in ownership from 65% to 67%.

To understand why the results differ among immigrants from low- and moderate-income countries, we explore the relationship between inflation experiences and homeownership in a binned scatter plot in Appendix Figure A8. Among immigrants from high-income countries, homeownership is increasing in experienced inflation up to about 4% after which point it starts to decline slightly. For immigrants from low- and moderate-income countries, we see qualitatively the same pattern, but the decline after 4% is much steeper. Moreover, while few immigrants from high-income countries have experienced inflation above 5%, the majority of immigrants from low- and moderate-income countries have (19% from high-income vs. 61%

from low- and moderate-income).

We hypothesize that very high inflation experiences, especially in low- and moderate-income countries, may be correlated with unobserved household wealth levels. While we can directly control for household wealth in the HFCS data, in the ACS data, we have only household income. Two immigrants may look the same in the ACS data, but one of them who lived through high inflation in a low-income country may have been able to bring substantially less wealth when they came to the US and thus cannot afford to buy a home. We return to the discussion of unobserved wealth effects below when we introduce additional macroeconomic experiences, like GDP per capita. Because of these confounds, we focus our analyses with the ACS data on immigrants from high-income countries, where there is plausibly less variation in unobserved wealth.

Other Macroeconomic Histories and Homeownership in the ACS Data. Mirroring the HFCS analysis, we explore the relationship between homeownership and other macroeconomic experiences including real house-price growth, real GDP per capita, real long-term interest rates, and employment. In all of these specifications, we control for demographics, measures of assimilation, survey year, native homeownership in the same state $\times$ metro status $\times$ survey year, and country-of-birth fixed effects. In these analyses, we standardize the measures of experience in each sample for easy comparison of the magnitudes.

We are able to obtain sufficient data on real house-price growth, real GDP per capita, and real long-term interest rates to calculate lifetime experiences for 14 of the high-income countries in the ACS data. In column (1) of Table 7, we estimate that a one standard deviation increase in log experienced inflation is associated with a 35% increase in the odds of ownership, or an increase in homeownership from 65% to 71%.[39]

In column (2), we add experienced real house-price growth and find no significant relationship with homeownership, while the significance and magnitude of the coefficient on experienced inflation remain unchanged. These results confirm our findings in the HFCS that inflation experiences are a stronger predictor of homeownership than real house-price experiences. Among the possible hypotheses we discussed in Section 4.1 for why this may be the case, the ACS data helps rule out any of the general equilibrium channels, like changes in

[39] In the corresponding estimates from the full high-income sample, shown in column (1) of Appendix Table D2, a one standard deviation increase in log experienced inflation is correlated with an increase from 65% to 69%.

home prices or mortgage rates, since all individuals face the same housing market. Instead, the fact that we find similar results in an entirely different setting lends support to hypotheses that imply true differences in the way that inflation and real house-price experiences translate to beliefs or preferences for homeownership.

In column (3), we add experienced real GDP per capita and real long-term interest rates. Unlike the HFCS data, we estimate a large positive relationship between experienced GDP per capita and homeownership; a one standard deviation increase in experiences is correlated with a 47% increase in the odds of ownership. This reversal between the data sets may reflect the absence of data on household wealth in the ACS. As wealth is likely to vary drastically by country-of-birth and year of immigration, experiences of real GDP per capita might proxy for these differences, and therefore predict higher homeownership. We estimate a smaller but significantly positive relationship between experienced real interest rates and homeownership. As with GDP experiences, living through periods with higher interest rates may be a proxy for more wealth accumulation.

At the same time, the relation between inflation experiences and homeownership remains similar; a one standard deviation increase is associated with a 42% increase in the odds of ownership, or an increase from 65% to 73%. In this specification, we estimate a small but significantly negative relationship between experienced real house-price growth and ownership. Appendix Figure A9 shows these relationships graphically with binned scatter plots of residual homeownership and these experience measures.

Turning to employment experiences, in columns (4) through (9), we focus on samples for which we can calculate GDP and employment experiences (in addition to inflation experiences). Because the employment data starts in 1950, we limit these analyses to immigrants aged 20 to 57. In columns (4) and (5) we include all high-income countries with this data. In columns (6) and (7), we limit to the subset of countries for which we also have historical real house-price growth. Finally in columns (8) and (9), we expand the sample to include low- and moderate-income countries with sufficient data.

Across all specifications, we continue to estimate a significantly positive relationship between homeownership and experienced inflation as well as between homeownership and experienced real GDP per capita. In column (7), we also estimate a positive, but small and only marginally significant relationship between real house-price growth and homeownership. Higher experienced employment rates, however, are associated with lower homeownership

rates. This could be the case, for example, if experiences of unemployment lead to higher rates of savings (as in Malmendier and Shen (2017)) and resulting higher homeownership.

4.3 Robustness

We test the robustness of our main analyses to a number of alternative specifications.

Alternative Measures of Inflation Experience. In Appendix D, we discuss in detail several alternative methods of capturing past inflation experiences, with the corresponding estimation results shown in Appendix Tables D1 (HFCS) and D2 (ACS). First, we demonstrate the robustness of our main result to alternative treatments of households with high inflation experience. In the HFCS, we show that our results are robust to estimating a linear effect of experienced inflation and winsorizing experienced inflation either before or after averaging to calculate the lifetime experience measure. In the ACS, we demonstrate robustness to winsorizing inflation each year before averaging and to winsorizing experiences at a higher threshold than in our baseline specification. Second we test several conceptually different measures of experienced inflation. We find that experienced inflation volatility also predicts homeownership, but with a smaller magnitude than the level. In the HFCS, we also implement and extend the AR(1) model as described in Malmendier and Nagel (2016) to estimate households' one-year and five-year inflation forecasts from their lifetime experienced inflation. Longer-run estimated forecasts also significantly predict higher likelihoods of homeownership, but with smaller magnitudes than our main specification. In the ACS, we calculate a conceptually similar experience-based AR(1) forecast, estimated from a regression of inflation on lagged values, with linear declining weights over the lifetime. We calculate this first as if immigrants consider all inflation from their lives as part of the same series. This measure significantly predicts ownership, but with a smaller magnitude than our baseline specification. We also estimate a similar forecast allowing for a break in the series when people immigrate to the US, which does not significantly predict ownership.

HFCS Multiple Imputation Data. In Appendix Table A5, we test the sensitivity of our main estimates on the HFCS data to the use of the multiple-imputation data. In column (1), we report all of the coefficients from our benchmark estimation in column (4) of Table 3. Using only the non-imputed data (column (2)), we limit the analysis to about 60% of

the sample when we control for wealth and income. In column (3), we estimate the model on non-imputed data without including wealth and income controls. Across specifications, a one log-point change in experienced inflation corresponding to an increase in the likelihood of homeownership from 65% to between 73% and 75%. While the coefficient on experienced inflation remains relatively stable, the wealth and income controls increase the explanatory power of the model and alter the effect of some of the other demographic coefficients, including age, education, and unemployment. This may indicate that one mechanism through which age, education, and employment affect ownership is through wealth accumulation. Most importantly, all coefficient estimates and also the increased explanatory power of the estimation with wealth and income controls on the subsample of non-imputed data closely match those from the estimation on multiple-imputation data.

Alternative Wealth Controls in the HFCS Data. We also probe the robustness of our results to alternative methods for controlling for household wealth, which are discussed in detail in Appendix G. We show that the predictive power of log experienced inflation is robust to controlling for measures of household wealth net of home equity or house-price appreciation (see columns (1) and (2) of Appendix Table G1). The main results are also robust to using nominal, rather than real income and wealth (column 3) and to adjusting real income and wealth for purchasing power parity across countries in the Euro area (column 4). Finally, in column (5), we test the robustness to defining the wealth and income deciles within rather than across countries.

Accounting for Persistence in Homeownership. Our main analysis tests the hypothesis that macroeconomic experiences predict homeownership at the time of the survey. One potential concern we discuss in Section 3.2 is persistence in homeownership: While beliefs formed up to the moment of first becoming a homeowner matter for the purchase decision, homeowners might be unlikely to switch back to renting. While the ACS and HFCS data do not identify when an individual first assumed homeownership status, the retrospective data from the Survey of Health, Ageing and Retirement in Europe (SHARE) does. We perform a full analysis of the role of past inflation exposure on households' first homeownership decisions using the SHARE data. The data and analysis are described in detail in Appendix H with summary statistics and results reported in Appendix Tables H1 and H2. We find that

experienced inflation predicts if and when an individual first purchases a home.

Another approach to address persistence in homeownership could be to focus on recent movers as those individuals are forced to re-evaluate their tenure decision after moving. If moving was random, we might expect to estimate a stronger experience effect in the subsample of recent movers. Unfortunately, we are lacking quasi-random variation in moving. In our HFCS sample, for example, the 22% who have moved in the last 5 years are younger, more employed, and significantly more likely to be renters with 32% ownership vs. 71% in the sample that has not moved recently. The benefit of the retrospective SHARE data is that it allows us to address the persistence in homeownership without the selection issues of the cross-sectional data.

Variance Estimation. We test the robustness of our results to alternative clustering of standard errors in Appendix Tables A6 (HFCS) and A7 (ACS) to account for correlation in experienced inflation among different cohorts, at different ages, across time, and in different countries. In these tables, we report standard errors clustered at different levels for our preferred specifications. In the HFCS, we estimate similar standard errors clustering by country-cohort-survey wave (baseline specification), country-cohort, or by cohort. Standard errors are about 3-4 times as large if we instead cluster by survey year, country-survey wave, or by country. As we have only 11 survey years and 22 countries, we also report p-values calculated using the score bootstrap approach of Kline and Santos (2012), which is more appropriate for inference with few clusters. To apply this to multiple imputation data, we report the average p-value across the 5 imputations.

In the ACS, the estimated standard error on the winsorized measure of experienced inflation is up to twice as large as our baseline specification (clustering by birth country-cohort-immigration year-survey year) when we cluster by birth country-cohort, birth country-immigration year, cohort, or survey year. The standard error is 9 times as large if we cluster by birth country. Across all of these specifications, log experienced inflation remains statistically significant at the 5% level, though we are cautious in interpreting the standard errors when clustering by survey year or birth country given the small number of clusters. We do not report score bootstrap p-values using the Kline and Santos (2012) approach as these estimates did not converge.

In addition to the robustness reported in the Appendix, we also find that our HFCS

results are robust to variance estimation that accounts for the full sampling design using the provided replicate weights (bootstrap weights accounting for the sampling design). The standard errors in these estimates are about 25% smaller than the clustered standard errors reported in our main tables.

Additional Robustness. We test the robustness of our preferred specifications, column (4) of Table 3 for the HFCS and column (6) of Table 6 for the ACS, to several alternative specifications.

Results are robust to including age fixed effects or cohort (birth year) fixed effects instead of modeling age as a quadratic effect. Our results are not dependent on the logit specification; we obtain similar results with OLS or probit regressions.

In our main HFCS analyses, we control for survey wave fixed effects as most surveys occur over a concentrated period; however, our results are robust to including survey year fixed effects. Our results are also robust to alternative weighting; either by equal-weighting households or equal-weighting countries.

Our ACS analyses are also robust to alternative weighting using either weights meant to be representative of the US population or by equal-weighting countries.

5 Conclusion

In this paper, we present evidence in support of the hypothesis that the macroeconomic histories individuals experience in their home countries have a long-lasting effect on the composition of and demand in the housing market. Heterogeneity in households exposure to past episodes of higher or lower inflation can explain differences in the likelihood of being a homeowner, both within and across countries. Thus, individual-level and country-level histories of past price increases emerge as an economically meaningful factor explaining large cross-country differences in housing markets as well as the variation in ownership within countries. We show that the relationship between prior inflation and tenure choices is not explained by housing market conditions, nor by indicators of current macroeconomic conditions or other macroeconomic experiences.

The effect of personal experiences appears to be powerful and long-lasting enough to influence even the homeownership decisions of immigrants who move to the same housing

market (the US) and still respond to the inflation exposure they experienced in their home countries. We also show that inflation experiences throughout life predict the hazard of first homeownership.

The results of this paper tie into the literature on the long-run effects of macroeconomic events such as high inflation and economic crises addressed in DeLong and Summers (2012), Giuliano and Spilimbergo (2014), and Oreopoulos et al. (2012) among others. In this paper we formulate and address a housing-market participation puzzle and show that a similar notion of long-run effects of macroeconomic events goes a long way in explaining the puzzle.

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Table 1. Summary of Household Characteristics (HFCS and ACS)

Panel A: HFCS Data (N=220,605)

Variable	Mean	Med.	SD
Homeowner	0.62	1	0.48
Age	51.5	51	15.3
Male	0.55	1	0.50
Has child	0.45	0	0.50
Single	0.24	0	0.43
Married	0.54	1	0.50
High school educated	0.44	0	0.50
College educated	0.27	0	0.44
Employed	0.56	1	0.50
Unemployed	0.06	0	0.25
Income (2010 €k)	37.3	27.7	42.0
Net wealth (2010 €k)	207.9	91.6	637.2

Panel B: ACS Immigrants from Countries with Historical Inflation Data

Countries:	*HFCS (N=220,828)*			*High-Income (N=485,012)*			*All (N=1,406,860)*		
Variable	Mean	Med.	SD	Mean	Med.	SD	Mean	Med.	SD
Homeowner	0.74	1	0.44	0.71	1	0.46	0.61	1	0.49
Age	54.5	55	15.0	53.1	53	14.9	48.6	47	14.5
Male	0.54	1	0.50	0.55	1	0.50	0.59	1	0.49
Year of immigration	1976	1972	18	1980	1980	19	1987	1989	16
Years in the US	37.0	40	18.0	32.9	33	18.4	26.2	24	16.2
Speaks English well	0.13	0	0.34	0.13	0	0.33	0.21	0	0.41
Speaks English very well	0.35	0	0.48	0.27	0	0.45	0.33	0	0.47
Speaks only English	0.46	0	0.50	0.53	1	0.50	0.23	0	0.42
Citizen (Parents)	0.24	0	0.43	0.19	0	0.39	0.08	0	0.27
Citizen (Naturalized)	0.54	1	0.50	0.51	1	0.50	0.48	0	0.50
Has child	0.36	0	0.48	0.37	0	0.48	0.54	1	0.50
Single	0.13	0	0.34	0.14	0	0.35	0.15	0	0.36
Married	0.58	1	0.49	0.59	1	0.49	0.64	1	0.48
Married to US native	0.31	0	0.46	0.29	0	0.46	0.16	0	0.37
High school educated	0.51	1	0.50	0.47	0	0.50	0.40	0	0.49
College educated	0.39	0	0.49	0.46	0	0.50	0.37	0	0.48
Employed	0.63	1	0.48	0.65	1	0.48	0.71	1	0.45
Unemployed	0.03	0	0.16	0.03	0	0.16	0.03	0	0.18
Income (2010 $k)	88.3	61.6	96.5	94.1	64.9	103.8	79.7	53.3	91.0

Notes: Data in Panel A provides the summary statistics (mean, median, and standard deviation) for the Household Finance and Consumption Survey (HFCS) sample from waves 1, 2, and 3 (fielded in 2008-2018), weighted to be representative of the population within and across countries. Panel B is from immigrants to the US from the 2006-2020 American Community Surveys (ACS), obtained from IPUMS (2022). The first set of columns summarize the data for household heads who immigrated to the US from one of the countries sampled in the HFCS. The second set includes immigrants from all high-income countries and the third set includes immigrants from all countries with sufficient historical inflation data to be included in our main analyses. Summary statistics for the ACS data equal weight all respondents.

Table 2. Summary of Experienced and Average Historical Inflation Rates by Country

		Average Past Inflation (%)			Experienced Past Inflation (%) HFCS				ACS			
Country		Mean	Median	SD	Mean	Median	SD	N	Mean	Median	SD	N
AUT	Austria	5.5	2.2	12.9	2.7	2.7	0.6	7,990	3.7	3.7	0.8	3,963
BEL	Belgium	3.1	2.6	3.3	2.8	3.0	0.5	6,332	3.2	3.3	0.6	2,944
HRV	Croatia	80.6	8.0	310.9	103.5	111.6	22.6	1,273	44.2	7.2	55.5	2,767
CYP	Cyprus	3.7	2.8	5.2	3.3	3.4	0.7	3,704	3.4	3.6	0.5	261
EST	Estonia	18.0	1.1	105.7	29.4	30.6	7.4	4,596	17.1	4.1	18.2	244
FIN	Finland	6.5	3.4	9.7	3.4	3.6	1.1	29,445	3.8	3.9	0.9	1,432
FRA	France	7.5	3.2	11.8	3.3	3.3	1.1	37,720	3.5	3.6	0.9	15,088
DEU	Germany	3.7	2.7	6.9	2.6	2.7	0.7	12,315	3.4	3.5	0.7	80,620
GRC	Greece	25.4	5.2	85.5	7.7	7.7	2.6	8,521	5.5	4.3	2.6	10,141
HUN	Hungary	371.4	4.7	2549.4	16.3	9.0	21.9	11,367	38.8	8.2	51.8	5,290
IRL	Ireland	4.7	2.9	5.6	3.4	3.6	1.1	9,663	3.9	3.9	0.8	10,143
ITA	Italy	11.3	3.5	38.7	4.9	5.0	1.3	20,914	4.3	4.0	1.1	27,887
LVA	Latvia	15.3	1.6	103.2	25.0	26.1	5.9	2,328	11.9	4.0	12.7	1,490
LTU	Lithuania	19.8	1.1	126.7	31.5	33.4	5.8	1,546	23.9	29.1	19.6	1,985
LUX	Luxembourg	3.5	2.4	5.8	2.7	2.8	0.5	4,054				
MLT	Malta	2.7	2.1	3.5	2.8	2.8	0.3	2,665				
NLD	Netherlands	3.5	2.8	4.1	2.9	2.9	0.4	4,925	3.4	3.5	0.6	7,415
POL	Poland	76.7	4.7	295.3	27.9	29.4	6.5	8,804	17.6	16.3	12.2	26,951
PRT	Portugal	6.2	3.1	9.2	6.8	7.1	1.6	15,321	4.4	4.0	1.4	13,340
SVK	Slovakia	4.9	1.7	11.2	5.8	5.6	0.8	6,152	4.4	4.2	1.4	1,274
SVN	Slovenia	57.1	10.8	207.2	61.7	67.8	19.8	4,615				
ESP	Spain	6.8	4.8	6.4	5.6	5.9	1.1	16,891	4.0	3.9	1.0	7,593
All					6.3	3.6	10.1	221,141	7.1	3.8	13.9	220,828
All (eq. wt.)					16.2	4.9	25.4	221,141	10.7	3.9	22.5	220,828
Across Countries												
Mean					6.3	6.5	1.9	22	7.1	5.6	4.5	19
Median					3.3	3.3	1.1	22	3.8	3.9	0.9	19
Mean (eq. wt.)					16.2	16.8	4.7	22	10.7	6.2	9.7	19
Median (eq. wt.)					5.2	5.3	1.1	22	4.3	4.0	1.1	19

Notes: The inflation data, HFCS data, and ACS data are described in Section 3. Average Past Inflation is based on annual inflation rates from 1930 to 2018. The summary statistics of Experienced Past Inflation are weighted to be representative of the populations within and across countries in the HFCS data and are equal-weighted across immigrants in the ACS data. We indicate with "eq. wt." that summary statistics are equally weighted across countries. "Across Countries" statistics report the mean or median sample statistics across countries in the top panel.

Table 3. Inflation Experiences and Homeownership: Within and Across Countries (HFCS)

Dep. Var: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Experienced Inflation	2.71*** (0.08)	2.83*** (0.09)	3.00*** (0.29)	1.65*** (0.09)	2.06*** (0.11)	1.07 (0.08)	1.18** (0.09)
Tenant Protection (std.)			1.00 (0.02)				
Rent Control (std.)			0.73*** (0.02)				
Tax Benefits to Homeowners (std.)			1.52*** (0.04)				
Buyer Transaction Cost (std.)			0.81*** (0.02)				
Price-to-Rent Ratio (std.)			0.82*** (0.03)				
Current Inflation (std.)				1.16*** (0.03)			
Current Real House Price Growth (std.)				1.19*** (0.04)			
Current Real GDP Per Capita (std.)				0.59*** (0.04)			
Current Employment Rate (std.)				0.97 (0.04)			
Demographics (no age)	X	X	X	X	X	X	X
Age (quadratic)		X	X	X	X	X	X
Fixed Effects		Wave	Wave	Wave	Region & Wave	Country & Wave	Country-Wave
Observations	220,605	220,605	169,520	220,605	220,605	220,605	220,605
Countries	22	22	11	22	22	22	22
Pseudo R^2	0.510	0.512	0.534	0.519	0.513	0.537	0.538
R^2 of Log Experienced Inflation on Controls	0.293	0.360	0.822	0.723	0.769	0.960	0.963

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics (without age) include gender, marital status, children, education, employment status, and deciles of net wealth and household income. Housing market variables and current macroeconomic conditions are described in Section 3 and are normalized to have a mean of 0 and variance of 1 across all available data. Last row reports the average R^2 from an OLS regression of log experienced inflation on the controls and fixed effects in the specification.

Table 4. Heterogeneity in Within-Household Inflation Experiences and in Market Conditions (HFCS)

Dep. Var: Homeowner	Married vs. Single (1)	Variable vs. Fixed Rate (2)	High vs. Low Correlation π, g (3)
Log Experienced Inflation	2.20***	1.62***	2.04***
	(0.15)	(0.10)	(0.13)
Log Experienced Inflation X Married	0.70***		
	(0.03)		
Log Experienced Inflation X Prevalence of Variable Rate (std.)		0.79***	
		(0.03)	
Log Experienced Inflation X Correlation π, g (std.)			1.35***
			(0.10)
Prevalence of Variable Rate (std.)		1.93***	
		(0.11)	
Correlation of Inflation & Real House-Price Growth (π, g, std.)			0.45***
			(0.04)
Demographics	X	X	X
Current Macro Conditions	X	X	X
Wave FE	X	X	X
Observations	175,758	191,290	162,953
Countries	22	21	12
Pseudo R^2	0.508	0.527	0.531

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics include age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income. Column (1) excludes widowed and divorced household heads. Current macroeconomic conditions include inflation, real house-price growth, real GDP per capita, and employment rate in each country-year. Prevalence of variable rate mortgages is a standardized measure of the total loan dollars in variable- relative to fixed-rate mortgages in each country-wave. Correlation of inflation (π) and real house-price growth (g) calculated for each country using data from 1976 to 2007 and normalized to mean of 0 and variance of 1 across all available data.

Table 5. Other Macroeconomic Experiences and Homeownership (HFCS)

Sample:	Ages 20-68			Ages 20-55	
Data Required:	G, GDP, LTR			GDP, EMP	
Dependent Var: Homeowner	(1)	(2)	(3)	(4)	(5)
Log Experienced Inflation (std.)	2.10***	1.90***	1.72***	1.90***	1.86***
	(0.13)	(0.11)	(0.11)	(0.12)	(0.12)
Experienced Real House-Price Growth (std.)		1.28***	1.26***		
		(0.04)	(0.04)		
Experienced Real GDP Per Capita (std.)			0.63***		0.63***
			(0.06)		(0.06)
Experienced Real Long-Term Interest Rate (std.)			1.00		
			(0.03)		
Experienced Employment (std.)					1.81***
					(0.20)
Demographics	X	X	X	X	X
Current Macro Conditions	X	X	X	X	X
Wave FE	X	X	X	X	X
Observations	124,327	124,327	124,327	96,174	96,174
Countries	9	9	9	14	14
Pseudo R^2	0.512	0.514	0.515	0.488	0.490

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics include age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income. Current macroeconomic conditions include inflation, real house-price growth, real GDP per capita, and employment rate in each country-year. Columns (1)-(3) limit the sample to household heads aged 20-68 in the 9 countries with sufficient house-price, GDP per capita, and long-term interest rate data to calculate measures of lifetime experience. Columns (4)-(5) limit the sample to household heads aged 20-55 with sufficient GDP per capita and employment data. Macroeconomic experiences are described in Section 3 and are normalized to have a mean of 0 and variance of 1 in the relevant regression sample.

Table 6. Inflation Experiences and Homeownership: Immigrants to the US (ACS)

Immigrants from:	HFCS Countries			All High-Income Countries			All Countries		
Dep. Var.: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Exp. Inflation (Win. at 0 and 10)	1.30*** (0.04)	1.34*** (0.04)	1.37*** (0.04)	1.31*** (0.02)	1.34*** (0.02)	1.56*** (0.03)	0.99 (0.01)	0.94*** (0.01)	1.09*** (0.01)
Negative Exp. Inflation				14.79*** (15.46)	17.21*** (17.96)	68.90*** (70.45)	1.29 (1.32)	0.87 (0.87)	4.25 (4.25)
Exp. Inflation above 10	1.00 (0.03)	0.96 (0.03)	0.92** (0.04)	0.89*** (0.02)	0.86*** (0.02)	0.66*** (0.02)	0.95*** (0.01)	0.95*** (0.01)	0.95*** (0.01)
State-Year-Metro Native Homeownership Rate		37.68*** (1.72)	39.31*** (1.82)		44.47*** (1.40)	44.93*** (1.44)		33.87*** (0.64)	38.88*** (0.74)
Country FE			X			X			X
Observations	220,828	220,828	220,828	485,012	485,012	485,012	1,406,860	1,406,860	1,406,860
Countries	19	19	19	36	36	36	54	54	54
Pseudo R^2	0.231	0.257	0.259	0.237	0.262	0.269	0.238	0.258	0.265
R^2 of Win. Log Exp. Inflation on Controls	0.330	0.330	0.643	0.336	0.336	0.602	0.398	0.399	0.543

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country of birth X cohort X immigration year X survey year in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data includes immigrants to the US from the 2006-2020 ACS, equal weighting immigrants. Dependent variable is an indicator for owning the home surveyed in. Experienced Inflation is the weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year, using inflation from the birth country from birth year to year of immigration to the US. We winsorize below at the lowest positive experience level and above at 10 prior to taking the log of experienced inflation and include indicators for immigrants winsorized below and above. All regressions control for immigrant demographics (age, age-squared, gender, marital status, whether spouse is a US native, children in the home, education, employment status, decile of total household income, years in the US, years in the US-squared, English proficiency, and citizenship status) and survey year fixed effects. Regressions with immigrants from all countries also include indicators for the country income level. State-year-metro homeownership rate is the homeownership rate among non-immigrant households calculated using the ACS from the same state, year, and metro status. The sample in columns (1)-(3) limits the data to immigrants from the HFCS countries and to high-income countries in (4)-(6). Last row reports the R^2 from an OLS regression of winsorized log experienced inflation on the controls and fixed effects in the specification.

Table 7. Other Macroeconomic Experiences and Homeownership (ACS)

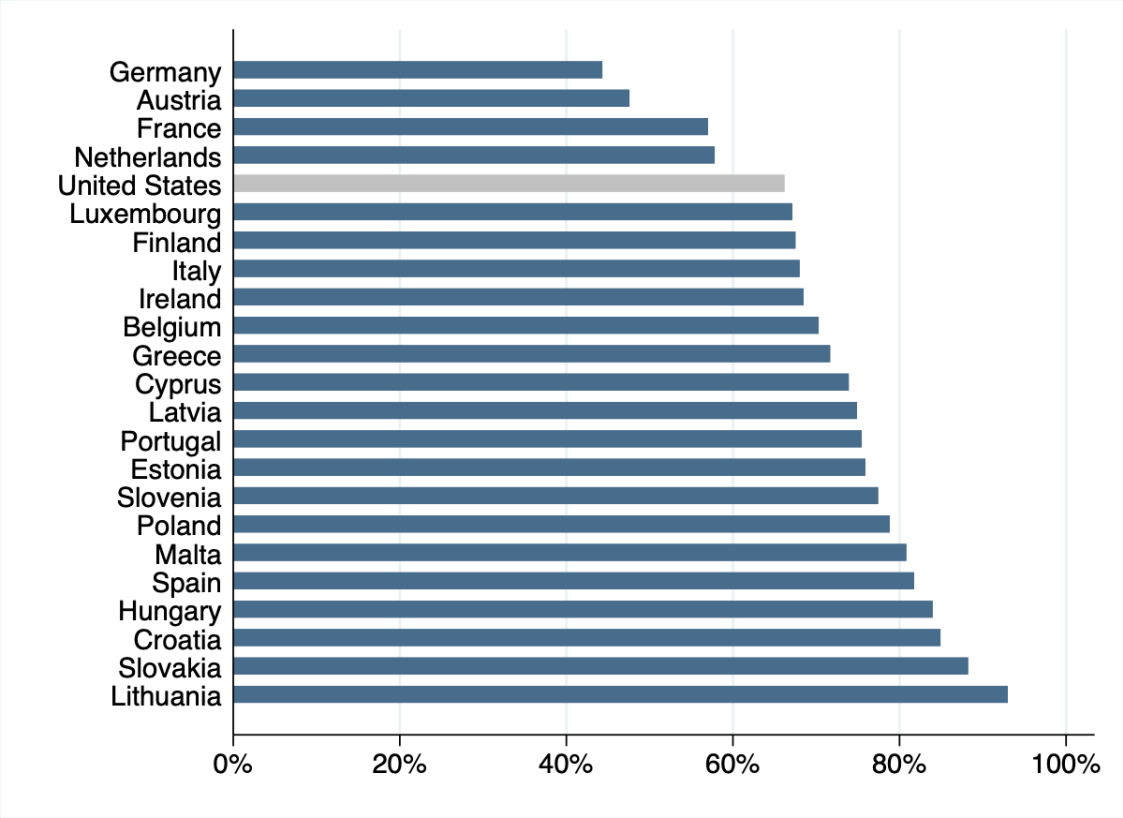
Sample:	Years 2006-18, Ages 20-80			Years 2006-19, Ages 20-57					
Data Required:	G, GDP, LTR			GDP, EMP		G, GDP, EMP		GDP, EMP	
Income Levels:	High			High		High		All	
Dep. Var: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Experienced Inflation	1.35***	1.35***	1.42***	1.25***	1.18***	1.25***	1.15***	1.08***	1.17***
(Win. at 0 and 10, std.)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Experienced Real House		1.00	0.98**				1.02*		
Price Growth (std.)		(0.01)	(0.01)				(0.01)		
Experienced Real GDP			1.47***		1.34***		1.37***		1.50***
Per Capita (std.)			(0.03)		(0.03)		(0.03)		(0.02)
Experienced Real Long-Term			1.16***						
Interest Rate (std.)			(0.01)						
Experienced Employment (std.)					0.90***		0.89***		0.90***
					(0.01)		(0.01)		(0.01)
Observations	254,718	254,718	254,718	193,125	193,125	188,222	188,222	889,141	889,141
Countries	14	14	14	22	22	17	17	41	41
Pseudo R^2	0.266	0.266	0.268	0.280	0.281	0.280	0.281	0.255	0.256

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country of birth X cohort X immigration year X survey year in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data includes immigrants to the US from the 2006-2019 ACS, equal weighting immigrants. Dependent variable is an indicator for owning the home surveyed in. Experienced Inflation is the weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year, using inflation from the birth country from birth year to year of immigration to the US. We winsorize below at the lowest positive experience level and above at 10 prior to taking the log of experienced inflation and include indicators for immigrants winsorized below and above. All regressions control for country fixed effects, immigrant demographics (age, age-squared, gender, marital status, whether spouse is a US native, children in the home, education, employment status, decile of total household income, years in the US, years in the US-squared, English proficiency, and citizenship status), survey year fixed effects, and the homeownership rate among non-immigrants in the ACS from the same state, year, and metro status. Regressions with immigrants from all countries also include indicators for the country income level. The sample varies across columns based on the country's available macroeconomic data, age range, and country-of-birth income status. Last row reports the R^2 from an OLS regression of winsorized log experienced inflation on the controls and fixed effects in the specification. Macroeconomic experiences are described in Section 3 and are normalized to have a mean of 0 and variance of 1 in the relevant regression sample.

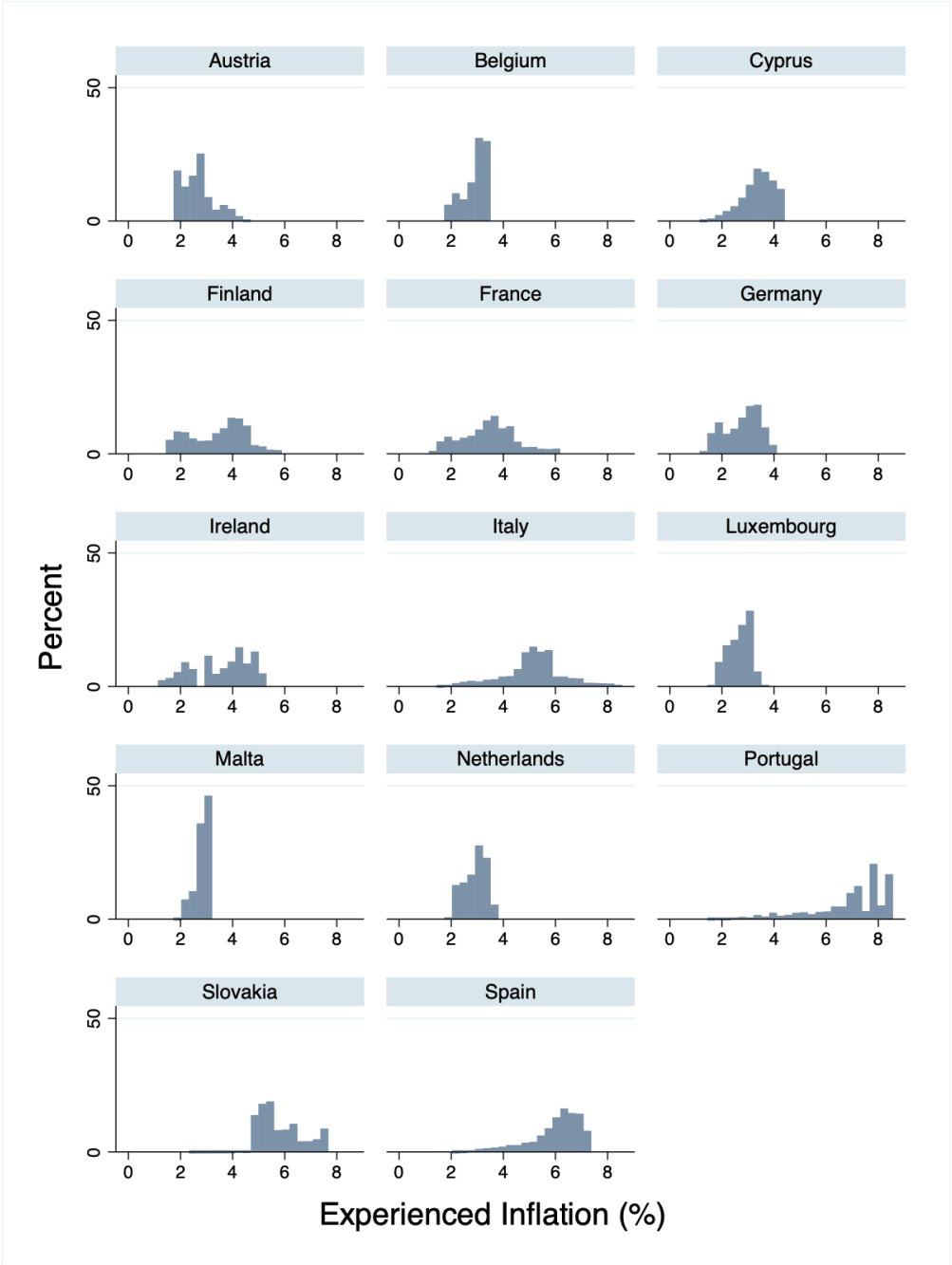
Internet Appendix

A Additional Figures and Tables



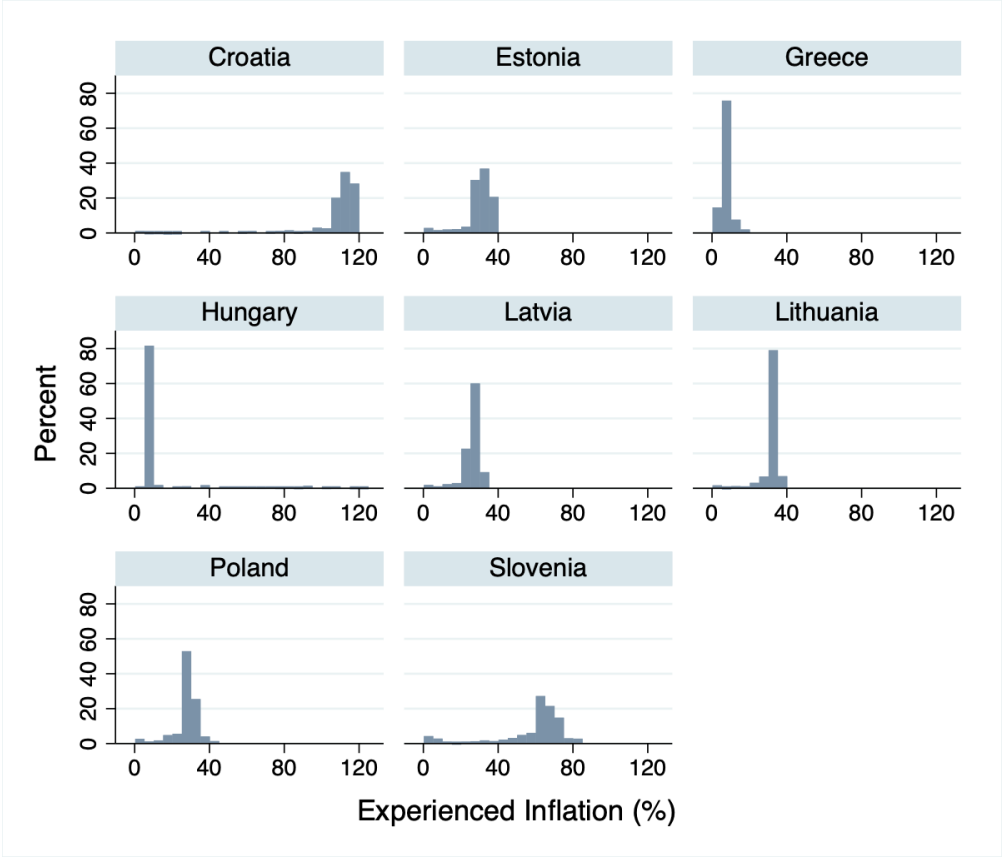
Appendix Figure A1. Homeownership Rates in Europe and the United States (2008-2018)

European data is from the ECB Household Finance and Consumption Survey. US homeownership is the average homeownership rate among US natives from 2008-2018 American Community Survey. Weighted to be representative of the population.



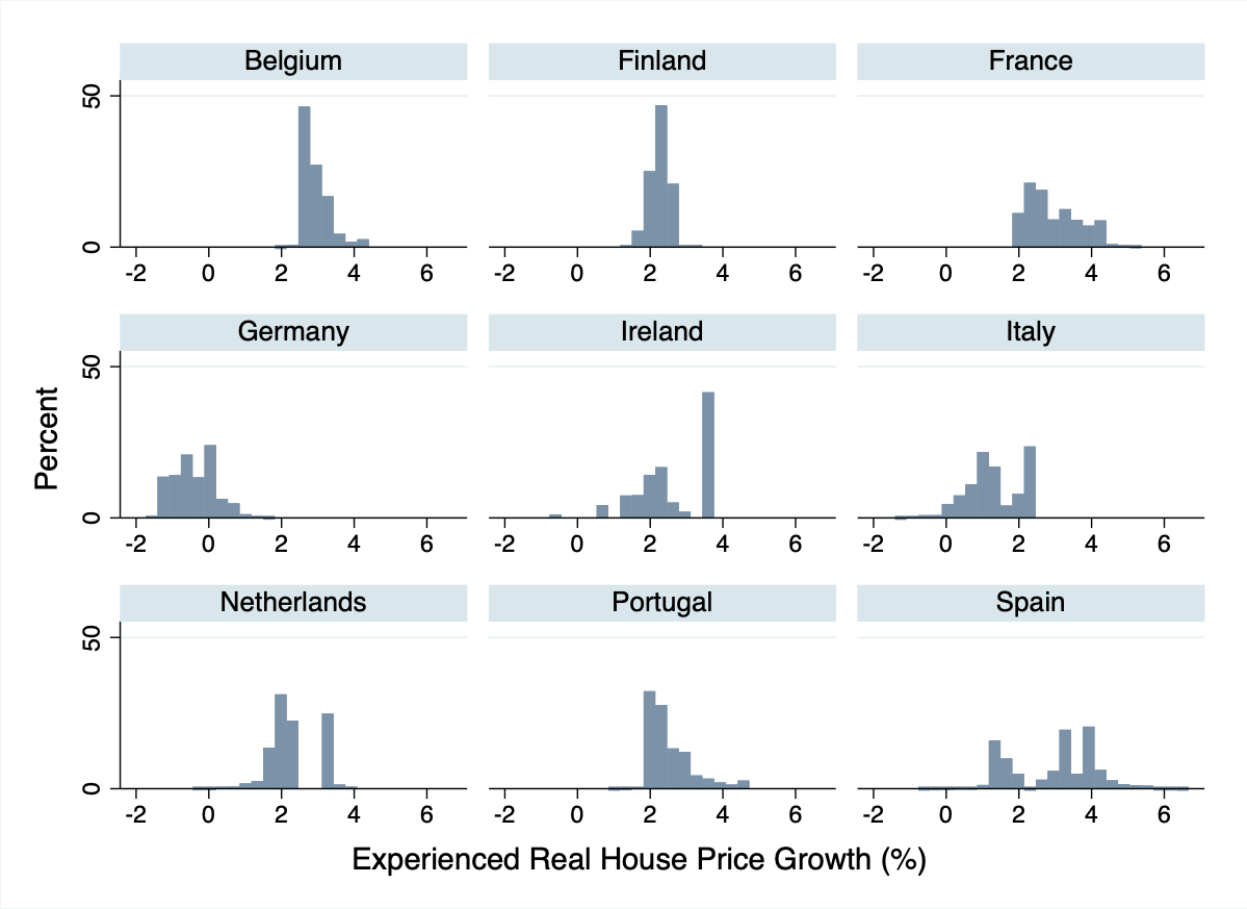
Appendix Figure A2. Distribution of experienced inflation, low- and moderate-inflation HFCS countries

Note: Histograms of experienced inflation across low- and moderate-inflation countries in the HFCS data. Inflation data sources and calculation of experienced inflation as described in Section 3.



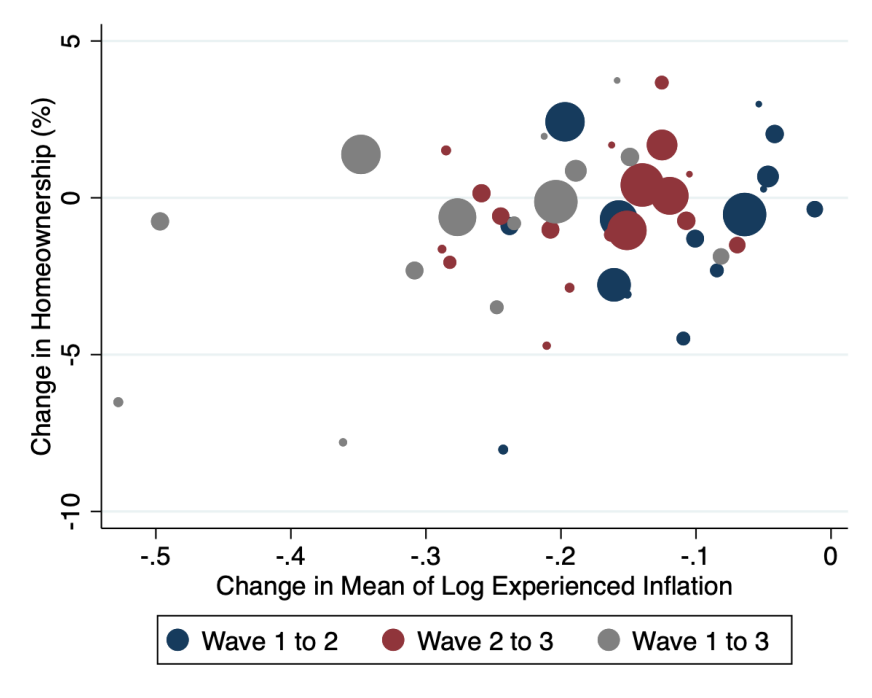
Appendix Figure A3. Distribution of experienced inflation, high-inflation HFCS countries

Note: Histograms of experienced inflation across high-inflation countries in the HFCS data. Inflation data sources and calculation of experienced inflation as described in Section 3.



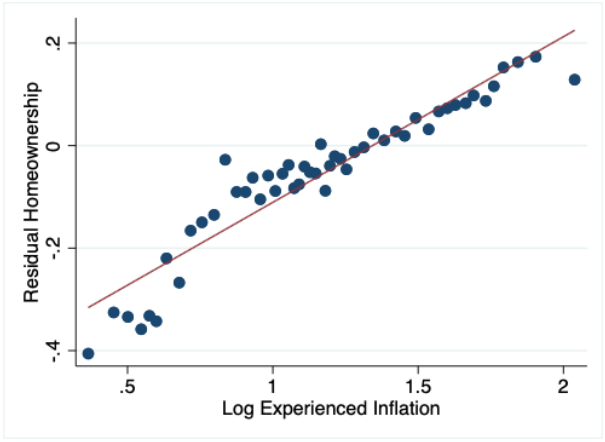
Appendix Figure A4. Distribution of experienced house-price growth, HFCS countries

Note: Histograms of experienced inflation across 9 countries in the HFCS data with sufficient historical house-price data. HFCS data limited to household heads aged 20-68. Real house-price data sources and calculation of experienced real house-price growth as described in Section 3.



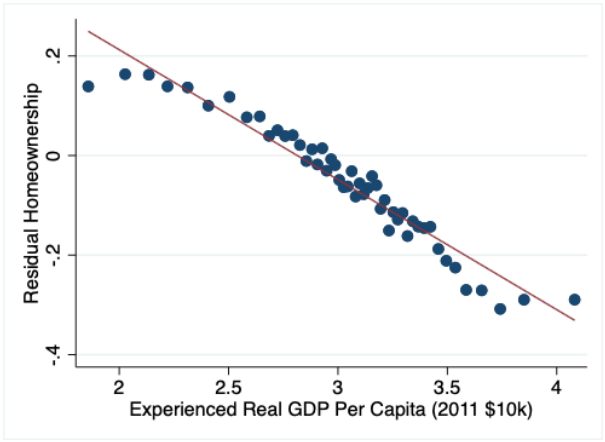
Appendix Figure A5. Changes in homeownership and experienced inflation across survey waves (HFCS)

Note: Figure plots the change in homeownership for each country across survey waves by the corresponding change in the average of households' log experienced inflation. Size indicates relative population. Homeownership from the HFCS data. Inflation data sources and measures of experienced inflation described in Section 3.

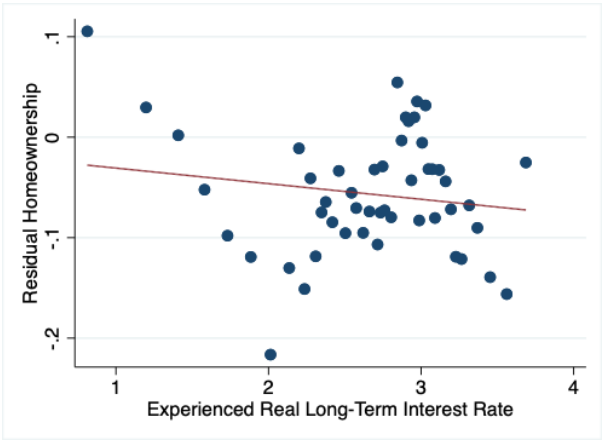


(a) Log Experienced Inflation

(b) Experienced Real House-Price Growth



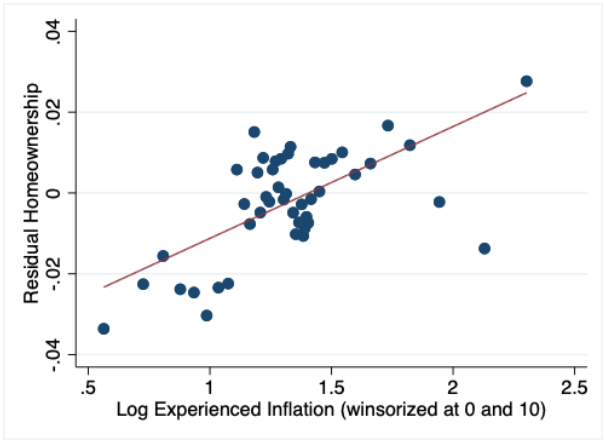
(c) Experienced Real GDP Per Capita



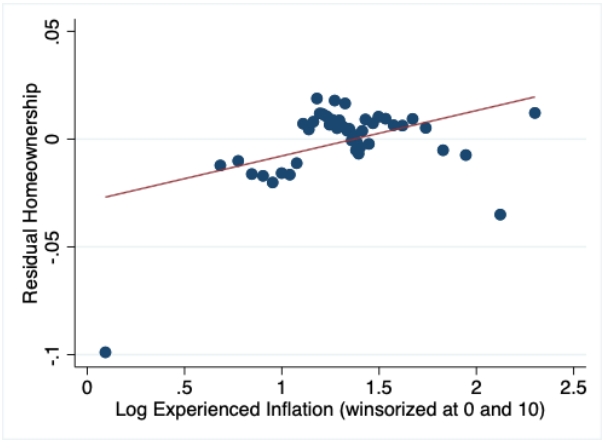
(d) Experienced Real Long-Term Interest Rates

Appendix Figure A6. Binned Scatter Plots of Residual Homeownership and Macroeconomic Experiences (HFCS)

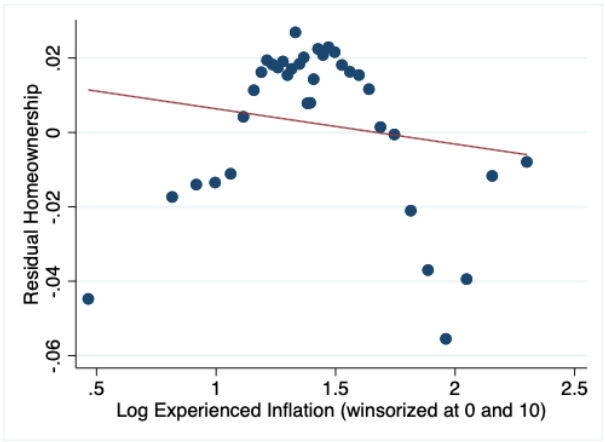
Binned scatter plots of measures of macroeconomic experiences (x-axis) and residual homeownership (y-axis) in the HFCS data as described in Section 3. Data limited to the subsample of 20-68 year olds from countries with complete macroeconomic history data. In all plots, residual homeownership is calculated as the difference between actual homeownership (1 or 0) and the predicted likelihood of ownership estimated from a logit regression of ownership on all demographic controls, current macroeconomic conditions, and survey wave fixed effects. The experience measure is log inflation in (a), real house-price growth in (b), real GDP per capita in (c) and real long-term interest rates in (d). To construct the plots, we divide households into bins by ranking the measure of experience plotted on the x-axis. For each bin, we plot the average of the x- and y-axis variables. Lines show the linear fit. All calculations are weighted by the HFCS representative weights.



(a) HFCS Countries



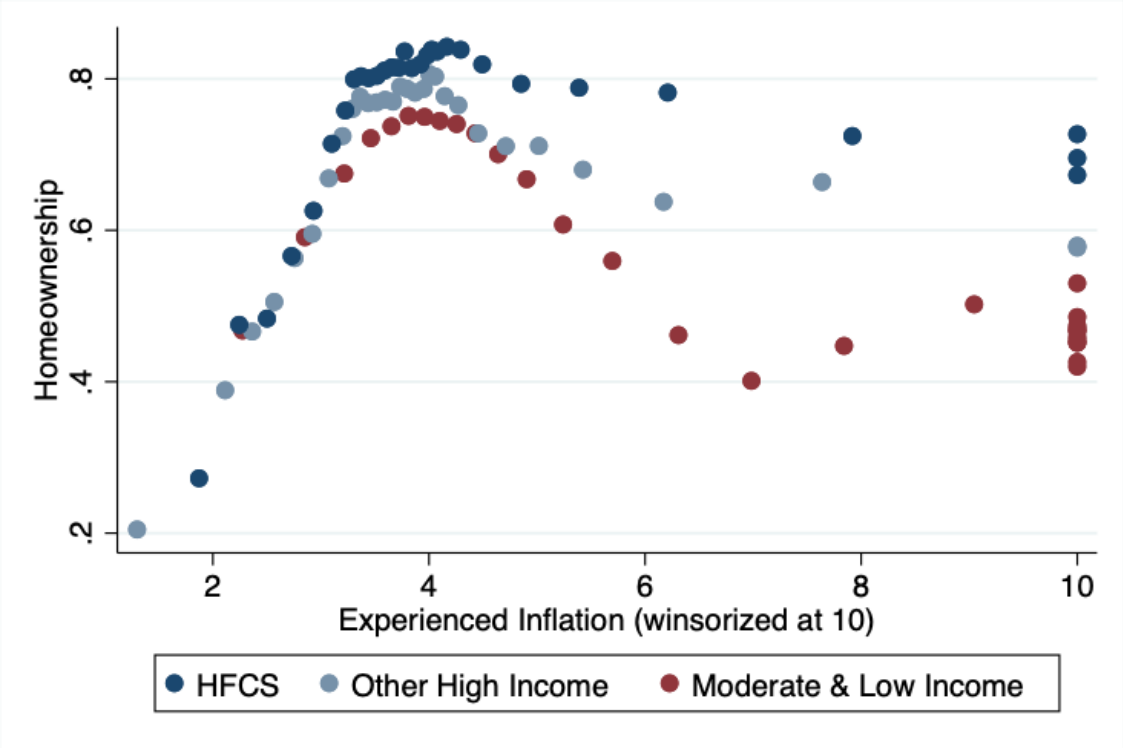
(b) High-Income Countries



(c) All Countries

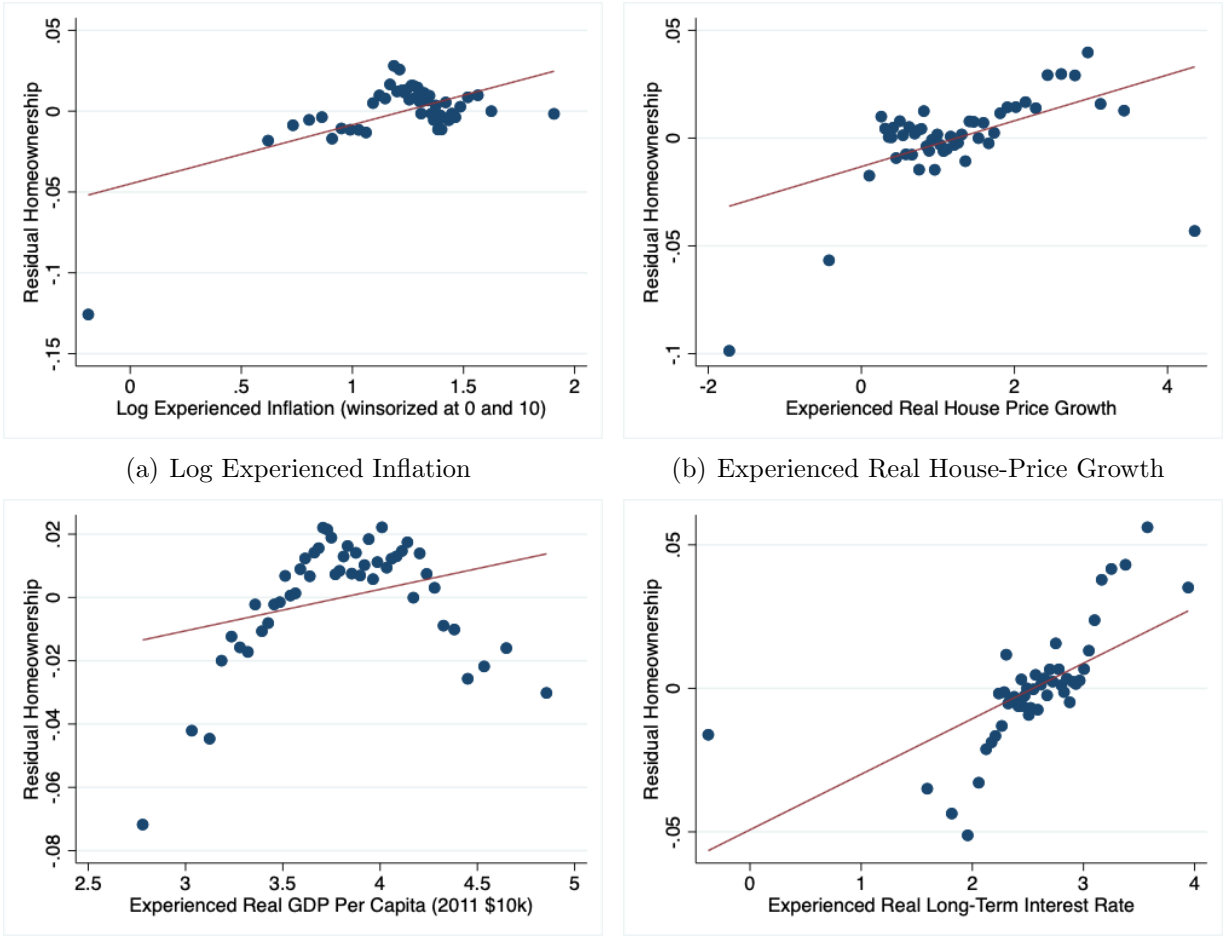
Appendix Figure A7. Binned Scatter Plot of Residual Homeownership and Inflation Experiences across ACS Subsamples

Binned scatter plots of log experienced inflation (x-axis) and residual homeownership (y-axis) in the ACS data as described in Section 3. Data includes all immigrants from 19 HFCS countries in (a), 36 high-income countries in (b), and all 54 countries with sufficient historical inflation data in (c). Residual homeownership is calculated as the difference between actual homeownership (1 or 0) and the predicted likelihood of ownership estimated from a logit regression of ownership on all demographic controls, survey year fixed effects, the native homeownership rate in the same state-year-metro. Controls for (c) also include indicators for country income level. Experienced inflation winsorized below at the smallest positive value in the data and above at 10 prior to taking the log transformation. Regressions are run separately for each sample. To construct the plots, we divide households into equal-sized bins by ranking experienced inflation within each subsample. For each bin, we plot the average of log experienced inflation and homeownership. Lines show the linear fit. All immigrants are equal-weighted.



Appendix Figure A8. Binned Scatter Plot of Residual Homeownership and Inflation Experiences by ACS Subsample

Binned scatter plots of measures of experienced inflation (x-axis) and homeownership (y-axis) in the ACS data as described in Section 3. Plot overlays three separate binned scatter plots: immigrants from the HFCS sample in dark blue, from other high-income countries in light blue, and from moderate- and low-income countries in red. To construct the plots, we divide households into bins by ranking experienced inflation into equal-sized bins within each sample. For each bin, we plot the average of experienced inflation (winsorized above at 10) and homeownership. All immigrants are equal-weighted.



(a) Log Experienced Inflation

(b) Experienced Real House-Price Growth

(c) Experienced Real GDP Per Capita

(d) Experienced Real Long-Term Interest Rates

Appendix Figure A9. Binned Scatter Plot of Residual Homeownership and Macroeconomic Experiences (ACS)

Binned scatter plots of measures of macroeconomic experiences (x-axis) and residual homeownership (y-axis) in the ACS data as described in Section 3. Data limited to the subsample of from countries with complete macroeconomic history data (as in Table 7 columns (1)-(3)). In all plots, residual homeownership is calculated as the difference between actual homeownership (1 or 0) and the predicted likelihood of ownership estimated from a logit regression of ownership on all demographic controls, survey year fixed effects, and the native homeownership rate in the same state-year-metro. The experience measure is log inflation (winsorized below at 0 and above at 10) in (a), real house-price growth in (b), real GDP per capita in (c) and real long-term interest rates in (d). To construct the plots, we divide immigrants into equal-sized bins by ranking the measure of experience plotted on the x-axis. For each bin, we plot the average of the x- and y-axis variables. Lines show the linear fit. All immigrants are equal-weighted.

Appendix Table A1. Summary of Housing Market Measures

Country	HFCS Homeownership	Tenant Protection	Rent Control	Tax Benefits	Buyer Trans. Cost	Price-to-Rent Ratio	PVR (% of Euros)	PVR (std.)
Lithuania	93%						98%	1.6
Slovakia	88%	-2.3			-2.6		59%	0.4
Croatia	85%						79%	1.0
Hungary	84%	-1.7	-0.6		-1.3		57%	0.4
Spain	82%	0.9	-0.8	0.5	0.0	1.1	88%	1.3
Malta	81%						64%	0.6
Poland	79%	-1.1	-1.3		-0.2		91%	1.4
Slovenia	77%	-1.9	-1.7		-2.6		81%	1.1
Estonia	76%				-2.3		88%	1.3
Portugal	75%	1.3	-0.3	-0.4	-0.9	-0.9	91%	1.4
Latvia	75%						94%	1.5
Cyprus	74%						64%	0.6
Greece	72%	1.8	-0.6	1.5	2.4	-0.5	54%	0.3
Belgium	70%	-2.0	-0.8	1.0	2.8	1.3	35%	-0.3
Ireland	68%	-2.0	-1.1	-0.2	-1.3	-0.5	83%	1.2
Italy	68%	-0.1	-0.8	-0.6	0.1	0.0	58%	0.4
Finland	68%	-1.4	-1.7	1.5	-1.5	-0.2		
Luxembourg	67%	-2.5	0.1	-0.5	0.6		73%	0.9
Netherlands	58%	-1.8	1.7	2.9	-1.0	0.7	84%	1.2
France	57%	0.9	-0.3	0.3	1.0	0.7	10%	-1.1
Austria	48%	1.1	0.3	-0.5	-0.8	0.1	64%	0.6
Germany	44%	-0.1	1.3	-0.9	-0.6	-1.1	14%	-1.0

Notes: Table is sorted by the homeownership rate (the percent of households who own their main residence) in the HFCS sample. The summary statistics are weighted to be representative of the population within and across countries. Housing market variables are constructed using data from the HFCS, Andrews et al. (2011), the World Bank, and the OECD. All housing market measures are normalized to have a mean of 0 and variance of 1 in the sample. Tenant protection is a comparative measure of tenant-landlord regulations. Rent control is a composite indicator increasing in the extent of controls of rents. Tax benefits is a comparative measure of the tax relief on debt financing of homeownership. Transaction costs measure the average cost associated with purchasing a home, including transfer taxes, real estate agent fees, notary fees, legal fees, and registration fees. Price-to-rent ratio is an index with a baseline for each country equal to the long-run average price-to-rent ratio within the country, where the long-run is defined as starting in 1980 or the average over all available data if the data begins after 1980. Prevalence of variable-rate mortgages (PVR) is the percent of main residence mortgage euros that carry an adjustable (vs. fixed) interest rate, calculated for each country-wave. Country averages for the table are the average across waves, weighted by the sum of household weights. In the last two columns, we display the averages of both the underlying measure (percent of mortgage euros) and the normalized measure.

Appendix Table A2. Summary of Household Characteristics for US Natives (ACS)

Variable	Mean	Median	SD
Homeowner	0.73	1	0.45
Age	51.90	53	15.34
Male	0.52	1	0.50
Speaks English well	0.01	0	0.09
Speaks English very well	0.05	0	0.22
Speaks only English	0.94	1	0.24
Has child	0.37	0	0.48
Single	0.18	0	0.39
Married	0.54	1	0.50
Married to U.S. native	0.55	1	0.50
High school educated	0.60	1	0.49
College educated	0.34	0	0.47
Employed	0.64	1	0.48
Unemployed	0.03	0	0.17
Income (2010 $ k)	75.4	55.2	79.6

N=14,556,494

Notes: Data provides the summary statistics from the 2006-2020 American Community Surveys (ACS), obtained from IPUMS (2022) for US natives. Summary statistics equal weight all respondents.

Appendix Table A3. Inflation and House-Price Data Sources

Country	Inflation Sources	Missing	Real House-Price Growth Sources	Missing
HFCS Countries				
Austria	RR 1927-2010, IMF 2011-20			
Belgium	RR 1927-2010, IMF 2011-20	1940-6 (rate)	JKKST 1927-2015, FED 2016-20	
Cyprus	Apostolides 1927-38, GFD 1943-2020	1939-42 (rate)		
Germany	RR 1927-2010, IMF 2011-20	1945 (rate)	KSS 1927-2012, FED 2013-20	1939-61 (index)
Spain	RR 1927-2010, IMF 2011-20		JKKST 1927-2015, FED 2016-20	
Estonia	GFD 1927-40, GFD Russia 1941-60, Bocharnikova 1961-88, EBRD 1989-90, GFD 1991-2020	1941-44 (index)		
Finland	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
France	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Greece	RR 1927-2010, IMF 2011-20	1942-4 (rate)		
Croatia	GFD Yugoslavia 1927-43, GFD 1952-2020	1927-28 (index), 1944-51 (rate)		
Hungary	RR 1927-2010, IMF 2011-20	1946 (rate)		
Ireland	RR 1927-2010, IMF 2011-20	1956-7 (rate)	JST 1946-2017, FED 2018-20	
Italy	RR 1927-2010, IMF 2011-20		JKKST 1928-2015, FED 2016-20	
Lithuania	GFD 1927-40, GFD Russia 1941-69, WB Russia 1970-88, EBRD 1989-91, GFD 1992-2020	1941-44 (index)		
Luxembourg	GFD 1927-2020	1941-44 (index)		
Latvia	GFD 1927-40, GFD Russia 1941-69, WB Russia 1970-88, EBRD 1989-91, GFD 1992-2020	1941-44 (index)		
Malta	Apostolides 1927-38, GFD 1947-2020	1939-46 (rate)		
Netherlands	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Poland	RR 1927-39, Hanke 1941-4, RR 1946-2010, IMF 2011-20	1940 (rate), 1945 (rate)		
Portugal	RR 1927-2010, IMF 2011-20		JKKST 1932-2015, Bank of Portugal 2016-20	
Slovakia	GFD Czech Republic 1927-48, Michal 1949-59, GFD 1964-2020	1949-52 (index), 1960-63 (rate)		
Slovenia	GFD Yugoslavia 1927-43, GFD 1952-1992, IMF 1992-2020	1927-28 (index), 1944-51 (rate)		

Notes: For each country, table lists inflation and house-price data sources, missing data years, and interpolation method (rate or index). Sources include Apostolides (2011), Bocharnikova (2021), European Bank for Reconstruction and Development (2000) (EBRD), Federal Reserve Bank of Dallas (FED), Global Financial Data (GFD), International Monetary Fund (IMF), Jordà et al. (2017) (JST), Jordà et al. (2019) (JKKST), Knoll et al. (2017) (KSS), Michal (1960), the Bank of Portugal, Reinhart and Rogoff (2009) (RR), and the World Bank (WB).

Appendix Table A3. Inflation and House-Price Data Sources (continued)

Country	Inflation Sources	Missing	Real House-Price Growth Sources	Missing
ACS High-Income Countries				
Australia	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Canada	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	1950-55 (index)
Switzerland	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Chile	RR 1927-2010, IMF 2011-20			
Czechoslovakia	Average of SVK and CZE			
Czech Republic	GFD 1927-48, Michal 1949-59, GFD 1960-2020	1949-52 (index), 1960-63 (index)		
Denmark	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
United Kingdom	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	1939-45 (index)
Iceland	RR 1927-2010, IMF 2011-20			
Japan	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Korea	RR 1927-2010, IMF 2011-20	1940-51 (rate)		
Norway	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
New Zealand	RR 1927-2010, IMF 2011-20			
Romania	RR 1927-41, WB 1970, RR 1971-2010, IMF 2010-20	1927-29 (rate), 1942-69 (rate)		
Sweden	RR 1927-2010, IMF 2011-20		KSS 1927-2012, FED 2013-20	
Uruguay	RR 1927-2010, IMF 2011-20			
Yugoslavia	GFD 1927-2003, Average of BIH HRV MKD MNE SRB SVN 2004-2020	1927-28 (index), 1944-51 (index)		

Notes: For each country, table lists inflation and house-price data sources, missing data years, and interpolation method (rate or index). Sources include Apostolides (2011), Bocharnikova (2021), European Bank for Reconstruction and Development (2000) (EBRD), Federal Reserve Bank of Dallas (FED), Global Financial Data (GFD), International Monetary Fund (IMF), Jordà et al. (2017) (JST), Jordà et al. (2019) (JKKST), Knoll et al. (2017) (KSS), Michal (1960), the Bank of Portugal, Reinhart and Rogoff (2009) (RR), and the World Bank (WB).

Appendix Table A3. Inflation and House-Price Data Sources (continued)

Country	Inflation Sources	Missing	Real House-Price Growth Sources	Missing
ACS Moderate- and Low-Income Countries				
Argentina	RR 1927-2010, IMF 2011-13, WB 2014-6, IMF 2017-20			
Brazil	RR 1927-2010, IMF 2011-20			
China	RR 1937-2010, IMF 2011-20	1949-62 (rate)		
Colombia	RR 1927-2010, IMF 2011-20			
Algeria	RR 1937-2010, IMF 2011-20	1927-38 (rate), 1962-7 (rate)		
Egypt	RR 1927-2010, IMF 2011-20			
Indonesia	RR 1927-2010, IMF 2011-20			
India	RR 1927-2010, IMF 2011-20			
Mexico	RR 1927-2010, IMF 2011-20			
Myanmar	RR 1927-2010, IMF 2011-20	1941-6 (rate)		
Peru	RR 1927-2010, IMF 2011-20			
Russia	GFD 1927-69, WB 1970-92, RR 1993-2010, WB 2011-20	1941-44 (index)		
Thailand	RR 1927-2010, IMF 2011-20	1942-8 (rate)		
Turkey	RR 1927-2010, IMF 2011-20			
Taiwan	RR 1927-2010, IMF 2011-20	1939-52 (rate)		
Venezuela	RR 1927-2010, IMF 2011-20			
South Africa	RR 1927-2010, IMF 2011-20			
Zimbabwe	RR 1927-2007, IMF 2008, RR 2009-10, IMF 2011-20			
Bolivia	RR 1937-2010, IMF 2011-20			
Costa Rica	RR 1937-2010, IMF 2011-20			
Ecuador	RR 1939-2010, IMF 2011-20			
Guatemala	RR 1938-2010, IMF 2011-20			
Kenya	RR 1948-2010, IMF 2011-20			
Sri Lanka	RR 1939-2010, IMF 2011-20			
Morocco	RR 1940-2010, IMF 2011-20			
Philippines	RR 1939-2010, IMF 2011-20	1944-5 (rate)		

Notes: For each country, table lists inflation and house-price data sources, missing data years, and interpolation method (rate or index). Sources include Apostolides (2011), Bocharnikova (2021), European Bank for Reconstruction and Development (2000) (EBRD), Federal Reserve Bank of Dallas (FED), Global Financial Data (GFD), International Monetary Fund (IMF), Jordà et al. (2017) (JST), Jordà et al. (2019) (JKKST), Knoll et al. (2017) (KSS), Michal (1960), the Bank of Portugal, Reinhart and Rogoff (2009) (RR), and the World Bank (WB).

Appendix Table A4. Experienced Inflation Excluding Countries Formerly in the Soviet Sphere of Influence (HFCS)

Exclude:	Baltics	Former Soviet Sphere (no DEU)	Former Soviet Sphere (+ DEU)
Dependent Var: Homeowner	(1)	(2)	(3)
Log Experienced Inflation	1.63***	4.40***	4.75***
	(0.09)	(0.53)	(0.51)
Demographics	X	X	X
Current Macroeconomic Conditions	X	X	X
Wave FE	X	X	X
Observations	212,135	179,936	167,672
Countries	19	14	13
Pseudo R^2	0.520	0.526	0.527

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics include age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income. Current macroeconomic conditions include inflation, real house-price growth, real GDP per capita, and employment rate in each country-year. Baltic countries are Estonia, Lithuania, and Latvia. Countries formerly in the Soviet Sphere include the Baltics, Poland, Slovakia, Hungary, Slovenia, Croatia in column (2) and also include Germany in (3).

Appendix Table A5. Imputed versus Non-Imputed Data (HFCS)

Dep. Var: Homeowner	(1)	(2)	(3)
Log Experienced Inflation	1.648***	1.474***	1.432***
	(0.089)	(0.110)	(0.062)
Age	1.038***	1.030**	1.154***
	(0.010)	(0.013)	(0.009)
Age Squared	1.000***	1.000**	0.999***
	(0.000)	(0.000)	(0.000)
Male	0.994	0.981	1.116***
	(0.037)	(0.046)	(0.028)
Married	1.744***	1.733***	2.398***
	(0.080)	(0.111)	(0.080)
Widow	1.574***	1.509***	1.354***
	(0.113)	(0.140)	(0.070)
Divorced	1.099*	1.116	0.741***
	(0.062)	(0.090)	(0.032)
Middle School Educated	0.834***	0.785***	1.033
	(0.046)	(0.052)	(0.043)
High School Educated	0.830***	0.782***	1.555***
	(0.043)	(0.049)	(0.059)
College Educated	0.659***	0.638***	2.381***
	(0.039)	(0.051)	(0.100)
Has Child	1.309***	1.267***	1.283***
	(0.052)	(0.063)	(0.034)
Employed	1.205***	1.127*	1.481***
	(0.067)	(0.074)	(0.060)
Unemployed	1.173**	1.214**	0.703***
	(0.084)	(0.114)	(0.037)
Retired	1.329***	1.239***	1.350***
	(0.079)	(0.095)	(0.064)
Wealth and Income Deciles	X	X	
Imputed Data?	X		
Observations	220,605	131,518	219,857
Pseudo R^2	0.519	0.559	0.174

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. HFCS multiple-imputation data in column (1) and the non-imputed data in columns (2) and (3). With the imputed data, the number of observations is the maximum N across the five imputations and the Pseudo R^2 is the average across the five imputations. Observations are weighted using the HFCS representative weights. All regressions control for current macroeconomic conditions (inflation, real house-price growth, real GDP per capita, and employment rate) and survey wave fixed effects.

Appendix Table A6. Alternative Clustering (HFCS)

Dependent Variable: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)
Log Experienced Inflation	1.65***	1.65***	1.65***	1.65**	1.65***	1.65**
	(0.09)	(0.11)	(0.09)	(0.32)	(0.30)	(0.39)
Clustering:	Country-Cohort-Wave	Country-Cohort	Cohort	Survey Year	Country-Wave	Country
Number of Clusters	3,173	1,389	71	11	56	22
Score bootstrap p-value				$p < 0.001$		$p = 0.019$
Demographics	X	X	X	X	X	X
Current Macro Conditions	X	X	X	X	X	X
Wave FE	X	X	X	X	X	X
Observations	220,605	220,605	220,605	220,605	220,605	220,605
Pseudo R^2	0.519	0.519	0.519	0.519	0.519	0.519

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with clustered standard errors in parentheses. Level of clustering varies across columns as indicated. We report the number of clusters and, if less than 50, the average across imputations of the score bootstrap p-value calculated using the approach of Kline and Santos (2012). Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics include age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income. Current macroeconomic conditions include inflation, real house-price growth, real GDP per capita, and employment rate in each country-year.

Appendix Table A7. Alternative Clustering (ACS)

Dependent Variable: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)
Log Experienced Inflation	1.56***	1.56***	1.56***	1.56***	1.56***	1.56***
(Win. at 0 and 10)	(0.03)	(0.06)	(0.04)	(0.05)	(0.06)	(0.26)
Negative Experienced Inflation	68.90***	68.90***	68.90***	68.90***	68.90***	68.90***
	(70.45)	(70.07)	(71.91)	(68.65)	(81.19)	(88.59)
Experienced Inflation above 10	0.66***	0.66***	0.66***	0.66***	0.66***	0.66***
	(0.02)	(0.04)	(0.02)	(0.03)	(0.04)	(0.10)
Clustering:	Country-Cohort-Immigration Year-Survey Year	Country-Cohort	Country-Immigration Year	Cohort	Survey Year	Country
Number of Clusters	267,465	2,590	31,511	75	15	36
Observations	485,012	485,012	485,012	485,012	485,012	485,012
Pseudo R^2	0.269	0.269	0.269	0.269	0.269	0.269

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with clustered standard errors in parentheses. Level of clustering varies across columns as indicated. Stars indicate statistical difference from an odds ratio of 1. Data includes immigrants to the US from the 36 high-income countries in the 2006-2020 ACS, equal weighting immigrants. Dependent variable is an indicator for owning the home surveyed in. All regressions control for demographics (age, age-squared, gender, marital status, whether spouse is a US native, children in the home, education, employment status, decile of total household income, years in the US, years in the US-squared, English proficiency, and citizenship status), survey year fixed effects, the homeownership rate among non-immigrants in the same state, year, and metro status, and birth-country fixed effects. Log Experienced Inflation is the log of weighted average of inflation over the immigrant's lifetime, with linearly declining weights from the year before the survey to birth year, using inflation from the birth country from birth year to year of immigration to the US. Experienced inflation is winsorized below at the lowest positive value and above at 10 prior to applying the log transformation.

B Survey of Homeowners

Recruitment We conducted a survey of 700 homeowners in six HFCS countries: Austria, Germany, Ireland, Italy, Portugal, and Spain. We recruited 100 participants from each country to our survey from Dynata's market research panel. We also recruited 100 participants through Amazon's Mechanical Turk (MTurk).[40] The results are similar across samples, so we combine them in the results below.

Participants recruited though Dynata were compensated for completing the survey using a combination of incentives including cash, gift cards, airline points, sweepstakes entries, and charity donations. Participants recruited from MTurk were paid $1 to complete our 3-minute survey.[41]

The survey was initially written in English, translated using translation services, and then edited by native speakers. The survey took place from March 5th to May 12th, 2020 for MTurk participants and from May 13 to May 15, 2020 for Dynata.

Survey Questions and Results After providing informed consent, participants were asked the following questions. Below we provide the exact question text and summary of responses from those who completed our survey.

1. In which country do you currently reside?
   →Screened out 9 participants not from the target countries.

Country	N	Percent
Austria	100	14
Germany	116	17
Ireland	105	15
Italy	150	21
Portugal	105	15
Spain	124	18
Total	700	100

2. Do you rent or own your home?
   →Screened out 55 participants who did not select "Own."

Response	N	Percent
Rent	0	0
Own	700	100
Other	0	0
Total	700	100

[40] We initially intended to recruit 100 participants from each country through MTurk, but were unable to recruit a sufficient sample during the COVID-19 crisis.

[41] Several participants were paid $0.50 before we increased the fee in an attempt to recruit more participants.

3. Why did you decide to buy rather than rent your home?
Text box, free fill in.

4. What do you think are good reasons for buying a home? Please select all that apply.
Order of options was randomized across participants, with "None of the Above" at the end.

Response	Percent Selected
Ownership provides peace of mind.	65%
Better selection of homes to buy than to rent.	19%
More flexibility to redecorate or remodel.	41%
House prices are likely to increase over time.	37%
Rent prices are likely to increase over time.	47%
Real estate is a good investment if there is inflation.	50%
Mortgage rates are low.	27%
Ownership provides tax benefits.	18%
Mortgage payments force me to save money.	15%
Mortgage payments are more predictable than rent prices.	31%
None of the above.	3%

Note: 26 respondents selected "I don't know what inflation is" in question 5 (Dynata only), 6, or 7 (Dynata and MTurk). These respondents excluded from tabs of questions 5-8 below.

5. Did concerns about inflation impact your decision to buy a home?

Response	N	Percent
Yes	228	34
No	380	56
I am not sure	66	10
Total who know what inflation is	674	100

6. Have you personally experienced high inflation? *[Asked only if know what inflation is.]*

Response	N	Percent
Yes	283	42
No	391	58
Total who know what inflation is	674	100

7. Do you worry about inflation in the future? *[Asked only if know what inflation is.]*

Response	N	Percent
Yes	460	68
No	214	32
Total who know what inflation is	674	100

8. What do you think inflation will be next year? *[Asked only if know what inflation is.]*

Mean	38
25th percentile	2
Median	3
75th percentile	10
SD	770
Total who know what inflation is	674

9. Were you born in *[Country from Q1]*?

Response	N	Percent
Yes	634	91
No	66	9
Total	700	100

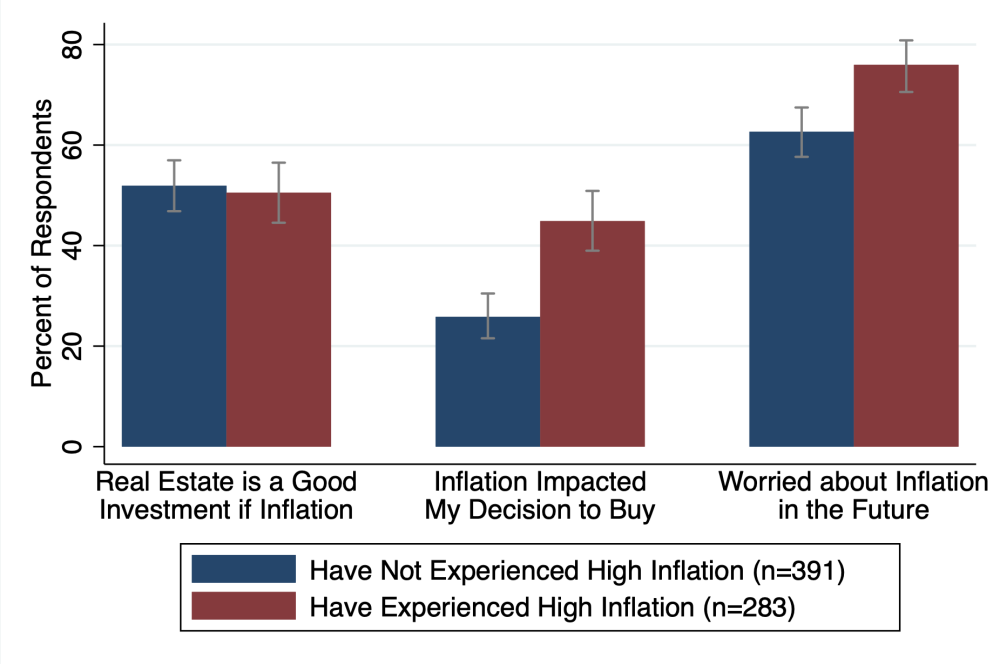
10. In which country were you born?*[Asked only if Q9=no.]*

11. What is your age?

Mean	44
25th percentile	34
Median	43
75th percentile	54
SD	13
Total	700

Results by Experience In addition to the results shown in the main section of the paper, we analyze the key results by those who indicated that they have vs. have not personally experienced high inflation.

We find no difference between the two groups in their evaluation of real estate as an inflation hedge. Figure B1 shows that about half of respondents indicated that real estate is a good investment if there is inflation regardless of whether they personally lived through high inflation. However, the figure also shows that those with high inflation experience were more likely to say that their own homeownership decisions were impacted by inflation (45% vs. 26%) and more likely to be worried about inflation in the future (76% vs. 63%).



Appendix Figure B1. Inflation results by inflation experience.

Figure shows means and 95% confidence intervals, separately for respondents who reported that they have (or have not) personally experience high inflation. Total sample includes 674 respondents who know what inflation is.

We also find that respondents who personally experienced high inflation have significantly higher expectations of next year's inflation. Excluding one outlier at 20,000%, expected inflation is 6.9% among those that did not experience high inflation and 11.3% among those who did. If we instead winsorize expected inflation at 20%, the 90th percentile, those with high inflation experiences have expected inflation about 1 pp higher than those who did not (means of 5.7% vs. 6.7%).

C Theoretical Framework

C.1 Generalized Theoretical Framework

In this section, we consider a more general version of our model. We relax some of the parameterizations and we allow for alternative inflation-protected assets (other than housing). To distinguish between the markets with and without an alternative inflation hedge, we introduce additional notation: $U_{t+1}(\cdot,\cdot,n_t)$ indicates utility when the alternative asset pays a nominal rate of n_t, and $U_{t+1}(\cdot,\cdot,r_t)$ indicates utility when the alternative asset pays a real rate of r_t.

In addition, we expand the model to allow for costs of ownership such as maintenance costs, property taxes, and costs of being a landlord (e.g., tenant protection, regulations, and rent control). We model the cost c as proportional to the value of housing and payable at $t+1$, amounting to cM_{t+1},[42] and assume that initial wealth is sufficiently high relative to housing costs to be positive under any realization, to accommodate the log utility specification.

We derive the utilities of renting and owning under fixed- and variable-rate financing in market with and without an alternative inflation hedge.

Housing as the only inflation hedge In this scenario, the alternative asset pays a nominal rate n_t between t and $t+1$, known to households at time t. Under this assumption, the household's expected utility conditional on renting is

$$\begin{aligned} E_t\left[U_{t+1}(R,h_t,n_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(R,h_t,n_t)}{1+\pi_{t+1}}\right)\right] \\ &= \log\left((w_t-h_t)(1+n_t)\right) - E_t[\log(1+\pi_{t+1})], \end{aligned} \tag{5}$$

where $w_{t+1}(R,h_t,n_t)$ is the nominal wealth in $t+1$ conditional on renting at the prevailing prices.

Households' expected utility conditional on buying with a fixed-rate mortgage is

$$\begin{aligned} E_t\left[U_{t+1}(FR,m_t,n_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(FR,m_t,n_t)}{1+\pi_{t+1}}\right)\right] \\ &= E_t[\log(M_t(1+\pi_{t+1})(1+g_{t+1})(1-c) - m_t(1+n_t^f) \\ &\quad + (w_t-(M_t-m_t))(1+n_t)) - \log(1+\pi_{t+1})], \end{aligned} \tag{6}$$

where $w_{t+1}(FR,m_t,n_t)$ is nominal wealth in $t+1$ conditional on buying and financing with a fixed-rate mortgage at the prevailing prices.

[42] The results are qualitatively unchanged if c grows with inflation instead of house prices.

Similarly, buying with a variable-rate mortgage m_t yields

$$\begin{aligned} E_t\left[U_{t+1}(\,VR, m_t, n_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(\,VR, m_t, n_t)}{1+\pi_{t+1}}\right)\right] \\ &= E_t[\log(M_t(1+\pi_{t+1})(1+g_{t+1})(1-c) - m_t(1+r_t^v)(1+\pi_{t+1}) \\ &\quad + (w_t - (M_t - m_t))(1+n_t)) - \log(1+\pi_{t+1})], \end{aligned} \tag{7}$$

where $w_{t+1}(\,VR, m_t, n_t)$ is nominal wealth in $t+1$ conditional on buying and financing with a variable-rate mortgage at the prevailing prices.

Housing with alternative inflation hedge. In the second scenario, the alternative asset is inflation-protected and pays a *real* rate r_t between t and $t+1$, known to households at time t. Here, the expected utility conditional on renting is

$$\begin{aligned} E_t\left[U_{t+1}(R, h_t, r_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(R, h_t, r_t)}{1+\pi_{t+1}}\right)\right] \\ &= E_t\left[\log\left((w_t - h_t)(1+r_t)(1+\pi_{t+1})\right) - \log(1+\pi_{t+1})\right] \\ &= E_t\left[\log\left((w_t - h_t)(1+r_t)\right)\right], \end{aligned} \tag{8}$$

where $w_{t+1}(R, h_t, r_t)$ is the nominal wealth in $t+1$ conditional on renting at prevailing prices.

The expected utility conditional on buying with a fixed-rate mortgage of value m_t is

$$\begin{aligned} E_t\left[U_{t+1}(FR, m_t, r_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(FR, m_t, r_t)}{1+\pi_{t+1}}\right)\right] \\ &= E_t[\log(M_t(1+\pi_{t+1})(1+g_{t+1})(1-c) - m_t(1+n_t^f) \\ &\quad + (w_t - (M_t - m_t))(1+r_t)(1+\pi_{t+1})) - \log(1+\pi_{t+1})] \\ &= E_t\left[\log(M_t(1+g_{t+1})(1-c) - \frac{m_t(1+n_t^f)}{1+\pi_{t+1}} + (w_t - (M_t - m_t))(1+r_t))\right], \end{aligned} \tag{9}$$

where $w_{t+1}(FR, m_t, r_t)$ is the nominal wealth in $t+1$ conditional on buying with a fixed-rate mortgage at prevailing prices.

The expected utility conditional on buying with a variable-rate mortgage of value m_t is

$$\begin{aligned} E_t\left[U_{t+1}(\,VR, m_t, r_t)\right] &= E_t\left[u\left(\frac{w_{t+1}(\,VR, m_t, r_t)}{1+\pi_{t+1}}\right)\right] \\ &= E_t[\log(M_t(1+\pi_{t+1})(1+g_{t+1})(1-c) - m_t(1+r_t^v)(1+\pi_{t+1}) \\ &\quad + (w_t - (M_t - m_t))(1+r_t)(1+\pi_{t+1})) - \log(1+\pi_{t+1})] \\ &= E_t[\log(M_t(1+g_{t+1})(1-c) - m_t(1+r_t^v) + (w_t - (M_t - m_t))(1+r_t))], \end{aligned} \tag{10}$$

where $w(\,VR, m_t, r_t)$ is the nominal wealth in $t+1$ conditional on buying with a variable-rate mortgage at prevailing prices.

The generalized model generates four equations capturing the sensitivity of utility to experiences. The pointwise derivatives of the utility difference between buying and renting with respect to inflation for each of the two types of mortgages and alternative assets are:

$$\frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(FR, m_t, n_t) - U_{t+1}(R, h_t, n_t)\right]\Big|_{\pi,g} = \frac{M_t(1+g)(1-c)}{w_{t+1}(FR, m_t, n_t|\pi, g)} > 0 \tag{11}$$

$$\frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(\,VR, m_t, n_t) - U_{t+1}(R, h_t, n_t)\right]\Big|_{\pi,g} = \frac{M_t(1+g)(1-c) - m_t(1+r_t^v)}{w_{t+1}(\,VR, m_t, n_t|\pi, g)} > 0 \tag{12}$$

$$\frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(FR, m_t, r_t) - U_{t+1}(R, h_t, r_t)\right]\Big|_{\pi,g} = \frac{m_t(1+n_t^f)}{w_{t+1}(FR, m_t, r_t|\pi, g)(1+\pi)} > 0 \tag{13}$$

$$\frac{\partial}{\partial \pi_{t+1}} \left[U_{t+1}(\,VR, m_t, r_t) - U_{t+1}(R, h_t, r_t)\right]\Big|_{\pi,g} = 0 \tag{14}$$

Because the partial derivatives are weakly positive in all four cases, our model predicts that homeownership will be increasing in experienced inflation in any market with a mix of funding opportunities and access to inflation hedges. Equations (11) and (12) confirm Prediction 1 from the main text, generalized in allowing for housing costs.

With equation (13) > 0, we confirm Prediction 1 under fixed-rate financing in a market with alternative inflation hedges. Here, the benefit of homeownership among households who have experienced higher inflation is that they can borrow at what they perceive to be a low real rate. In equation (14), we find no response of homeownership to experienced inflation in a market with an alternative inflation hedge (and thus no real-asset motivation) and variable-rate financing (and thus no cheap borrowing motivation).

We also find that Prediction 2 is robust to the existence of alternative inflation hedges. Equations (11) and (12) mirror the derivation in the main text. Turning to the scenario with alternative inflation hedges, (13)-(14)=(13)>0 implies that the effect of experienced inflation continues to be stronger with fixed-rate financing.

Finally, we confirm that the results of Prediction 3 are robust to the availability of inflation hedges. The pointwise derivatives of the utility difference between buying and renting with respect to house-price growth are:

$$\frac{\partial}{\partial g_{t+1}}\left[U_{t+1}(FR, m_t, n_t) - U_{t+1}(R, h_t, n_t)\right]\Big|_{\pi,g} = \frac{M_t(1+\pi)(1-c)}{w_{t+1}(FR, m_t, n_t|\pi, g)} \quad > 0 \qquad (15)$$

$$\frac{\partial}{\partial g_{t+1}}\left[U_{t+1}(\,VR, m_t, n_t) - U_{t+1}(R, h_t, n_t)\right]\Big|_{\pi,g} = \frac{M_t(1+\pi)(1-c)}{w_{t+1}(\,VR, m_t, n_t|\pi, g)} \quad > 0 \qquad (16)$$

$$\frac{\partial}{\partial g_{t+1}}\left[U_{t+1}(FR, m_t, r_t) - U_{t+1}(R, h_t, r_t)\right]\Big|_{\pi,g} = \frac{M_t(1+\pi)(1-c)}{w_{t+1}(FR, m_t, r_t|\pi, g)} \quad > 0 \qquad (17)$$

$$\frac{\partial}{\partial g_{t+1}}\left[U_{t+1}(\,VR, m_t, r_t) - U_{t+1}(R, h_t, r_t)\right]\Big|_{\pi,g} = \frac{M_t(1+\pi)(1-c)}{w_{t+1}(\,VR, m_t, r_t|\pi, g)} \quad > 0 \qquad (18)$$

Equations (15) and (16) mirror the derivation in the main text. Because the relationship between house-price growth and the benefit of homeownership is independent of the type of financing and availability of inflation hedges, equations (17) and (18) are also positive.

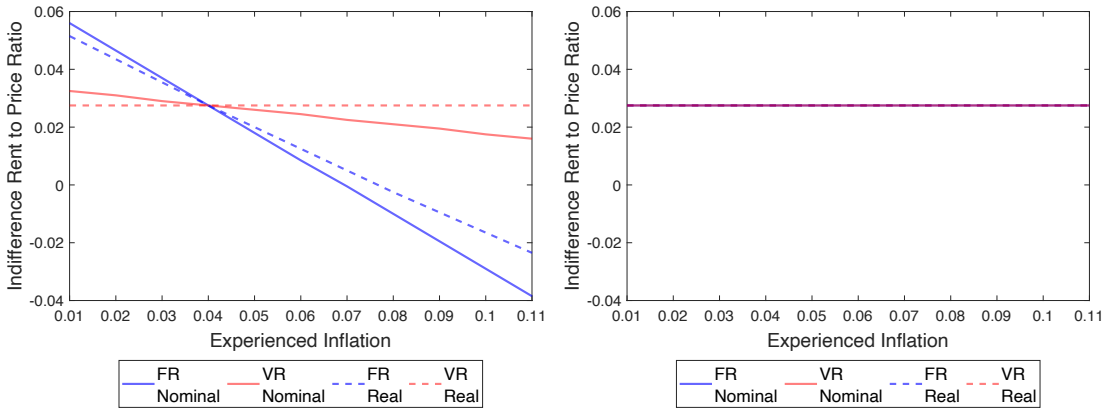
C.2 Simulations of the Model

To further illustrate the influence of experience-based learning in all four settings, we simulate tenure decisions under different plausible inflation-exposure scenarios. We will also use the simulations to consider a wider parameter space than in our baseline setting from Section 2 and under alternative assumptions.

Baseline. To simulate the model, we parametrize beliefs of agents who are influenced by past macro histories and, for comparison, of agents with rational beliefs. We start with the most simplistic version, by assuming that past macro histories induce deterministic beliefs that are exactly the same as what they observed in the past. For example, a household who sees 5% inflation in t would expect 5% inflation in $t+1$.

We explore the influence of past realizations of inflation on agents' tenure decisions under this parameterization in Figure C1(a). For each historical inflation level, we plot the rental price (as a percent of the house price, h_t/M_t) at which the agent is indifferent between renting and owning, separately for each the four markets: fixed- vs. variable-rate mortgage and with an alternative asset that pays a known nominal or real return. A lower h_t/M_t indicates a higher value of ownership relative to renting.[43]

[43] We also assume the household expects real house-price growth $g_{t+1} = 2\%$, has log utility over real wealth, initial wealth $w_t = 200,000$, house price $M_t = 100,000$, loan-to-value ratio $m_t/M_t = 0.8$, ownership costs $c = 2\%$, the alternative asset offers either a real return $r_t = 2\%$ or a nominal return $n_t = 6.1\%$ (corresponding to 4% anticipated inflation), and we assume mortgage rates carry a 1% premium relative to the alternative asset (i.e., $n_t^f = 7.1\%$ and $r_t^v = 3\%$).



(a) Experienced-Based Beliefs (b) Rational Beliefs

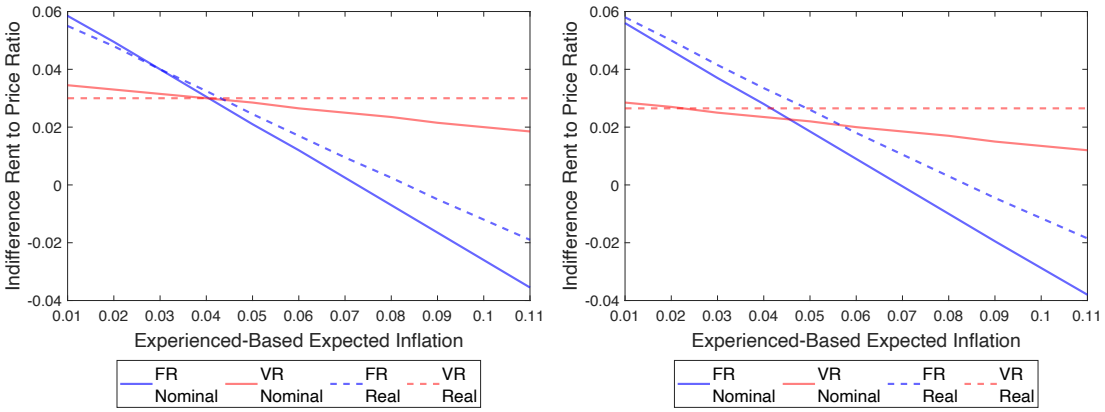
Appendix Figure C1. Simple simulation of the model

Figure C1(a) shows that, in all four markets, the slope is (weakly) negative, indicating that all else equal, higher past inflation increases the willingness to pay for ownership. Second, the effect of past inflation experiences on ownership is stronger when households have access to fixed- rather than variable-rate mortgages, evidenced by the steeper slope of the blue (darker) relative to the corresponding red (lighter) lines. Third, the graph shows that the effect of experienced inflation will be stronger in a market without alternative inflation hedges as the solid lines (for markets without inflation hedges) are steeper than the corresponding dashed lines (for markets with alternative hedging opportunities).

For comparison, in Figure C1(b), we plot the corresponding graph for a household who has rational beliefs. In this case, past realizations of inflation have no bearing on inflation expectations and therefore do not impact the relative value of ownership. All lines overlap.

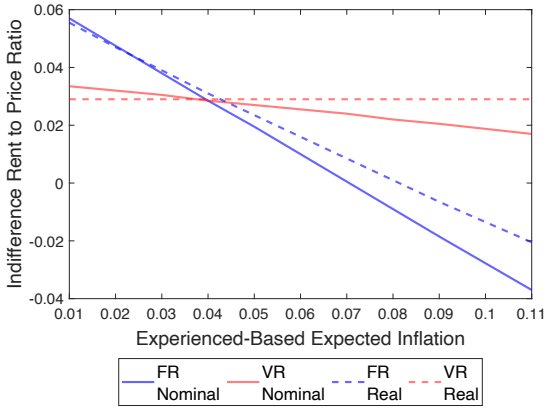
Note that there is a level of experienced inflation (in this case, 4%), at which the experienced-based household has the same beliefs as the rational household. If the experienced-based household lives through higher inflation, she is willing to pay more than the rational household for ownership. If she lives through lower inflation, she is willing to pay less.

In Figure C2, we present results under less simplistic parameterizations of experiences, namely, assuming instead that experienced-based households are uncertain about future inflation and real house-price growth. Specifically, we model households as having log-normal, uniform, or normally distributed beliefs about inflation and house-price growth. Along the x-axis we vary the mean of the experienced-based inflation belief distribution, fixing the standard deviation of beliefs about inflation and beliefs about house-price growth. Roughly consistent with the actual data, we assume the standard deviation of inflation beliefs is 6% and that real house-price growth is distributed with a mean of 2% and a standard deviation of 7%. Under all three distributional assumptions, the theoretical predictions



(a) Lognormal Distributions

(b) Uniform Distributions



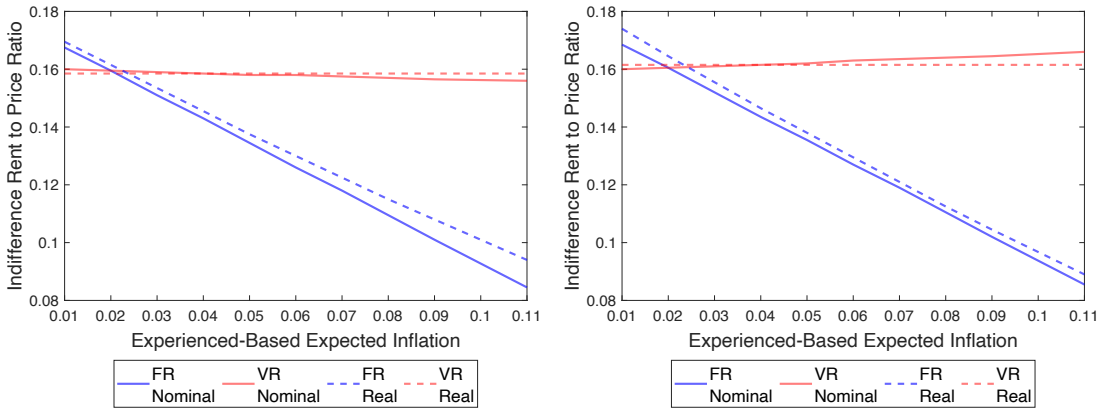
(c) Normal Distributions

Appendix Figure C2. Simulation with alternative distributions of beliefs

hold.

Robustness of Prediction 1. In the main text, we restrict the parameter space by requiring $M_t(1+g_{t+1})(1-c) > m_t(1+r_t^v)$. This condition fails when expected house-price growth is low, costs are high, LTV is high, and variable mortgage rates are high. Most predictions hold more generally, but, as we show in Section 2, the positive influence of past inflation on the value of ownership under variable-rate financing depends on this restriction in the scenario without an alternative inflation hedge. Assuming beliefs are normally distributed, in Figure C3(a) we show that Prediction 1 is robust to low beliefs about future house-price growth ($g_{t+1} \sim N(-2\%, 1\%)$), high costs of ownership ($c = 10\%$), and high variable mortgage rates ($r_t^v = 5\%$ compared to 3% in the benchmark simulations). In Figure

C3(b), we increase LTV all the way to 90% and find a slightly upward slope. That is, experiencing higher inflation predicts *lower* value of ownership for households who can finance with a variable-rate mortgage in a market with no alternative inflation hedges. However, the response remains strong in the predicted direction for households with access to fixed-rate financing. Assuming a mix of financing opportunities, the simulations imply that Prediction 1 still holds in the aggregate.



(a) Low g, high c, high variable-rate (b) Low g, high c, high variable-rate, high LTV

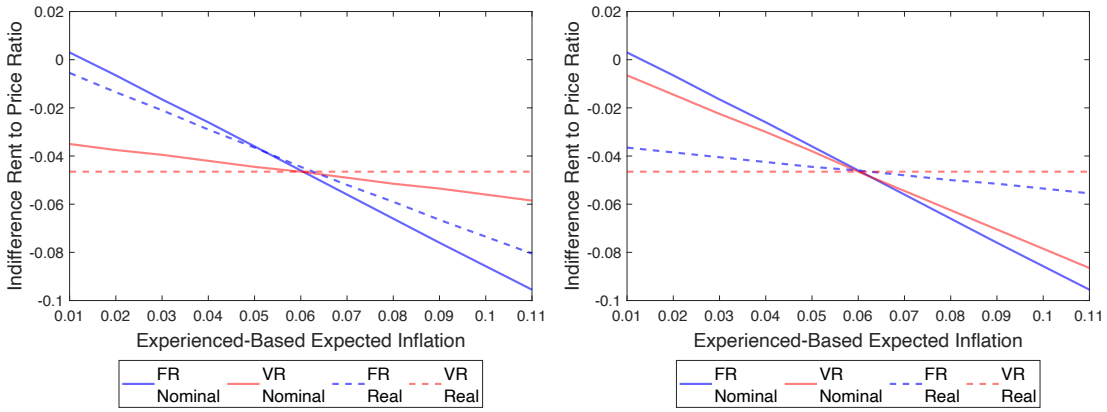
Appendix Figure C3. Stress test of Prediction 1

Robustness of Prediction 2. In a market with alternative inflation hedges, our model predicts an unambiguously stronger response to experienced inflation for households with access to fixed-rate compared to variable-rate financing. We argued in Section 2 that this is likely also the case in a market without alternative inflation hedges. In the simulations thus far, we have seen this evidenced by the fact that the solid blue line is steeper than the solid red line. In Figure C4, we test the robustness by simulating conditions least favorable to Prediction 2. Specifically, this prediction may fail when 1) $m_t(1+r_t^v)$ is small and 2)

$$\frac{M_t(1+g_{t+1})(1-c)}{w_{t+1}(FR, m_t, n_t)} << \frac{M_t(1+g_{t+1})(1-c)}{w_{t+1}(VR, m_t, n_t)}.$$

In Figure C4(a) we show that, although the magnitude drops, the prediction holds with low real rates relative to the nominal ($r_t = r_t^v = 1\%$, $n_t = n_t^f = 7\%$), a higher expected real house-price growth of 6%, and a 0% cost of ownership.[44] Lowering LTV to 20% (Figure C4(b)) greatly reduces the magnitude, however Prediction 2 still holds.

[44] We assume beliefs are log-normally distributed but results are similar for other distributions.

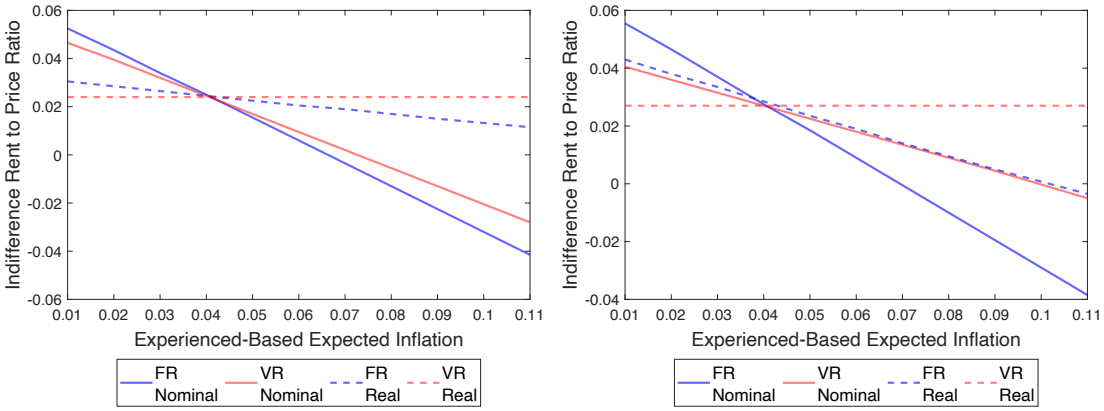


(a) Low real rates, high g, and low c (b) Low real rates, high g, low c, and low LTV

Appendix Figure C4. Stress tests of Prediction 2

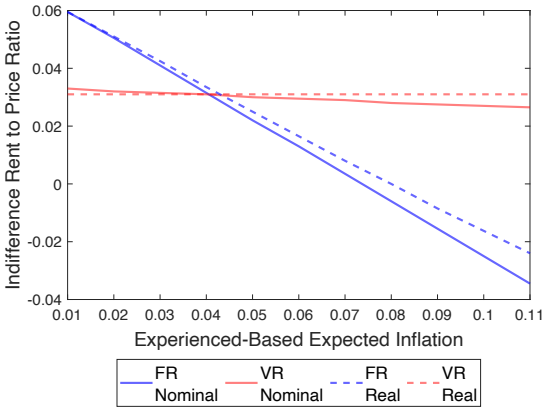
Loan-to-Value. In the baseline simulation, we assume the mortgage value is 80% of the value of the home. As discussed above, our predictions appear to be sensitive to loan-to-value ratios. Maintaining the benchmark parameters and varying only loan-to-value ratios, we find that the key predictions of our model hold except at LTVs above 90%, as demonstrated in Figure C5.

Housing Booms and Crises. We now explore the robustness of our predictions to more extreme changes in real house-price growth, as they may occur during housing booms or crises. To do this, we vary the assumptions about the mean real house-price growth, assuming beliefs about future inflation and house-price growth are normally distributed. Consistent with Prediction 3, we see in Figures C6(a) and (b) that higher mean g (i. e., a housing boom) increases the valuation of ownership overall, but does not meaningfully change Predictions 1 and 2. Similarly, a low mean $g = -2\%$ (i. e., a housing crisis) lowers overall ownership but does not affect our predictions, as demonstrated in Figure C6(c). Even in the case of an extreme housing crisis with mean $g = -20\%$ (Figure C6(d)), when mortgages would be underwater in the majority of the parameter space, Predictions 1 and 2 appear largely robust. At this very low g, we do see a reversal of Prediction 1 (though small in magnitude) in markets with variable-rate mortgages and no alternative inflation hedges.

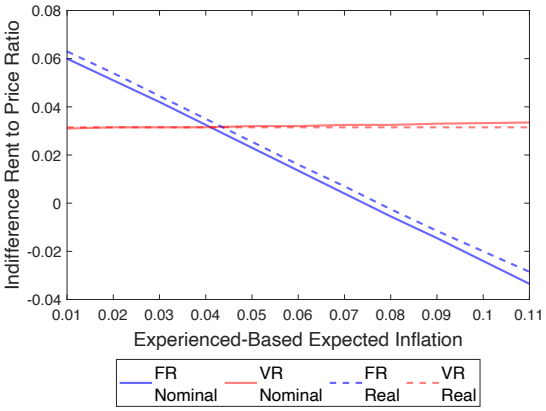


(a) 20% LTV

(b) 50% LTV

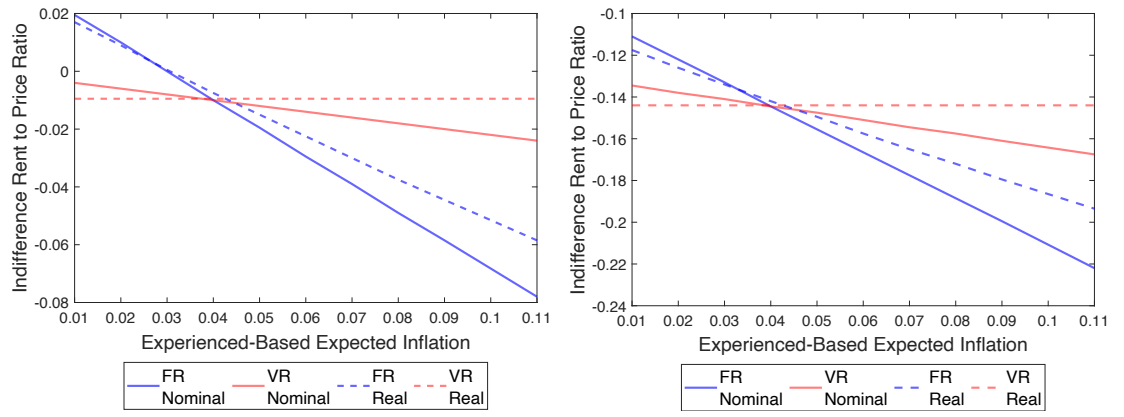


(c) 90% LTV



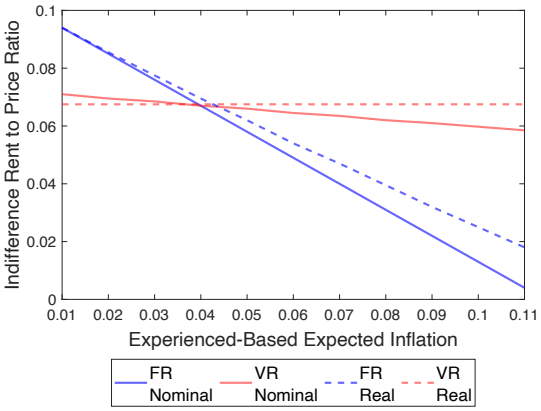
(d) 99% LTV

Appendix Figure C5. Simulation with alternative loan-to-value ratios

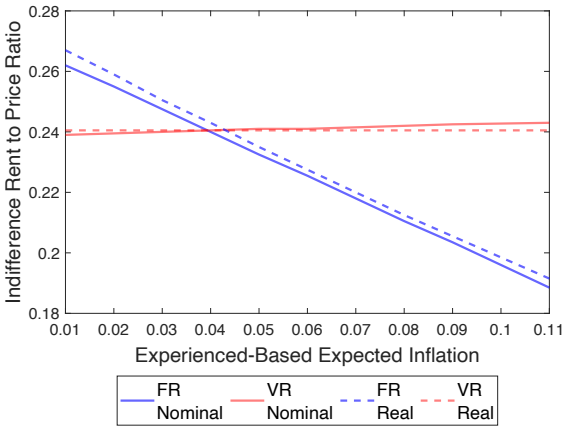


(a) Mean g 6%

(b) Mean g 20%



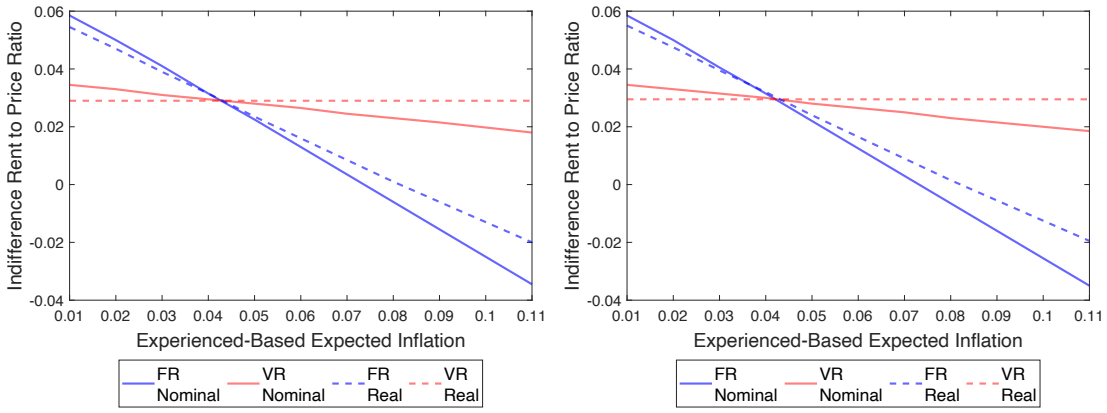
(c) Mean g -2%



(d) Mean g -20%

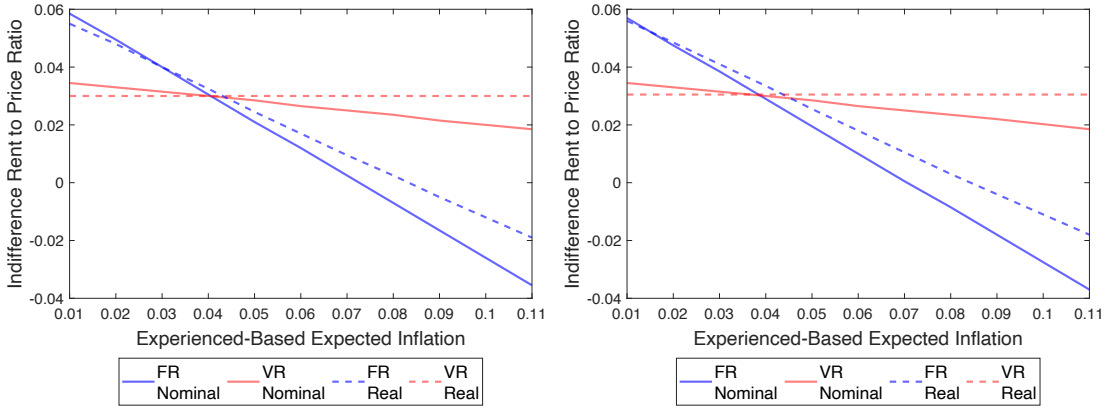
Appendix Figure C6. Simulation of extreme real house-price growth

Risk Aversion. The theoretical model assumes log utility. Here, we show that the results are robust to agents having more or less risk-averse preferences. We assume constant relative risk aversion and show that the predictions hold for a range of possible risk aversions in Figure C7.



(a) Risk Neutral (CRRA $\theta = 0$)

(b) Low Risk Aversion (CRRA $\theta = 0.25$)



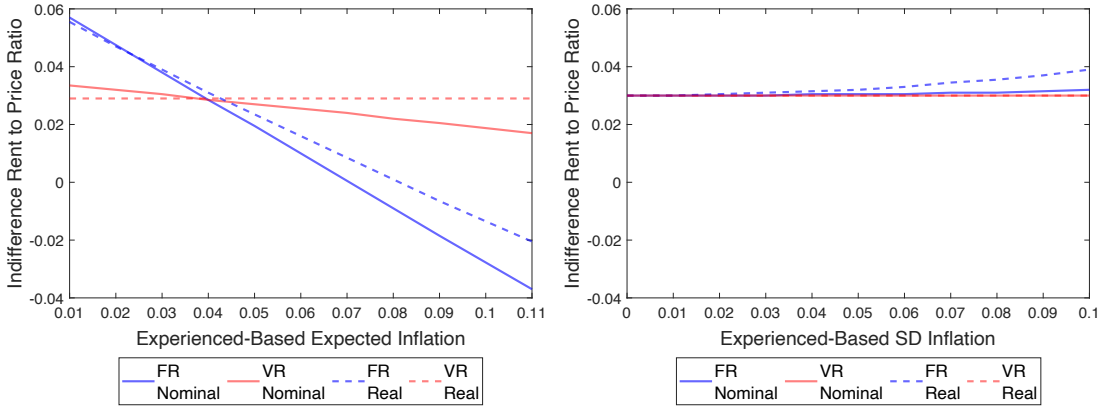
(c) Log Utility (CRRA $\theta = 1$), benchmark

(d) High Risk Aversion (CRRA $\theta = 2$)

Appendix Figure C7. Simulation with alternative levels of risk aversion

Inflation Variance. In the theoretical framework and in our empirical analysis, we model the level of experienced inflation as affecting the level of beliefs about future inflation. However, we can also think of the variance in experiences as affecting the variance of the belief distribution. In Figure C8(a), we replicate the benchmark graph with normally distributed beliefs, varying the mean of the distribution and holding the standard deviation at 6%. In Figure C8(b), we instead hold the mean of inflation beliefs fixed at 4% and vary the standard

deviation of inflation beliefs across the x-axis. Compared to changes in the means, we see little movement in the value of ownership as we vary the standard deviation of beliefs. The only detectable effect is a slight lowering in the value of ownership under fixed-rate financing in a market with alternative inflation hedges. By financing at a fixed-rate, the household gives up the inflation-hedging benefits of the alternative asset.



(a) Vary Mean Inflation (b) Vary SD Inflation

Appendix Figure C8. Simulations of experiences affecting the mean and variance of beliefs, normally distributed beliefs

D Alternative Measures of Inflation Experience

In Appendix Tables D1 and D2, we test several alternative methods of controlling for inflation experiences in the HFCS and ACS high-income country samples. In these tables, we standardize all continuous experience measures to facilitate comparisons of the magnitudes.

First, we demonstrate the robustness of our main result to the treatment of households with high inflation experience. In our baseline analyses, we apply a log transform to average experienced inflation over the lifetime to account for non-linearity in the effects and to limit the impact of high-experience outliers, with additional adjustments in the ACS data for negative and very high inflation experiences. In column (1) of both tables, we report the coefficient on the standardized measure of the log experienced inflation measures from our baseline specifications. In the HFCS, we find that a one standard deviation increase in the log of experienced inflation predicts a 44% increase in the odds of homeownership, or an increase from 65% to 73%. In the ACS, a one standard deviation increase in the winsorized measure of log experienced inflation predicts a 21% increase in the odds of ownership, or an increase from 65% to 69% ownership.

In column (2) of Appendix Table D1, we estimate a linear effect of experienced inflation in the HFCS. As in our main specification, we find a significant positive effect of experiences. A one standard deviation increase in experienced inflation predicts a 16% increase in the odds of homeownership, or an increase in the probability of ownership from 65% to 68%.

In column (3) of Appendix Table D1, we winsorize lifetime experienced inflation in the HFCS at 10%. We also include an indicator for any household above the threshold. This allows us to estimate effects on the entire sample, while accounting for the non-linearity we observed in the binned scatter data in Figure 5. In this specification, we find that a one standard deviation increase in winsorized experienced inflation is associated with a 74% increase in the odds of homeownership, or an increase in the predicted probability of ownership from 65% to 76%. We estimate a negative effect of being above the 10% threshold, indicating that the predicted probability of homeownership is lower for high-inflation households compared to those at 10%. We chose a 10% threshold to winsorize the data as it is a clear break distribution of experienced inflation (Figure 3(a)). Coincidentally, it also corresponds to the visual trend break in the binned scatter plot of homeownership and experienced inflation (Figure 5(a)). We estimate smaller, but qualitatively similar coefficients if we winsorize instead at 40% or 70%, which correspond to other natural breaks in the distribution.

In column (4) of Appendix Table D1 and column (2) of Appendix Table D1, rather than winsorizing the lifetime average of experienced inflation, we cap each year's inflation at 25% before calculating a weighted average over the lifetime. In this way, we limit the effect that any given year's inflation has on lifetime experiences. We also include an indicator for whether the household ever lived through inflation above the threshold (i. e., whether any year in their experienced inflation measure was above 25%). We find that the measure of

winsorized experienced inflation positively and significantly predicts higher homeownership, with a one standard deviation increase predicting an increase in probability of ownership from 65% to 73% in the HFCS and to 66% in the ACS. Using alternative annual thresholds of 50% and 100%, we continue to find a positive significant effect of the winsorized experience measure.

In column (3) of Appendix Table D2, we estimate a linear relationship with lifetime experienced inflation, winsorizing above at the 95th percentile to minimize the effect of outliers. We estimate a significant relationship, though of a smaller magnitude than our preferred specification.

Next, we test several conceptually different measures of experienced inflation.

In column (5) of Appendix Table D1 and column (4) of Appendix Table D2, we test the hypothesis that inflation volatility predicts individual homeownership. We calculate individual experienced inflation volatility as the standard deviation of inflation over the lifetime. In both samples, we estimate a significant and positive relationship between experienced inflation volatility and ownership, though smaller than that with the level of experienced inflation. In both specifications, a one standard deviation increase in inflation volatility is associated with an increase in homeownership from 65% to 67%. As we show in Appendix C, this weaker result is consistent with our model simulations.

We have also implemented an extended version of the AR(1) model as described in Malmendier and Nagel (2016) to estimate households' one-year inflation prediction from their lifetime experienced inflation. Extending the AR(1) model to our context is not straightforward as one-year inflation is unlikely to be relevant for homeownership decisions, which are long-term investments. Hence, we have to take a stance on the relevant forecast period for homeownership decisions as well as how individuals make long-term forecasts and iterate the one-year belief formation process forward.

Before we choose a set of assumptions, we start from simply relating homeownership to the original Malmendier-Nagel one-year forecast, despite the mismatch in horizon. We use their estimate of 3.044 for the gain parameter, and implement their AR(1) model to estimate households' one-year inflation prediction from their lifetime experienced inflation. In column (6) of Appendix Table D1, we find that the predicted inflation measure over the next-year significantly predicts the likelihood of being a homeowner.[45] Turning to the more relevant long-term horizon, we take the approach to let individuals recursively estimate an AR(1) model of inflation up to the year before the survey. We then assume that they use the estimated coefficients (as of the survey year) to iterate the model forward T periods to make a projection of inflation in each subsequent year, T. As shown in column (7), we find that the five-year aggregate inflation forecast significantly predicts ownership, with a slightly smaller estimated magnitude. We also find significant, though smaller, relationships using the predicted ten- and twenty-year inflation forecasts.

[45] The results are robust to using alternative gain parameters ranging from 2 to 5.

In the ACS data, we use a slightly different approach to calculate an experience-based forecast. Specifically, we calculate the one-year prediction from an OLS regression of inflation each year on lagged observed inflation over the immigrant's life so far with linearly declining weights. We winsorize the final measure to reduce the influence of several high-forecast outliers. As shown in column (5) of Appendix Table D2, we estimate a significant, though smaller, relationship between the forecast and homeownership. This alternative approach to estimate the forecast allows us to include a break in the estimated series at the time of immigration by including indicators for years in the birth country and the immigration year. Accounting for a break in the time series, we do not find any significant relationship with ownership.

In addition to the choice of timing, there are alternative ways of modeling long-term forecast formation, for example, assuming people anticipate future learning or assuming that people project their one-year forecast onto all future years. For these reasons, we choose to use the lifetime weighted average approach of measuring macroeconomic experiences in our main analyses.

Appendix Table D1. Alternative Measures of Inflation Experiences, Standardized Coefficients (HFCS)

Dependent Var: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Experienced Inflation (std.)	1.44***						
	(0.06)						
Experienced Inflation (std.)		1.16***					
		(0.03)					
Experienced Inflation (Wins. at 10, std.)			1.74***				
			(0.10)				
High-Inflation Experienced (Above 10)			0.71***				
			(0.07)				
Experienced Inflation (Wins. at 25 Each Year, std.)				1.44***			
				(0.06)			
Any Year High-Inflation Experienced (Above 25)				0.58***			
				(0.04)			
Standard Deviation of Experienced Inflation (std.)					1.09***		
					(0.01)		
Predicted AR(1) 1-Year Inflation Forecast (std.)						1.09***	
						(0.01)	
Predicted AR(1) 5-Year Inflation Forecast (std.)							1.05**
							(0.02)
Observations	220,605	220,605	220,605	220,605	220,605	220,605	220,605
Pseudo R^2	0.519	0.517	0.520	0.521	0.517	0.517	0.516

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. All regressions control for demographics (age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income), current macroeconomic conditions (inflation, real house-price growth, real GDP per capita, and employment rate), and survey wave fixed effects. Experienced Inflation is the weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. In column (3), experienced inflation is winsorized at 10% and we include an indicator for having experienced inflation above 10%. In column (4), each year's experienced inflation is winsorized at 25% prior to averaging and we include an indicator for ever living through a year of inflation above 25%. Volatility is measured as the standard deviation of annual experienced inflation over the lifetime so far. Predicted inflation is predicted from experienced inflation using an AR(1) model. 5-year forecast calculated by iterating estimated AR(1) model forward, fixing coefficients as estimated in the survey year. All continuous experience measures are standardized within sample.

Appendix Table D2. Alternative Measures of Inflation Experiences, Standardized Coefficients (ACS)

Dependent Var: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)
Log Experienced Inflation (Wins. at 0 and 10, std.)	1.21***					
	(0.01)					
Experienced Inflation (Wins. at 25 Each Year, std.)		1.04***				
		(0.01)				
Experienced Inflation (Wins. at 95th, std.)			1.03***			
			(0.01)			
Standard Deviation of Experienced Inflation (Wins. at 95th, std.)				1.10***		
				(0.01)		
Estimated AR(1) 1-Year Forecast (Wins. at 95th, std.)					1.06***	
					(0.01)	
Estimated AR(1) 1-Year Forecast with Break (Wins. at 95th, std.)						1.004
						(0.004)
Winsorized Above	0.66***	1.05***	0.99	1.18***	0.93***	0.58***
	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.03)
Negative Experienced Inflation	68.90***					
	(70.45)					
Observations	485,012	485,012	485,012	485,012	485,012	479,586
Countries	36	36	36	36	36	36
Pseudo R^2	0.269	0.268	0.268	0.268	0.268	0.263

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country of birth X cohort X immigration year X survey year in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data includes immigrants to the US from high-income countries in the 2006-2020 ACS, equal weighting immigrants. Dependent variable is an indicator for owning the home surveyed in. All regressions control for demographics (age, age-squared, gender, marital status, whether spouse is a US native, children in the home, education, employment status, decile of total household income, years in the US, years in the US-squared, English proficiency, and citizenship status), survey year fixed effects, the homeownership rate among non-immigrants in the same state, year, and metro status, and birth-country fixed effects. Experienced Inflation is the weighted average of inflation over the immigrant's lifetime, with linearly declining weights from the year before the survey to birth year, using inflation from the birth country from birth year to year of immigration to the US. In column (1), experience is winsorized below at the lowest positive experience level and above at 10 prior to taking the log. In column (2), each year's experienced inflation is winsorized at 25% prior to averaging and we include an indicator for ever living through inflation above 25%. In columns (3) to (6), experience measures are winsorized at the 95th percentile. Volatility is measured as the standard deviation of annual experienced inflation over the lifetime. Estimated AR(1) Forecast is the prediction from an OLS regression of inflation each year on lagged observed inflation over the immigrant's life so far with linearly declining weights. In column (6), we allow for a break in the estimated series at the time of immigration by including indicators for years in the birth country and the immigration year. All continuous experience measures are standardized within sample.

E Sources of Variation in Experienced Inflation

In this Appendix Section, we provide an example to illustrate how inflation histories translate to changes in experienced inflation through three primary sources of variation: country, age, and time. We consider the differences in experienced inflation between two countries in the HFCS (Germany and Greece) for two ages (30 and 60) at two time periods (in 2009-2011 during wave 1 and in 2014 during wave 2).

In Figure E1, we plot the inflation histories of Germany and Greece from 1950 to 2013. In Figure E2, we plot average experienced inflation for household heads aged 30 and 60 in these countries as surveyed in waves 1 and 2.

First, we consider the variation in experienced inflation across countries. For both ages and survey waves, Greece's high inflation during the 1980s and 1990s, shown in Figure E1, plays a large role in differentiating inflation experiences from those in Germany. It is the reason why experienced inflation in Greece is higher than in Germany across both ages and survey waves, as shown in Figure E2.

Second, we consider the variation in experienced inflation across ages. In both countries and both survey waves, 60-year-olds have higher experienced inflation than 30-year-olds. The variation in experienced inflation across ages comes from two sources: differences in inflation experiences and differences in weights assigned to specific past realizations. In our example, the main difference in inflation experience is that the older cohorts lived through the high inflation of the 1970s before the younger cohorts were born. The main effect of weighting is that, even for the inflation that both cohorts experienced, linearly declining weights over the lifetime imply that the same year will affect a 30-year-old's experience differently from a 60-year-old's: the younger cohorts have fewer years of experience, and thus will have a steeper weighting function over time. This makes recent experiences more important for the younger than for the older cohorts. In this example, both the young and old lived through low inflation since the 2000s, but this period contributes more to the experience of the young than the old.

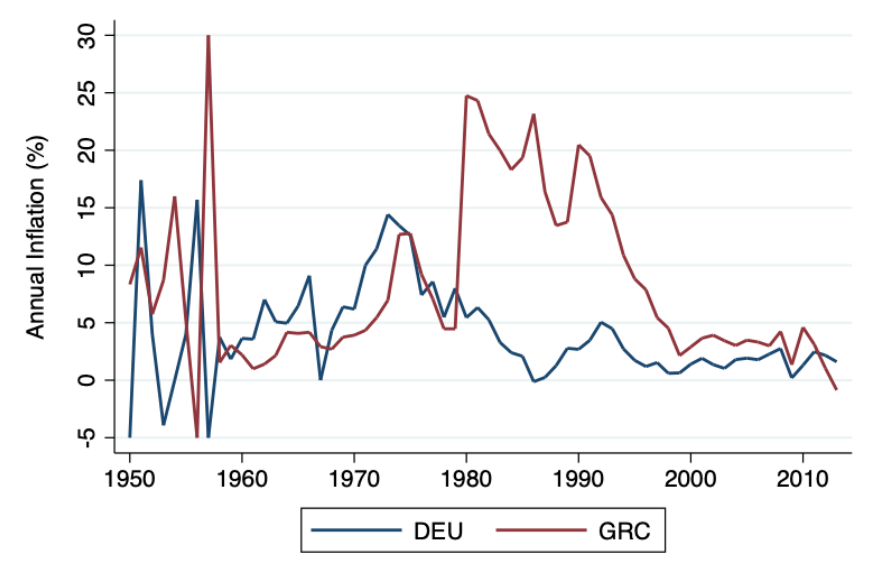
The third source of variation is time. Across the survey waves, experienced inflation fell from 2010 to 2013 as inflation was lower than average past experiences for all cohorts. In addition to level effects, changes over time introduce variation in the age profiles *within* a country over time: 30-year-olds in the latter waves have lived through four more years of inflation beginning in 2010 and four fewer years of inflation in the 1980s, compared to their counterparts from the first wave; 60-year-olds in the second wave have also lived through four more years of inflation in the 2010s than their counterparts from the first wave, but four fewer years in the early 1950s.

In Germany, annual inflation between waves 1 and 2 was between 1.3 and 2.5% each year. This resulted in almost no change in experienced inflation across waves for 30-year-olds and a reduction of 0.2 pp for the 60-year-olds. In this case, the difference was larger for 60-year-olds who did not experience high inflation in the early 1950s like their counterparts

in wave 1. In Greece, inflation was close to 5% in 2010 and fell to -1% in 2013. Due to the linearly declining weights, the low inflation years from 2010 to 2013 make up a larger portion of a 30-year-old's experience than a 60-year-old's and thus resulted in a larger change for 30-year-olds across survey waves. This widened the age gap in experienced inflation in Greece from 1.5 pp in wave 1 to 3.2 pp in wave 2.

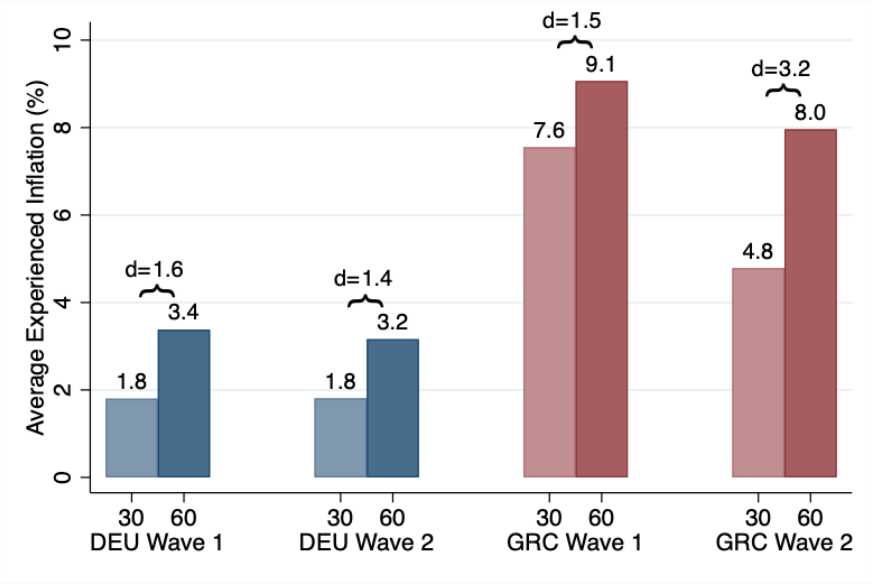
In the empirical analyses, we draw from all of these sources of variation in experienced inflation to identify correlations between experiences and homeownership. In our analyses controlling for age and survey wave, we remove the average differences in experiences across age groups and over time, but also common lifecycle and global market changes. In our analyses with country-wave fixed effects, we remove a key source of variation in country- and time-specific average experiences. Nevertheless, this is an important robustness check since cultural and market differences may affect homeownership. As we show, even with all of these controls, there is remaining variation in experiences within a country over time. (However, as we see graphically and empirically in Table 3, the within-country-time variation is much more limited.)

Indeed, we can return to the Germany-Greece example to illustrate the general estimation results from the paper. Although only one stylized example, many of the patterns in experienced inflation described above can be observed in the homeownership rates. In Figure E3, we plot homeownership rates for 30- and 60-year-olds in Germany and Greece as measured in waves 1 and 2 of the HFCS. To ensure a large enough sample, we extend to include all household heads in their 30s and 60s. As with experienced inflation, Greeks have higher homeownership rates than Germans and 60-year-olds have higher homeownership rates than 30-year-olds. Across the survey waves, the gap in homeownership between 30- and 60-year-olds is closing in Germany as inflation experiences become more similar and growing in Greece as inflation experiences diverge.



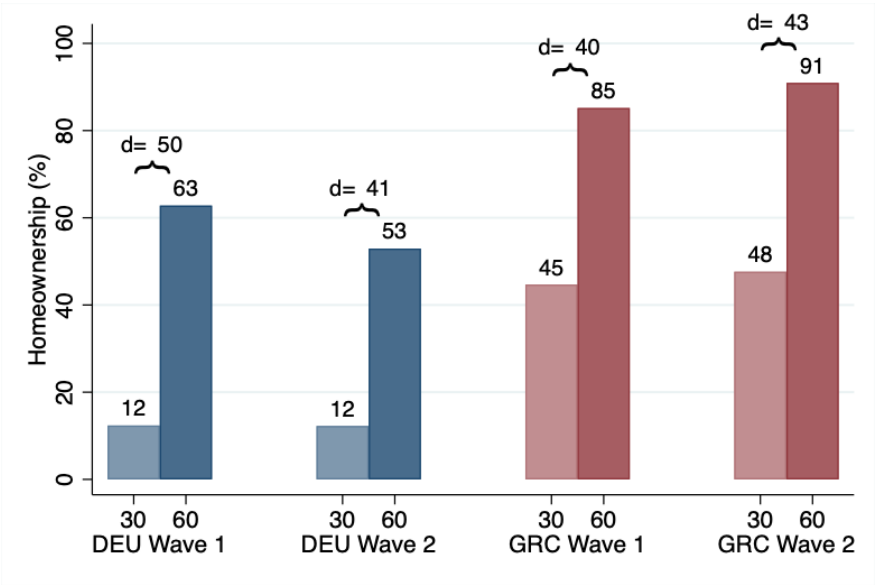
Appendix Figure E1. Inflation history of Germany and Greece

Annual inflation in Germany and Greece from 1950 to 2013. Inflation sources as described in the text. Inflation capped above at 30% and below at -5% for the figure.



Appendix Figure E2. Experienced inflation of 30- and 60-year-olds in Germany and Greece (HFCS)

Average of experienced inflation for household heads aged 30 and 60 in Germany and Greece over the first and second HFCS survey waves. Experienced inflation constructed as described in the text. For each country-survey wave, the graph also displays the difference in experienced inflation between household heads aged 60 and 30.



Appendix Figure E3. Homeownership of household heads in their 30s and 60s in Germany and Greece (HFCS)

Homeownership rates for household heads in their 30s and 60s in Germany and Greece over the first and second HFCS survey waves. Homeownership data from the HFCS. For each country-survey wave, the graph also displays the difference in homeownership rates between household heads aged 60 and 30.

F Expectations and Experiences in the HFCS

In this section, we explore the relationship between experiences, expectations, and homeownership in the HFCS. Because of the limited data on expectations, we cannot draw any strong conclusions from these analyses and leave in-depth exploration of these topics to other past and future work.

In Appendix Table F1, we test the predictive power of experiences on expectations. Inflation expectations are measured qualitatively in the HFCS in Belgium (waves 1-3), Germany (wave 1), Luxembourg (waves 1-2), and Slovakia (waves 2-3) with responses to the question "Over the next year, do you think prices in general will increase a lot, increase somewhat, decrease, or stay about the same?"

We begin with a qualitative replication of the findings of Malmendier and Nagel (2016). Specifically, we estimate 1-year inflation and house-price growth forecasts assuming individuals estimate the parameters of an AR(1) model over their lifetime experiences. We use the gain parameter estimated by Malmendier and Nagel (2016), adjusted for annual data.

In column (1) of Appendix Table F1, we use the estimated AR(1) forecast to predict inflation expectations, measured as the bins of expected inflation, in an ordered logit. We control for country-survey wave fixed effects and cluster standard errors by county-cohort-survey wave. The coefficient indicates that a 1pp increase in experience-based inflation forecast predicts a 16% increase in the odds of reporting a higher inflation expectation bin. Thus, like Malmendier and Nagel, we find that experienced inflation predicts reported inflation expectations.

Next we relate inflation and house-price growth experiences with house-price expectations. In wave 3 for 17 countries, respondents are asked about how they expect the price of the residence they are living in to change over the next 12 months. In 7 of these countries, house-price growth expectations are only elicited for homeowners. We note that this is similar to other surveys, like the Michigan Survey of Consumers, and is consistent with an implicit assumption that renters pay less attention to house prices than owners. However, house-price expectations for renters and owners likely differ, biasing analyses with the selected sample. Thus we focus on the 10 countries in which this question is asked for both owners and renters. To elicit expectations, respondents allocate 10 points across 5 different house-price growth scenarios.[46] As our measure of expected house-price growth, we calculate the mean of the implied probability distribution.[47] The question does not specify real house-price growth, so we assume the measure is intended to capture expectations about nominal price changes.

[46] For most countries the categories are decrease by more than 5%, decrease by 2 to 5%, no more than 2% change, increase by 2 to 5%, increase by more than 5%. Germany has upper and lower bounds of 4% instead of 5%.

[47] To calculate the mean, we assign each bin to the midpoint of bounded bins and the endpoint of the end bins (e.g., $+/-$ 5%).

In column (2), we estimate an OLS regression predicting the average house-price expectation with inflation expectations. If respondents were reporting nominal house-price expectations, and they believe real estate to be an inflation hedge, we would expect inflation experiences to predict expectations. In fact, we find almost no relationship. Similarly, in column (3), we find no relationship between an experience-based AR(1) forecast for nominal house-price growth. In column (4) we include both experience-based forecasts for inflation and real house-price growth and again find almost no relationship. The magnitudes imply that a 1pp increase in the experience-based real house-price growth forecast is associated with no more than a 0.08pp increase in expected house-price growth. If the forecast were perfectly predictive, we would expect this coefficient to be 1.

In Appendix Table F2, we directly control for these experience measures in our regressions predicting homeownership. With the limited sample of countries, we do not control for current macroeconomic conditions as in our main analyses. We do control for household demographics in all analyses and additionally for survey wave fixed effects in regressions with data from multiple waves. We standardize our measures of experienced inflation and mean nominal house-price growth expectations for comparison.

In columns (1) and (2), we show that experienced inflation predicts homeownership, with little reduction in the magnitude of the relationship after controlling directly for inflation expectations. In columns (4) and (5), we similarly find that the relationship between experienced inflation and homeownership is not moderated by average house-price growth expectations. Surprisingly, we find that higher expected house-price growth is associated with lower homeownership rates. In columns (7) and (8), we also control for experienced real house-price growth and find little change in the magnitudes of the relationship between experiences and homeownership after controlling for house-price growth expectations. Across all specifications, the predictive power of experiences is stronger than the survey measures of expectations, as evidenced by the higher R^2 in regressions with experiences over expectations.

Several hypotheses could explain these results. First, experiences may affect homeownership through a channel other than expectations (e. g., by changing the desire to protect from high inflation). Second, these survey expectation measures may only be noisy proxies for true expectations and thus are not strong predictors of behavior. For example, binned response categories could lower precision or respondents may be confused about real vs. nominal house-price growth. This could help reconcile, for example, our null result on the relationship between house-price experiences and expectations with those found in Kuchler and Zafar (2019). Third, even if these are precise measures, one-year expectations may not be relevant time dimension for long-term investment decisions. Unfortunately, with the available data, we cannot disentangle these hypotheses. We hope that future data sources will allow for further investigation.

Appendix Table F1. Predicting Inflation and House-Price Expectations (HFCS)

	Ordered Logit: Inflation Expectation Bins	OLS Regression: Mean Expected Nominal House-Price Growth		
	(1)	(2)	(3)	(4)
Predicted AR(1) 1-Year Forecast:				
Inflation	1.16***	-0.01*		0.00
	(0.04)	(0.01)		(0.05)
Nominal House-Price Growth			-0.00	
			(0.02)	
Real House-Price Growth				0.02
				(0.03)
Sample Ages	20-80	20-80	20-68	20-68
Country-Wave FE	X	X	X	X
Observations	15,940	25,200	13,442	13,442
Countries	4	10	4	4
Pseudo R^2	0.120	0.206	0.198	0.198

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Exponentiated coefficients (odds ratios) from an ordered logit regression in column (1) and OLS regression coefficients in columns (2) to (4). Standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1 in column (1) and from a coefficient of 0 in columns (2) to (4). Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable in column (1) is the response to "Over the next year, do you think prices in general will increase a lot, increase somewhat, decrease, or stay about the same?". Dependent variable in columns (2) to (4) is the implied mean of the distribution of expected house-price growth. Inflation and house-price growth forecasts calculated from a learning-from-experience AR(1) model as described in Malmendier and Nagel (2016).

Appendix Table F2. Predicting Homeownership with Experiences and Expectations (HFCS)

Dependent Var: Homeowner	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Experienced Inflation (std.)	2.39***	2.34***		1.91***	1.86***		1.70***	1.61***	
	(0.20)	(0.20)		(0.11)	(0.10)		(0.20)	(0.19)	
Experienced Real House Price Growth (std.)							1.24***	1.26***	
							(0.07)	(0.07)	
Inflation Expectations:									
Stay about the same		0.43***	0.34***						
		(0.12)	(0.09)						
Increase somewhat		0.64**	0.55***						
		(0.11)	(0.10)						
Increase a lot		0.79	0.67**						
		(0.14)	(0.12)						
Mean Nominal House-Price Growth Expectation (std.)					0.87**	0.82***		0.91	0.84***
					(0.05)	(0.04)		(0.06)	(0.05)
Sample Ages	20-80	20-80	20-80	20-80	20-80	20-80	20-68	20-68	20-68
Demographics	X	X	X	X	X	X	X	X	X
Wave FE	X	X	X						
Observations	15,936	15,936	15,936	25,181	25,181	25,181	13,425	13,425	13,425
Countries	4	4	4	10	10	10	4	4	4
Pseudo R^2	0.532	0.534	0.521	0.590	0.591	0.579	0.585	0.585	0.576

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Measures of experienced inflation and real house-price growth are calculated as the weighted average over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Demographics include age, age-squared, gender, marital status, children, education, employment status, and deciles of net wealth and household income. Bins of inflation expectations relative to decrease. Columns (7)-(9) limit the sample to household heads aged 20-68 in countries with sufficient house-price data to calculate measures of lifetime experience. Continuous measures are normalized to have a mean of 0 and variance of 1 in the relevant regression sample.

G Alternative Measures of Household Wealth

In our main HFCS analyses, we control for the decile of total household net wealth at the time of the survey. One concern with including wealth as an independent variable is that wealth may be endogenous if owning a home acts as a means of forced savings or asset accumulation.

In column (1) of Appendix Table G1 we try to address this endogeneity by removing home equity from net wealth. We calculate a homeowner's current home equity as the current value of their main residence minus current mortgages with household main residence as collateral. Experienced inflation continues to predict higher odds of homeownership, at statistically significant levels. The explanatory power of this model over the baseline treatment of wealth is significantly lower, with a Pseudo R^2 of 0.22 compared to 0.51 in our baseline model, Table 3, column (2).

One concern with this analysis is that we might be over-correcting. With this definition of wealth, a household suffers a large drop in wealth immediately after purchasing a home, when instead we should view those households as having the same wealth. As a way to try to improve upon the measure of wealth, we use the current value of the household's main residence and its value at the time of purchase to calculate a real gain from homeownership due to house-price appreciation. We then subtract this gain from wealth to calculate wealth net the gain from owning the main residence. We can only calculate this measure for a subset of households who, if owners, reported the purchase price of their home, so the sample size in column (2) is substantially smaller. Using this alternative definition of wealth, the effect of experienced inflation remains large and statistically significant.

Measuring wealth net of the increase in home price is not ideal for several reasons. First, this is a noisy measure as we can at most observe the increase in the price of the current home and not any previously owned property. Inertial effects in homeownership are likely to be problematic – if the household currently owns a home, they may be more likely to have owned a home in the past. Another problem with this variable is that it does not account for additional investment into the home. If the value of the home increases because the homeowner invested in adding a second floor, we would be subtracting more than just asset accumulation from being a homeowner. An additional concern is that for homeowners, this measure does not represent their counterfactual choice had they not purchased their home. For example, if a household purchased their home 20 years ago, we subtract 20 years of price increases but, presumably, the household would have invested their home equity elsewhere and would have received a return on their investment. For these reasons, we leave this as a robustness exercise.

Appendix Table G1. Alternative Wealth Measures (HFCS)

Dependent Variable: Homeowner	(1)	(2)	(3)	(4)	(5)
Log Experienced Inflation	1.71***	1.78***	1.66***	2.22***	1.47***
	(0.09)	(0.11)	(0.09)	(0.16)	(0.07)
Wealth and Income Deciles	Wealth net home equity	Wealth net HMR gain	Nominal	PPP-adj	Within-country
Other Demographics	X	X	X	X	X
Current Macro Conditions	X	X	X	X	X
Wave FE	X	X	X	X	X
Observations	220,605	172,137	220,605	199,173	220,605
Countries	22	22	22	19	22
Pseudo R^2	0.239	0.428	0.519	0.520	0.485

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Table reports exponentiated coefficients (odds ratios) from logit regressions with standard errors clustered by country X cohort X survey wave in parentheses. Stars indicate statistical difference from an odds ratio of 1. Data is the HFCS multiple-imputation data, using representative weights. Number of observations is the maximum N across the 5 imputations. Pseudo R^2 is the average across the 5 imputations. Dependent variable is an indicator for owning the household main residence. Log Experienced Inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from the year before the survey to birth year. Other demographics include age, age-squared, gender, marital status, children, education, employment status. Current macroeconomic conditions include inflation, real house-price growth, real GDP per capita, and employment rate in each country-year. In column (1), wealth is calculated as net home equity for owners with available price data. Column (2) excludes homeowners who do not report the purchase price of their home and uses wealth net of HMR gain, i. e., net wealth minus the gain from price appreciation of a homeowner's current home. Column (3) controls for nominal wealth and income. Column (4) adjusts wealth and income for purchasing power parity (limited to Euro Area countries). In Column (5), wealth and income deciles are defined within-country.

H Accounting for Persistence in Homeownership Using SHARE Data

Our main analysis tests the hypothesis that macroeconomic experiences predict homeownership *at the time of the survey*. However, homeownership is persistent and therefore the relevant experience measure may be experiences at the point of first home-ownership. With retrospective data from the SHARE, we are able to zoom in on the first home purchase and ask whether macroeconomic experiences throughout life predict if and when an individual first purchases a home.

The SHARE microdata consists of a panel following elderly individuals (above age 50) in countries across Europe, starting with the first wave in 2004 to the most recent wave in 2015. We use data collected primarily in 2008-2009 from the SHARELIFE wave of the study for 14 countries in Europe.[48] In this wave, study participants were asked retrospective questions about several major aspects of their life, such as family structure, employment status, and homeownership. The data allows us to construct a yearly panel for each individual from age 20 to the year of the survey with indicators for whether the individual was married, had children under the age of 18, was employed, whether they had established their own household, and tenure status.

We also calculate a measure of experienced inflation for each of these individual-year observations using the individual's country and age as described in Section 3.2. In addition to HFCS countries, the data also includes respondents in Denmark, Sweden, and Switzerland.

We drop about 6% of individuals with incomplete homeownership histories or who never established their own household. The final sample includes 26,691 individuals in 17,959 households from 14 countries. Appendix Table H1 displays the summary statistics.

Using this data, we estimate a Cox proportional hazard model, defining a failure as the first year in which the individual was a homeowner after establishing their own household. We allow for a flexible baseline hazard over age. The key independent variable is log experienced inflation, which we adjust for individual-years who have experienced the German hyperinflation (thus having an experienced inflation measure in the millions) or have a negative lifetime average. For each of these two groups, we include separate indicators and set log experienced inflation to 0.

[48] This paper uses data from SHARE Wave 3 (DOI: 10.6103/SHARE.w3.700, see Börsch-Supan et al. (2013) for methodological details). The SHARE data collection has been funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982) and Horizon 2020 (SHARE-DEV3: GA N°676536, SERISS: GA N°654221) and by DG Employment, Social Affairs & Inclusion. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the US National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

In all analyses, we control for the year, gender, and several time-varying demographics: whether the individual is married, has a child under the age of 18, and is employed. The results are in Appendix Table H2. In columns (1) and (2), we limit the analysis to the 65% of individuals with complete demographic data over the relevant time frame. In columns (3) and (4) we use all available data, filling covariates with 0 when missing and including indicators for missing demographics. In columns (2) and (4), we also add country fixed effects. Standard errors are clustered by country-cohort-year.[49]

The estimated hazard ratios in columns (1) and (3) indicate that a one log-point increase in experienced inflation predicts an 12-13% increase in the hazard of becoming a homeowner. The results are robust to controlling for country fixed effects in columns (2) and (4), where a 1 log-point increase in experienced inflation predicts a 17-23% increase in the hazard of homeownership. Hence, we confirm a significant role of past exposure to inflation on the decision to become a first-time homeowner and its timing.

[49] Our main results are unweighted as it is not clear that the SHARE survey weights are appropriate for the retrospective data. The estimated coefficients on log experienced inflation are smaller in all specifications if we instead use the calibrated cross-sectional individual weights and only marginally significant in column (2).

Appendix Table H1. Summary of SHARE Data

Country	Homeownership			Experienced Inflation (%)			
	Ever Own	Average Age First Own	Ind. Obs.	Mean	Median	SD	Ind.-Year Obs.
Austria	69%	30.3	909	8.2	6.6	6.0	21,294
Belgium	86%	30.6	2,731	3.7	3.6	1.1	46,074
Czech Republic	63%	28.6	1,778	0.6	-0.3	4.4	41,636
Denmark	89%	28.4	1,919	5.4	5.1	1.5	26,567
France	81%	33.7	2,254	9.5	8.1	4.8	47,308
Germany	65%	32.8	1,802	5.8	5.6	1.2	44,144
Greece	90%	31.5	2,935	26.7	13.2	29.1	46,101
Ireland	90%	29.9	792	5.9	5.2	2.4	11,635
Italy	78%	33.7	2,417	12.6	10.2	8.7	53,018
Netherlands	74%	31.1	2,135	4.6	4.4	0.9	46,181
Poland	69%	27.9	1,882	58.1	42.2	74.3	36,980
Spain	87%	32.2	2,122	8.3	7.8	1.8	37,825
Sweden	87%	31.4	1,781	5.2	4.9	1.4	30,814
Switzerland	65%	36.4	1,234	3.2	3.3	0.7	34,978
Total	79%	31.4	26,691	11.7	5.7	26.2	524,555

Notes: Summary statistics of microdata obtained from Wave 3 of the SHARE. Homeownership variables are on the individual level and describe the percent of individuals who ever own their home and the average age at first ownership for individuals who ever own. For summary statistics of experienced inflation, each observation is an individual-age. Includes ages 20 to the minimum of (1) age of first ownership, (2) age at survey year, and (3) age 80. Experienced inflation excluded for 3% of Germans who lived through the hyperinflation. Experienced inflation is the weighted average of inflation over the household head's lifetime, with linearly declining weights from year before the observation year to birth year.

Appendix Table H2. Inflation Experiences and First Year of Homeownership (SHARE)

	(1)	(2)	(3)	(4)
Log Experienced Inflation (capped)	1.13***	1.17***	1.12***	1.23***
	(0.01)	(0.02)	(0.01)	(0.02)
Experienced German Hyperinflation	1.51**	2.36***	0.93	1.88***
	(0.29)	(0.47)	(0.16)	(0.33)
Negative Experienced Inflation	1.10*	0.94	0.74***	1.01
	(0.05)	(0.07)	(0.04)	(0.07)
Male	0.96**	0.96**	1.04***	1.04**
	(0.02)	(0.02)	(0.01)	(0.01)
Married	11.26***	11.66***	9.51***	10.12***
	(0.42)	(0.42)	(0.34)	(0.35)
Has Child under 18	0.49***	0.50***	0.53***	0.54***
	(0.01)	(0.01)	(0.01)	(0.01)
Employed	1.61***	1.61***	1.11***	1.21***
	(0.04)	(0.04)	(0.02)	(0.03)
Sample	Complete Covariates		All Available Data	
Indicators for Missing Covariates			X	X
Year Fixed Effects	X	X	X	X
Country Fixed Effects		X		X
Observations	237,291	237,291	522,200	522,200
Individuals	17,412	17,412	26,691	26,691
Countries	14	14	14	14
Pseudo R^2	0.041	0.043	0.028	0.033

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Notes: Hazard ratios estimated from Cox proportional hazards model with failure defined as the first year of homeownership after establishing own household. Standard errors are clustered at the country X cohort X year level. Stars indicate statistical difference from an odds ratio of 1. Data are unweighted individual responses from the SHARE Wave 3 retrospective survey. We include time-varying indicators for being married, having children under the age of 18, and being employed. Columns (1) and (2) include only individuals with complete demographic data from age 20 to the first year of homeownership or survey year if never a homeowner. In columns (3) and (4), demographic indicators are filled with 0s for approximately 50% of observations with at least one missing covariate. Log experienced inflation is the log of weighted average of inflation over the household head's lifetime, with linearly declining weights from year before the observation year to birth year. This variable is 0 for households who lived through the German hyperinflation and for those with negative experienced inflation, with corresponding indicators.