Rent or Buy? The Role of Lifetime Experiences of Macroeconomic Shocks within and across Countries

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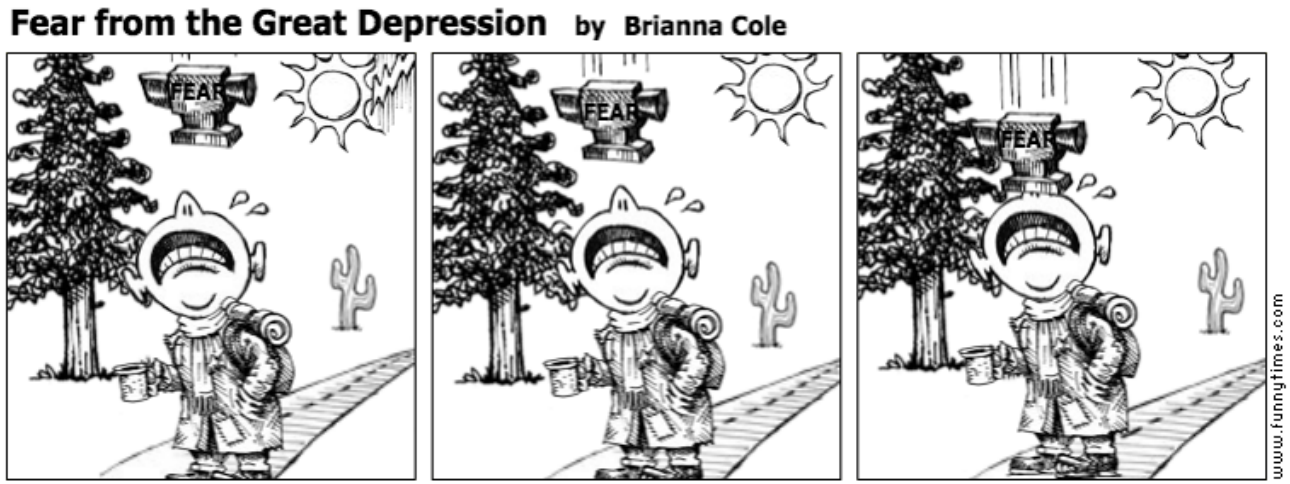
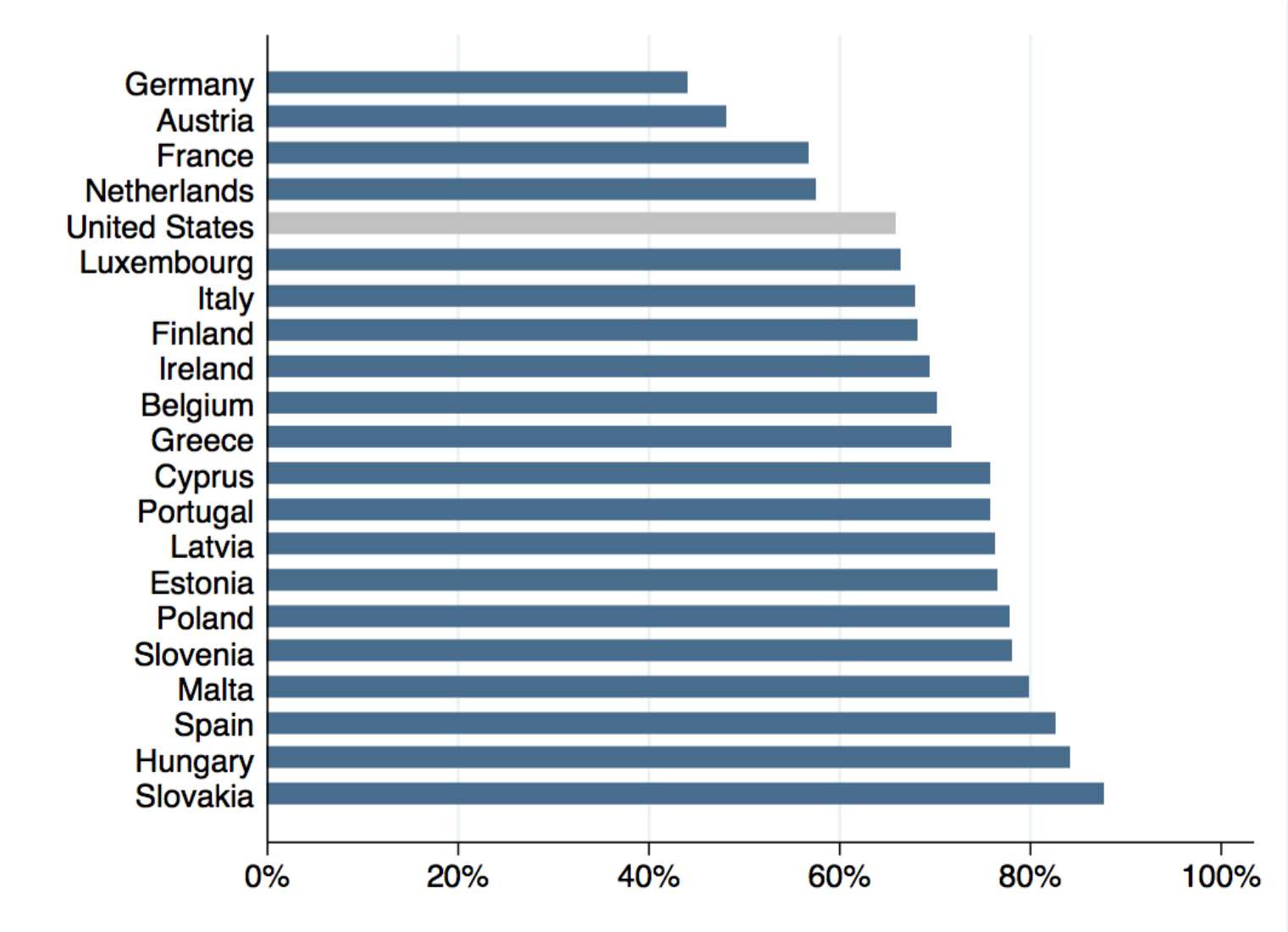


Housing Market Participation Puzzle: Across countries



Sources: ECB Household Finance and Consumption Survey. US homeownership rate is the average of homeownership rates in 2008-2015 from the CPS.

Housing Market Participation Puzzle: Within countries

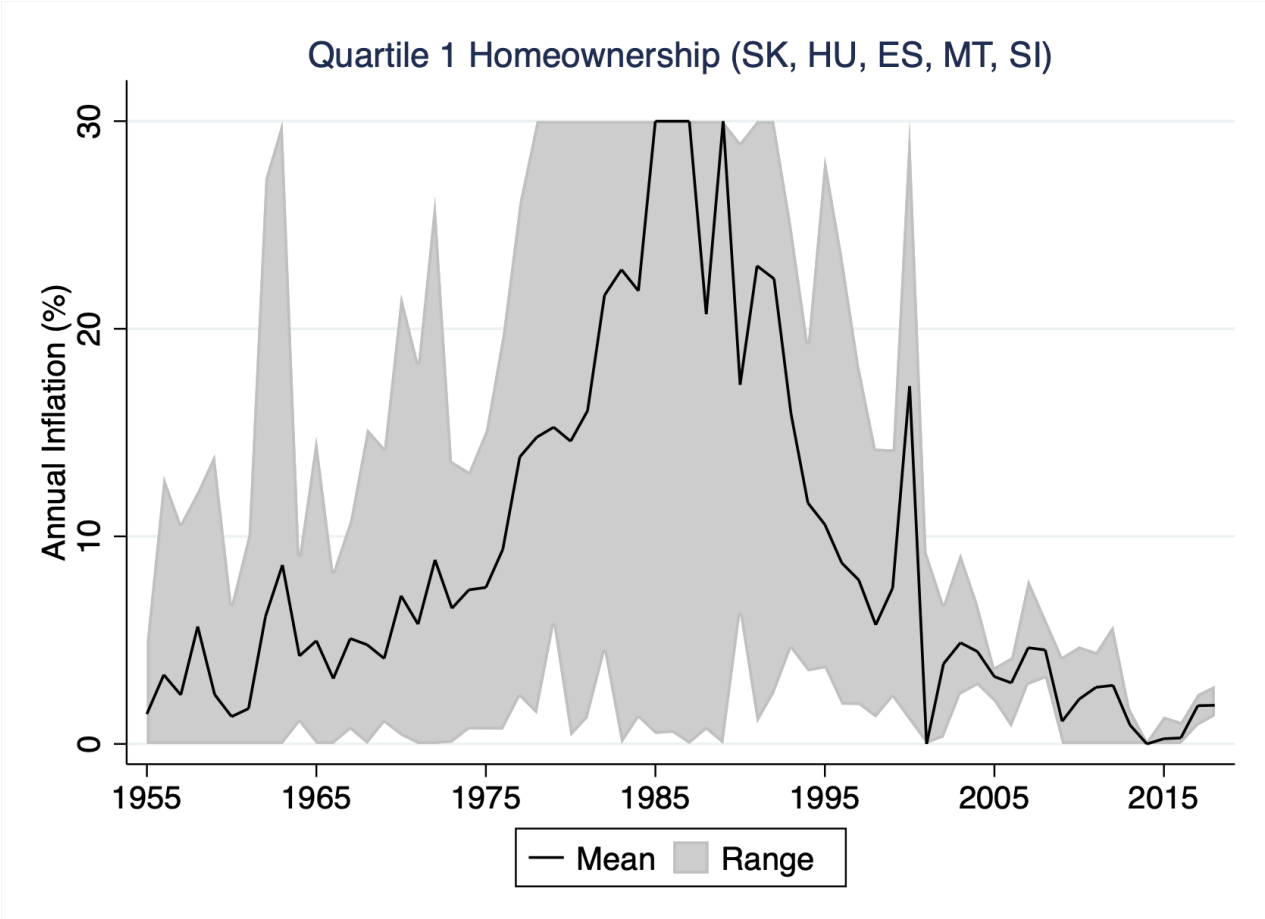
- Italy: fewer 30-year-olds than 60-year-olds are homeowners (49% vs 80%)
- NL: reversed pattern, more 30-year-olds than 60-year-olds are homeowners (63% vs 59%)

What drives large differences?

- Commonly discussed factors include:
  - **Household characteristics**: age, family structure, employment status, income, wealth, and access to mortgage debt (e.g., Drew and Herbert 2013).
  - **Housing market factors**: government policies encouraging renting vs. owning, maturity of mortgage markets, transaction costs, and variations in housing supply (e.g., Earley 2004).
- New consideration: relationship with country-specific macroeconomic experiences.
  - Past experiences of political, institutional, and economic conditions exert a longlasting influence on attitudes and beliefs (cf. Alesina and Fuchs-Schuendeln 2007, Luttmer and Singhal 2011, Giuliano and Spilimbergo 2011).
  - **Conjecture**: Past experiences of high inflation trigger the desire to protect financial wealth from devaluation and have a longlasting influence on home purchases.

Motivating Evidence (1): HO and Historical Inflation

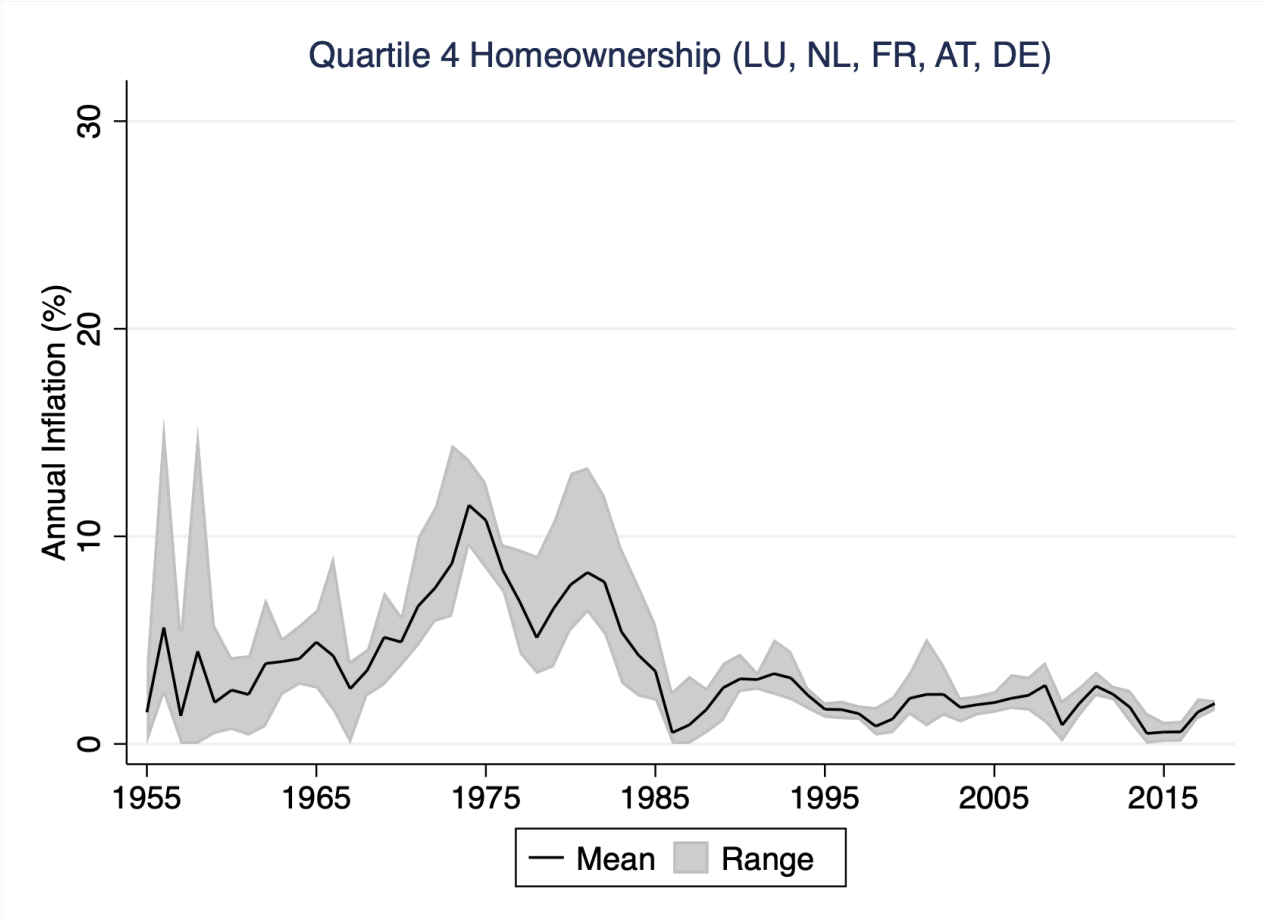
EU countries with highest homeownership rates



Note: Figure plots the mean and range of inflation across countries in the quartile. Inflation for figure capped above at 30% and below at 0%.

Motivating Evidence (1): HO and Historical Inflation

EU countries with lowest homeownership rates



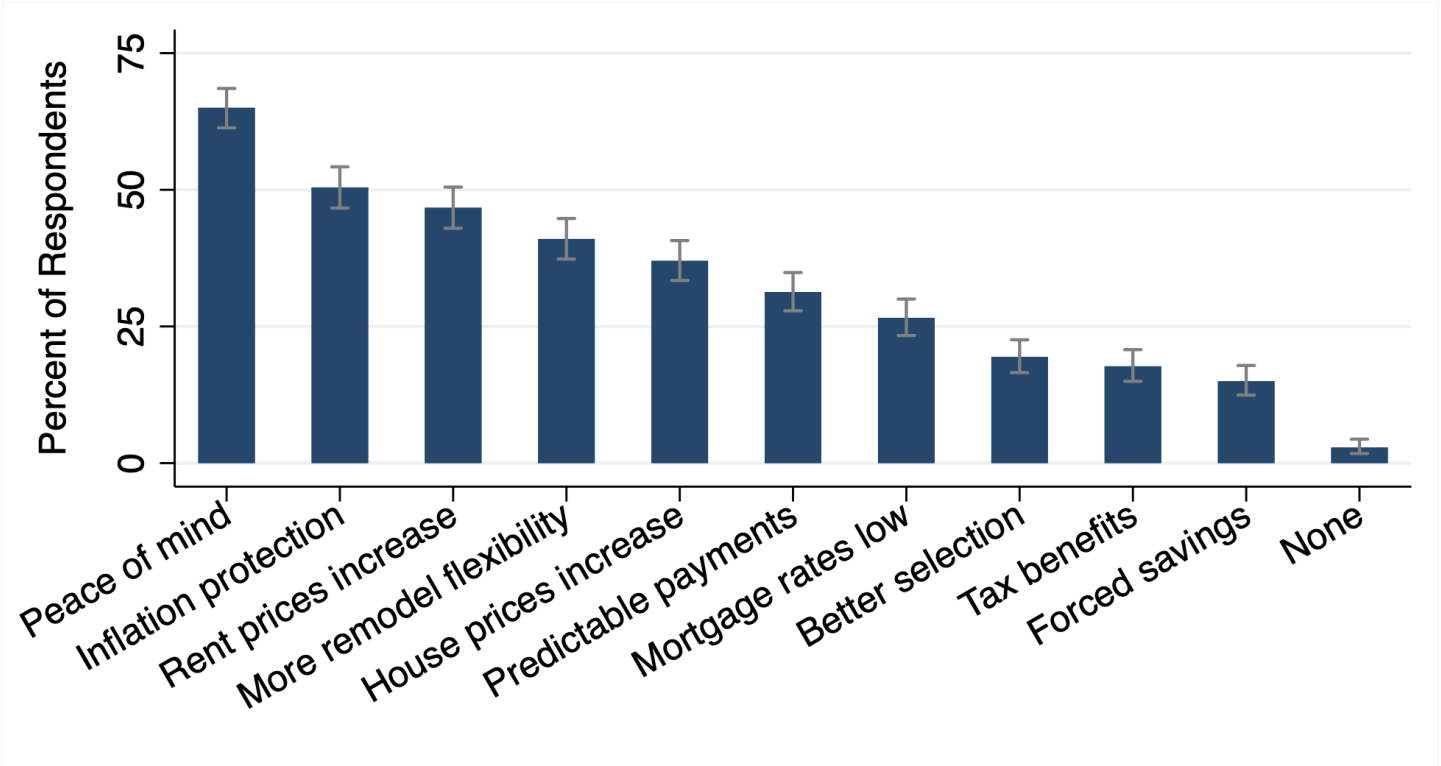
Note: Figure plots the mean and range of inflation across countries in the quartile. Inflation for figure capped above at 30% and below at 0%.

Motivating Evidence (2): HO Survey

- Surveyed 700 homeowners in Austria, Germany, Italy, Portugal, Spain in March/April 2020.
- **Question 1**: "What do you think are good reasons for buying a home?" (10 options, randomized)
- **Question 2**: "Did concerns about inflation impact your decision to buy a home?"
- **Question 3**: "Did you personally experience high inflation?"
- **Question 4**: "Do you worry about inflation in the future?"

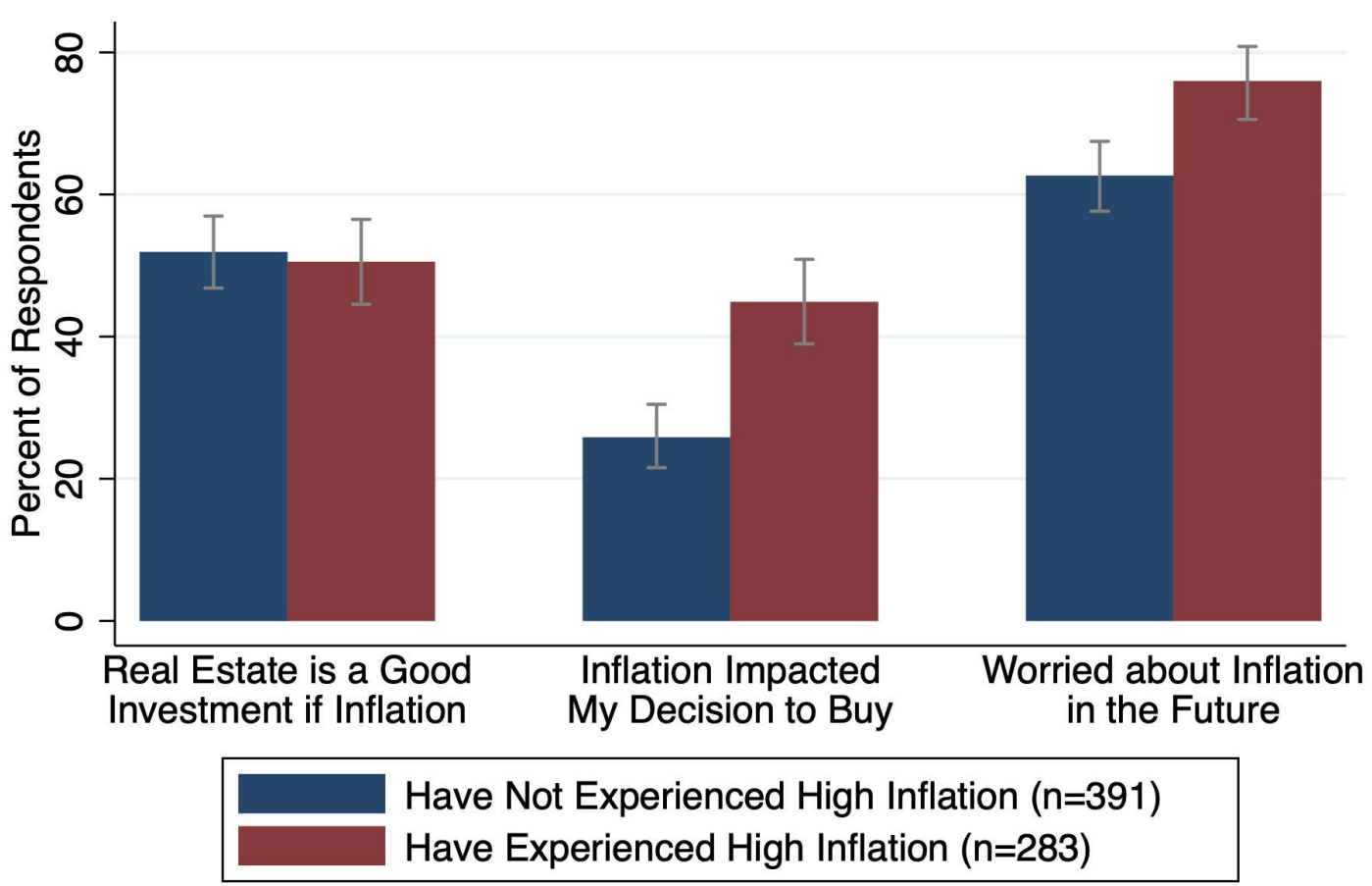
What do you think are good reasons for buying a home?

About 50% identify inflation hedging as an important reason.
(Second highest after "peace of mind.")



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.

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



Our Question

- Our Question: Do differences in inflation experiences over the past decades help predict household tenure choice and the composition of housing markets, *both across and within countries*, beyond known determinants?
- Growing literature on **experience effects**
  - How macroeconomic experiences influence financial and consumption decisions
  - Significant impact of macroeconomic experiences on interest rate beliefs, inflation beliefs, and portfolio choices (Malmendier and Nagel (2011, 2016), Knüpfer et al. (2016) etc.).

Theoretical Motivation

Stylized model of agent's decision to rent or buy their home

- Key assumption: experienced-based learning (generalized)
  - Agents' beliefs about future inflation and house price growth increasing in their experiences.
- Key channel:
  - Experiencing higher inflation increases value of real estate as an inflation hedge.
  - Experiencing higher inflation increases attractiveness of buying with an FRM as a form of cheap borrowing.
- Key results:
  - **Prediction 1**: Demand for homeownership increases in experienced inflation.
  - **Prediction 2**: Experienced inflation matters less for households in PVR countries.
  - **Prediction 3**: Demand for homeownership increases in experienced house price growth.

Empirical approach

Test whether experiences predict differences in homeownership rates across countries and differences in the likelihood of homeownership among individual households.

1. American Community Survey (**ACS**): US Housing Market
   - We focus on 200,426 immigrants from countries in the HFCS over a sample period from 2001 and 2015

2. ECB Household Finance and Consumption Survey (**HFCS**): Within and Across European Housing Markets
   - Cross-sectional information on households' finances and consumption in 2008-2015 for 20 countries.
   - Use ECB-provided weights that are representative of each country and the EU population (inverse probability of being sampled and non-response) and multiple imputation data.

Measuring experiences with historical data

- **Inflation:** Reinhart - Rogoff inflation series (2010), Global Financial Data, IMF data, Apostolides (2011), Michal (1960).
- **Real House Price Growth:**
  - Knoll, Schularick, and Steger (2017) and Bordo and Landon-Lane (2013): full data for 6 of the 20 countries (Belgium, Finland, France, Germany, the Netherlands, and Spain).
  - Federal Reserve Bank of Dallas: available from 1975 onward and for 9 of the 20 countries (Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, and Spain).

Measuring experiences

- We measure macroeconomic experiences using linearly declining weights over the lifetime (c.f. Malmendier and Nagel (2011))
- The experienced inflation for household i in year t is given by

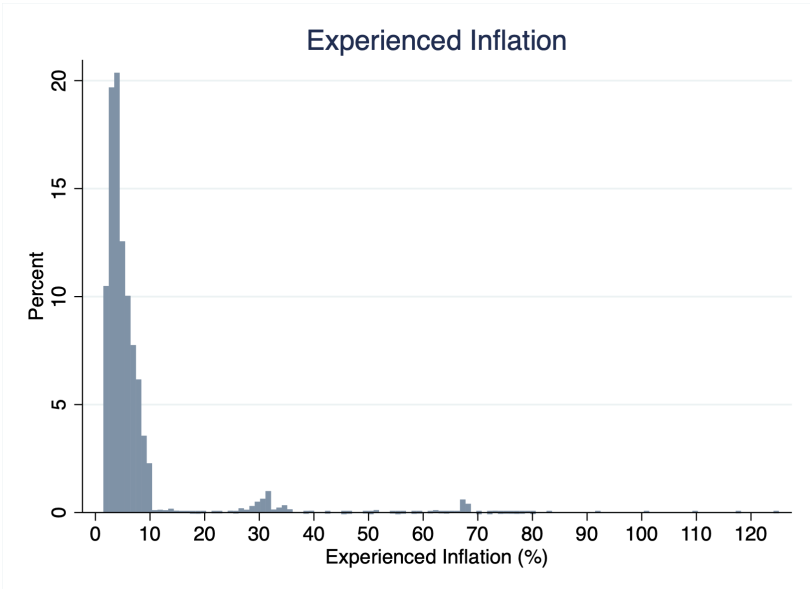
$$\pi_{i,t} = \frac{\sum_{k=1}^{age_{i,t}-1} w_{i,t}(k)\pi_{t-k}}{\sum_{k=1}^{age_{i,t}-1} w_{i,t}(k)}$$

where the weights are given by

$$w_{i,t}(k) = age_{i,t} - k$$

Distribution of Experienced Inflation

We apply a log transformation to the household measure of experienced inflation



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

Immigrants to the U.S.: American Community Survey

- Experienced inflation calculated using birth country inflation until year of immigration and U.S. inflation after.
- Controls include
  - household head age
  - gender
  - marital status and if married whether spouse is U.S. native
  - having children in the home
  - education level
  - employment status
  - decile of total household income relative to the entire ACS population
  - years living in the U.S.
- Also control for the homeownership rate in the same state and year among U.S. natives.

Results from the ACS

	Immigrants			All	
Dep. Var.: Homeowner	(1)	(2)	(3)	(4)	(5)
Experienced Inflation (log)	1.11***	1.08***	1.04**	1.99***	2.64***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)
State-Year Homeownership Rate		1.07***	1.07***		
		(0.00)	(0.00)		
Years in U.S. (% of Life)	1.01***	1.01***	1.01***	1.02***	1.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
U.S. Native				0.58***	
				(0.01)	
Demographic Controls	Yes	Yes	Yes	Yes	Yes
Extreme Experience Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Country of Birth FE	No	No	Yes	No	Yes
State & State x Year FE	No	No	No	Yes	Yes
Observations	200,426	200,426	200,426	12,468,374	12,468,374
Pseudo R^2	0.222	0.236	0.239	0.266	0.267

Notes: Odds ratios from logit regressions with robust standard errors in parentheses. 2001-2015 ACS survey data, using representative weights. $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Economic Magnitude

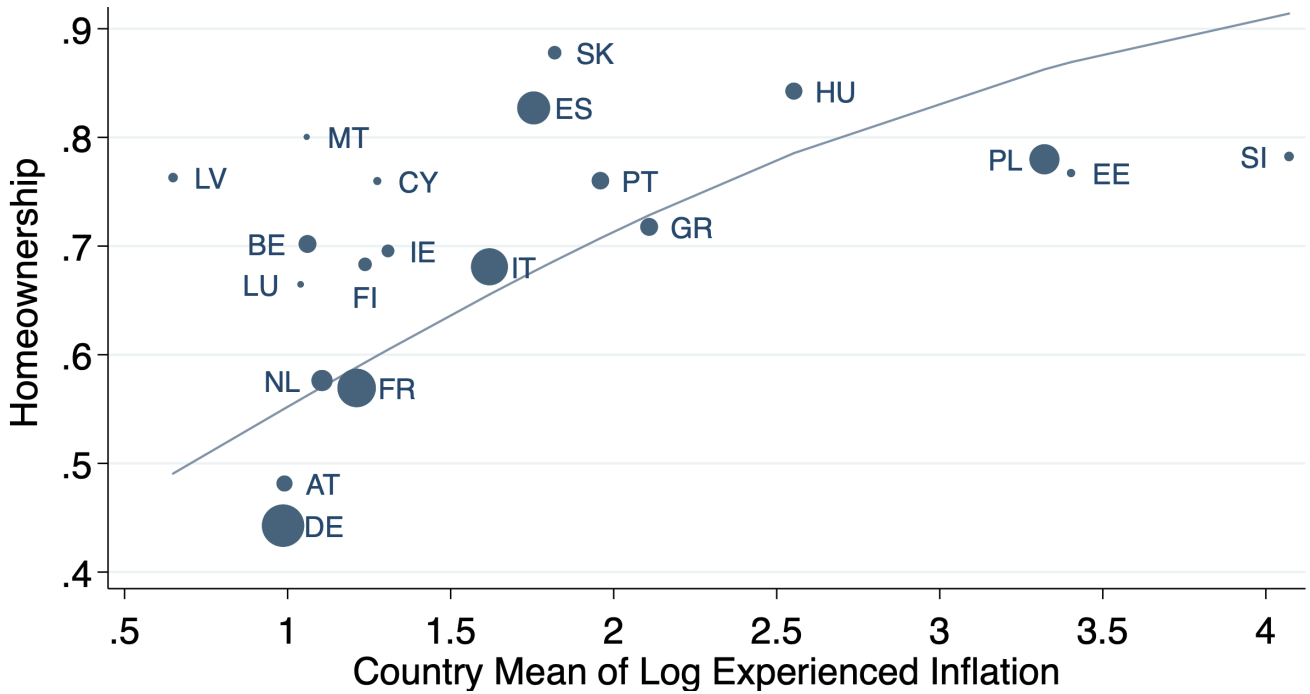
- A 1 log-point increase in experienced inflation predicts an 11 pp increase in the odds of ownership.
  - For a household head with a baseline probability of ownership of 65% (roughly the average in our sample) our estimation predicts that increasing one log-point in experienced inflation increases the likelihood of ownership to 67%.
- Magnitude increases dramatically when including U.S. natives, most of whom have experienced relatively low inflation compared to the immigrant population.
  - A one log-point in experienced inflation predicts an increase in the likelihood of ownership from 65% to 79-83%.

Experience effects using the HFCS

- Aggregating experience to the country level, we run logit regressions of national homeownership rate on country's average inflation experience.
- At the household level, we run logit regressions of homeownership on experience measures controlling for the following household demographics.
  - age
  - gender
  - marital status
  - indicator for having children
  - education level
  - employment status
  - log income
  - log net wealth
  - Housing market factors- measures of tenant protection, tax benefits to homeowners, and comparative rent levels from Andrews, Caldera Sanchez, and Johansson (2011)
  - Country fixed-effects

National homeownership rate and average inflation experiences

- Logit regression gives estimated odds ratio of 2.02 (s.e. 0.53)
- An increase in the average of log experienced inflation from 1.1 (as in the Netherlands) to 2.1 (as in Greece) is associated with a 16pp higher homeownership rate, e. g., from 65% (sample average) to 81%.



Note: 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.

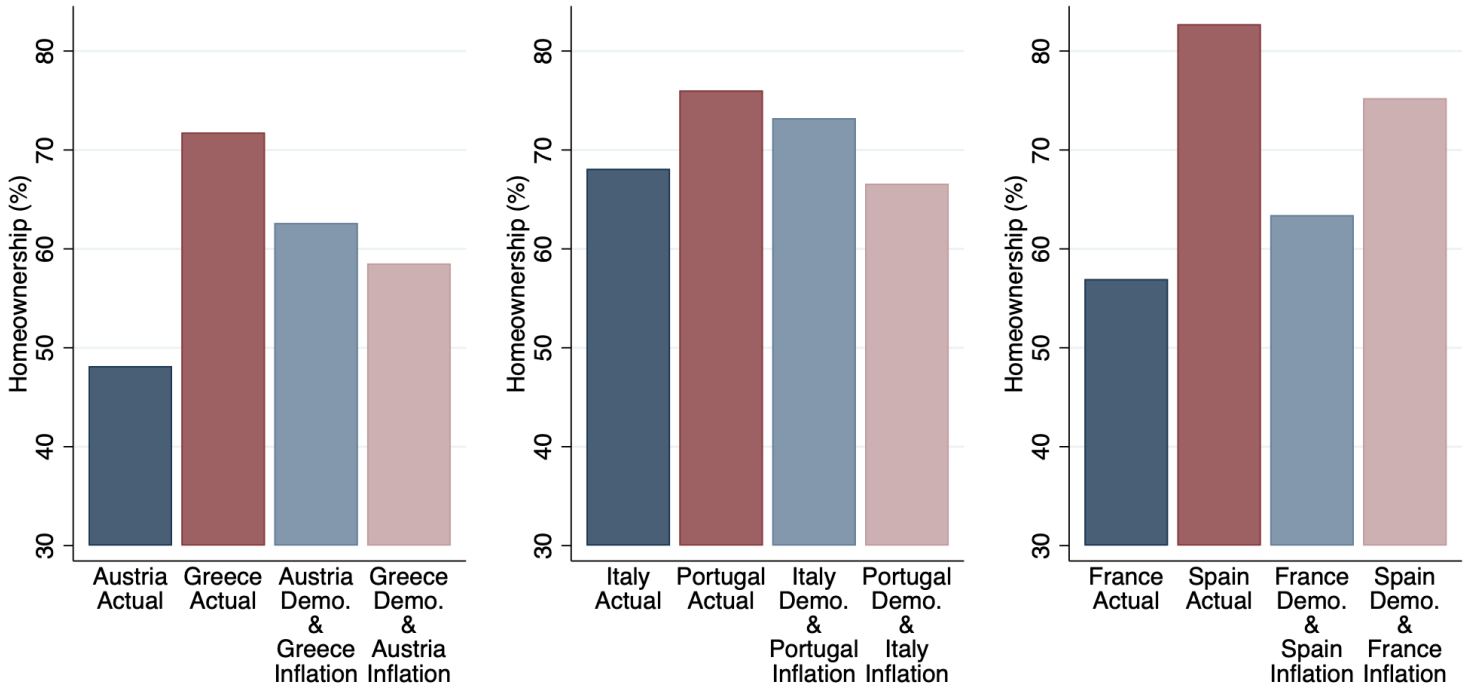
Logit of household-level homeownership on experience

Dep. Var: Own Main Residence	(1)	(2)	(3)	(4)
Log Exp. Inflation	2.74***			
	(0.10)			
Demographic Controls	Yes			
Wave FE	Yes			
Observations	136,437			
Countries	20			
Pseudo R^2	0.512			

Note: Odds ratios from logit regressions with robust standard errors in parentheses. HFCS multiple imputation data, using representative weights. $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Very similar magnitude of households-level estimate: 1 log-point increase in experienced inflation predicts HO rate increase from 65% (average) to 84%.

Hypothetical homeownership rates with alternate inflation histories



Logit of household-level homeownership on experience

Dep. Var: Own Main Residence	(1)	(2)	(3)	(4)
Log Exp. Inflation	2.74***	3.46***	1.32***	1.52***
	(0.10)	(0.32)	(0.13)	(0.16)
Demographic Controls	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	No
Housing Market Controls	No	Yes	No	No
Country FE	No	No	Yes	No
Country-Wave FE	No	No	No	Yes
Observations	136,437	110,614	136,437	136,437
Countries	20	11	20	20
Pseudo R^2	0.512	0.534	0.536	0.537

Note: Odds ratios from logit regressions with robust standard errors in parentheses. HFCS multiple imputation data, using representative weights. $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Additional variables

- If the relationship is driven by personal experiences, we expect our measure of the household heads' experienced inflation to be noisier for couples compared to singles.
- The model predicts attenuated experience effects among those without access to fixed-rate mortgages (**Prediction 2**). We proxy for these using the following measures.
  - Access to fixed-rate financing: Primarily variable-rate is an indicator for whether variable-rate mortgages are the prevailing type of interest rate (Andrews, Caldera Sanchez, and Johansson, 2011).

Testing additional predictions

Dependent Var:	Married vs. Single		Primarily Variable vs. Fixed-Rate Financing	
Own Main Residence	(1)	(2)	(3)	(4)
Log Exp. Inflation	3.57***	1.96***	2.29***	1.86***
	(0.23)	(0.26)	(0.20)	(0.30)
Log Exp. Inflation X Married	0.69***	0.71***		
	(0.05)	(0.05)		
Log Exp. Inflation X PVR			0.60***	0.77*
			(0.06)	(0.12)
Primarily Variable Rate (PVR)			7.65***	
			(1.15)	
Demographic Controls	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	Yes	Yes
Country-Wave FE	No	Yes	No	Yes
Observations	109,244	109,244	131,100	131,100
Countries	20	20	17	17
Pseudo R^2	0.475	0.501	0.499	0.515

Note: Odds ratios from logit regressions with robust standard errors in parentheses. HFCS multiple imputation data, using representative weights. $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Prediction 3: House price experiences predict HO

Dependent Var: Own Main Residence	(1)	(2)	(3)	(4)	(5)	(6)
Experienced Log Inflation (std.)	2.21*** (0.10)	1.99*** (0.10)	1.98*** (0.24)	1.84*** (0.07)	1.72*** (0.06)	1.79*** (0.20)
Experienced Real House Price Growth (Full History, std.)		1.12*** (0.04)	1.09 (0.19)			
Experienced Real House Price Growth (Partial History from 1975, std.)					1.16*** (0.03)	1.56*** (0.24)
Demographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Wave FE	Yes	Yes	No	Yes	Yes	No
Country-Wave FE	No	No	Yes	No	No	Yes
Observations	70,267	70,267	70,267	92,440	92,440	92,440
Countries	6	6	6	9	9	9
Pseudo R^2	0.516	0.517	0.524	0.532	0.534	0.543

Note: Odds ratios from logit regressions with robust standard errors in parentheses. HFCS multiple imputation data, using representative weights. All experience measures are standardized within the regression sample.
$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Experiences of Real House-Price Growth and Homeownership

- The magnitudes of both measures of experienced house price growth are very similar and smaller than that of experienced inflation (from 65% to about 68%).
  - Possibly due to:
    - Smaller sample
    - House price changes may be less apparent
    - Observe nominal change, not real change
    - Direct impact of house-price experience on affordability
  - The first 3 aren't supported by our data
  - One possible interpretation: while our model did not specify the process underlying changes in rental prices, they likely move with general inflation as well. So, the price-to-rent ratio will not respond (on average) to inflation, but will respond to house-price growth.

Additional robustness

- Using first-time homeownership (SHARE data)
- Sensitivity to Multiple Imputation HCFS Data
- Alternative Measures of Inflation Experience
- Alternative Wealth Controls
- Age Fixed Effects
- Cohort Fixed Effects
- Survey-year Fixed Effects
- Country Clustered Standard Errors

Conclusion

- Inflation experiences are a robust predictor of household homeownership contributing to both cross-country and within-country homeownership patterns.
  - Individuals seem to carry their experiences with them; inflation experiences predict homeownership even after immigration to another country.
  - Suggestive evidence that inflation experiences also predict the hazard of an individual's first home ownership.
- Experiences of higher real house price growth also predict higher homeownership, but weaker predictor than inflation experiences.

Broader Takeaways

- **Literature on Experience Effects** Daily exposure and its lifetime aggregation have a significant long-term impact in all areas of economic decision making.
  - Even among **experts** (e.g., Malmendier, Nagel, Yan, JME 2020)
  - Even for **international** capital flows (Malmendier, Pouzo, Vanasco JIE 2020)
  - Here: largest hh finance decision
  - (Quasi-)Bayesian Framework, restricted to (or overweighing) lifetime experiences (e.g. Malmendier, Pouzo, Vanasco JFE 2020)
- As a result: Macro shocks have a significant **long-term effects**, even if pre-crisis conditions are re-established.

Disrupting the Dichotomy

Standard Neoclassical Economics versus Behavioral Economics

Homo oeconomicus

- Payoff maximizer
- Bayesian beliefs
- Perfect cognition

Disrupting the Dichotomy

Standard Neoclassical Economics versus Behavioral Economics

Homo ... sapiens?

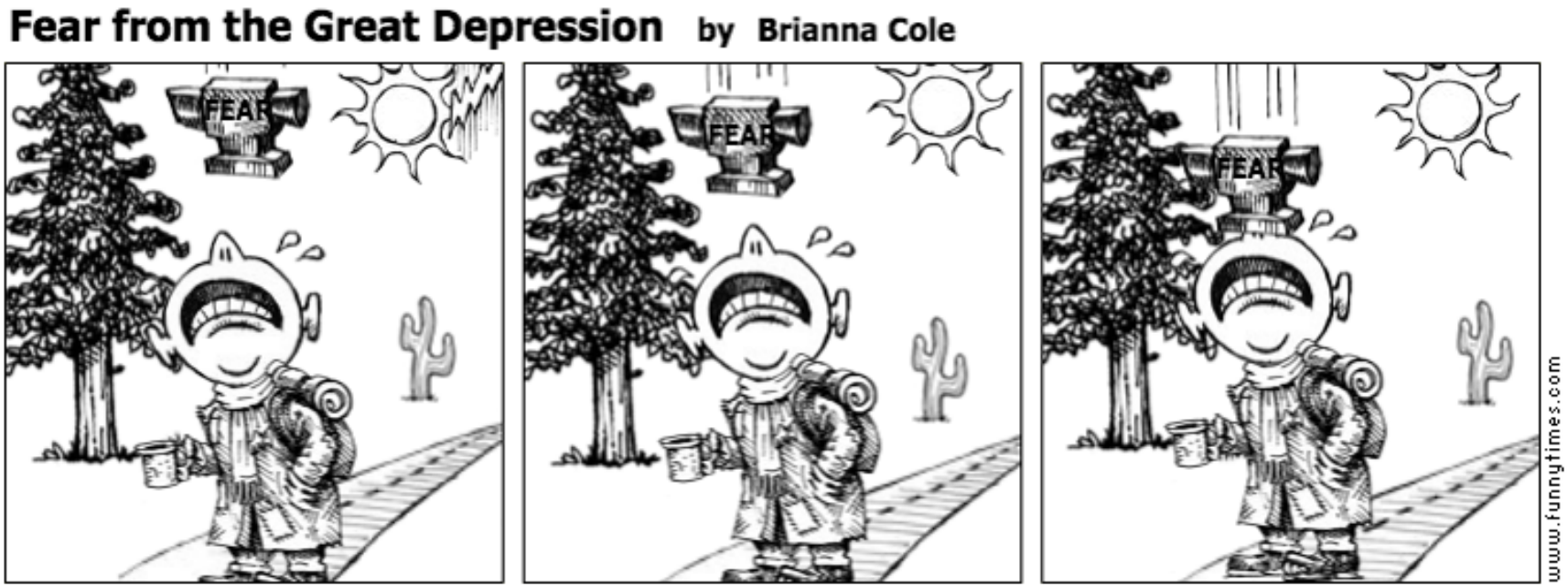
- Payoff maximizer???
- Bayesian beliefs???
- Perfect cognition???

Disrupting the Dichotomy

Psychologically Realistic Dynamic Belief Formation

Homo Experiens

- *experiri, experiens*
- *ire* $\Longrightarrow$ *per* $\Longrightarrow$ *ex*



- *experiri, experior, expertus sum*

Conclusion

- Macro shocks have a significant **long-term effects**, even if pre-crisis conditions are re-established.
- Potential of significant improvement of cross-sectional (and time) predictions of crisis effects.
  - By country, by gender, by race, ...
- Potential of within-individual "big data."

THANK YOU!