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Determinants of House Price Expectations in Europe

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Determinants of House Price Expectations in Europe*

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ABSTRACT

I use data from the European Central Bank's Household Finance and Consumption Survey (HFCS) to examine how house price expectations differ across Europe and to identify the main drivers of such expectations. During the period 2010-2017, housing-related assets drove the household balance sheet evolution. Therefore, house price expectations remained highly heterogenous across European countries. The paper found that changes in income and house prices are the key determinants of house price expectations. Homeownership status, income and wealth distributions also explain part of the heterogeneity in household expectations about house prices in Europe. All these effects appear to be stronger for renters and for households from the bottom quintiles in income and wealth distributions.

Keywords: house price expectations; housing; household portfolio.

JEL Classification: D10, D31, D84, G11

1 Introduction

The 2008 Global Financial Crisis was the culmination of an extensive boom-bust cycle in house prices all around the world. Soon after the crisis, economists proposed overly optimistic house price expectations as a main factor in explaining the dynamics of house prices. More specifically, huge aggregate consumption losses during this period were related to credit liberalization and expansion as well as overestimated expectations of house prices ((Piazzesi and Schneider (2016); (Guerrieri and Uhlig (2016); Kaplan et al. (2020)). Expectations are a natural candidate to be a key variable describing aggregate market outcomes, since they are a crucial factor in intertemporal decision-making in the presence of uncertainty (Kuchler et al. (2022)). Many decisions in the housing market – for example, whether to buy or sell a house – are partly determined by individual expectations about future market conditions. In such cases, individual beliefs have the potential to influence the aggregate economy through market-level outcomes. Following the financial crisis, many researchers focused on better understanding how individuals form housing market expectations, how these expectations explain individuals’ behavior, and how those decisions affect aggregate outcomes in the economy (Kuchler et al. (2022)). However, interactions between expectations and the real economy are still too under-researched to draw clear conclusions, despite the macroeconomic and policy implications especially in times when standard tools, such as monetary policy, do not support the economy as well as intended.

A large part of the literature on expectation formation concentrates on extrapolations, and shows that individuals extrapolate from recent information when forming expectations (Fuster et al. (2010); Greenwood and Shleifer (2014); Barberis et al. (2015); Liu and Palmer (2021); Giglio et al. (2021a); Giglio et al. (2021b)). Various papers have found that stock market expectations tend to be serially uncorrelated, whereas house price expectations are serially correlated in the short run but exhibit mean reversion in the long run ((Shiller and Case (1989); Cutler et al. (1991); Guren (2018)). Moreover, Armona et al. (2019) show that, in the short run, individuals underreact to recent house price changes but also overreact in the long run in comparison with the actual predictiveness of past house price changes in the data.

In addition to the evidence above, extrapolation and expectations are often based on recent personal experiences. Put differently, in forming beliefs, individuals tend to put considerable weight on their personal experience. Recent work by Kuchler and Zafar (2019) has shown that when individuals form expectations about aggregate housing market performance, they usually overemphasize recent, geographically local information. Additionally, the expectations of less educated and less numerate respondents are more heavily influenced by personal local experiences. Finally, since personal experience differs across individuals, the emphasis on personal experiences naturally leads to heterogeneous expectations across individuals, even if we consider the process of belief formation to be the same among them.

Another stream in the literature claims that current ownership status also affects the formation of house price expectations. In particular, a key difference between housing and other assets is that renters have better information about the dividend stream of the asset, because they pay rent each month (Kuchler et al. (2022)). This information may provide useful signals about the value

of the asset itself, which renters can easily capture. By contrast, owner-occupiers miss part of this information as they simply consume housing services and do not need to pay attention to the value of their consumption (Kindermann et al. (2021)). Moreover, Kindermann et al. (2021) found that renters are not only more accurate in their house price expectations, but their expectations show more dispersion than those of owners. An explanation for such findings was constructed through Bayesian learning, showing that ownership status-dependent information can quantitatively capture all these stylized facts (Kindermann et al. (2021)). Specifically, individuals can learn about house price growth from signals that differ in their precision depending on whether they rent or own. Renters receive signals about rent that are more precise, but also noisier in terms of house prices in comparison to owners. In this case, the noisier signals about house prices result in a larger dispersion of renter forecasts.

Another mechanism for how ownership status can affect belief formation comes from the endowment effect. Studies that analyze the stock market have found that stock owners over-predict future stock prices in response to positive signals about their stocks compared to non-owners (Hartzmark et al. (2021); Anagol et al. (2021); Anagol et al. (2018)). However, Kindermann et al. (2021) point to a specific period with positive signals about house prices and find that owners of houses have lower house price expectations in comparison to renters. This suggests the opposite results than what we would expect from the endowment effect. The paper goes on to investigate homeownership status in greater depth and discuss its possible effects in various countries.

Finally, diverging from much of the current literature, which concentrates on financial frictions in macroeconomics, López-Salido et al. (2017) have suggested a behavioral view and argued that investors' sentiments in credit markets explain economic fluctuations. The key point is that present economic activity strongly influences expectations about future credit defaults. Specifically, investors become too optimistic once they are influenced by good news about fundamentals, leading to situations in which credit spread narrows and the quantity of credit expands (López-Salido et al. (2017)). This mechanism leads to endogenous reversals of sentiments, as the later periods of further economic news will be disappointing compared to optimistic expectations. The same mechanism can be applied to the housing market, and influence the dynamics of house prices.

In this paper, I use data from the European Central Bank's Household Finance and Consumption Survey (HFCS) to explore how individual expectations about house prices differ across Europe, and what the main determinants of these differences are. I start with a brief analysis of the household balance sheet in Europe and highlight the importance of housing among other types of assets. In real numbers, household assets grew slightly from the average 255 300 EUR per European household in 2010 (HFCS Network (2013)) to 259 400 EUR per household in 2017 (HFCS Network (2020)), while housing remained responsible for the major part of the balance sheet. This makes it important to analyze the main determinants of how actual house price changes affect expectations about future house price change, which later cascade into individual economic decisions.

In this paper, I observe the average household portfolio after the recent financial crisis and how it developed over the 2010-2017 period. Aggregate changes seem to be minor, while distributional results have changed more significantly. Notably, I analyze the micro-level HFCS dataset to see how households were moving between wealth quintiles in 2014-2017 and with which factors these

movements were associated. I also draw some stylized facts about house price expectations and their heterogeneous results among different countries. Finally, I show the importance of housing and other factors such as income or personal risk attitude in explaining differences in house price expectations across Europe.

2 Data

2.1 Overview of HFCS

The HFCS is a cross-section survey conducted every 3-4 years by the European Central Bank and delegated authorities in each country. The HFCS provides the most comprehensive and highest quality survey microdata on European household wealth. In HFCS, households respond to questions about their financial and nonfinancial assets, debts, employment status, income, consumption, and demographic characteristics. Additionally, many countries also complement their results with detailed microlevel institutional data. As housing and real assets are the interest of this paper, it is important to mention that such information is collected by survey during a face-to-face interview. Households respond about their expectations or different asset values. Some countries also use aggregated registries data to evaluate households' valuation of their assets, but the majority of results remain supported only by household answers.

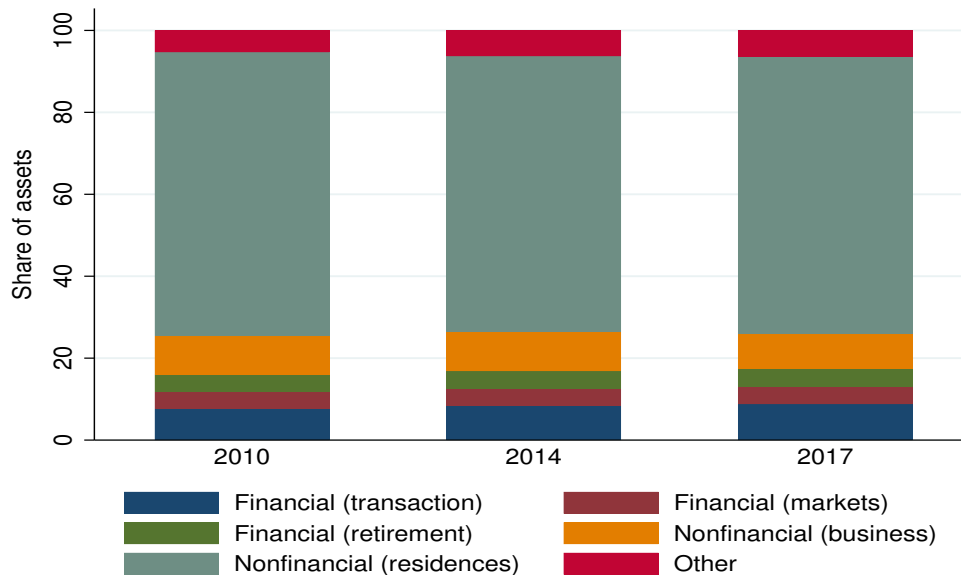
The HFCS is also designed around a common set of methodological principles, which ensures the comparability of results between countries. In particular, all country-level HFCS datasets provide a set of core output variables according to a set of common definitions and descriptive features, using an output-oriented approach ([HFCS Network \(2020\)](#)). On top of this, household samples have been designed in each country to ensure representative results at both the euro area and national level. More than 91 000 households participated in the last wave, with sample sizes varying across countries. However, all country surveys have a probabilistic sample design, which means that each household in the target population has an ex ante defined non-zero probability of being part of the final sample. A strict and methodologically consistent sampling procedure in all participating countries ensures the representativeness of all main variables, including real assets. Additionally, given the unequal distribution of household wealth, a random sample of families is unlikely to capture the small minority of families who hold the large majority of wealth ([Bricker et al. \(2019\)](#)). Therefore, to capture financial instruments that are almost exclusively held (and in large quantities) by the wealthiest households, most countries apply various techniques to oversample the wealthy households.

Some researchers also try to analyze the HFCS database by looking at differences in the sampling processes between countries, taking into consideration oversampling techniques, unit and item non-response rates, and how they are dealt with via weighting and imputation. [Tiefensee and Grabka \(2014\)](#) analyze the HFCS database over different criteria as institutional environment, comparability, accuracy and others. The authors conclude that HFCS is the best dataset for cross-country analysis and comparisons of balance sheets, wealth and inequality.

2.2 Composition of Average Household Portfolios

I start my analysis by looking at the household portfolio and how different asset classes are distributed within it. Households can hold two major types of assets: financial, such as those held at depository institutions and brokerages, or non-financial, such as housing, business, cars and others. The 2008 financial crisis was associated with the collapse of various kinds of asset classes (i.e. housing, stocks) (Mian et al. (2013)). However, analysis of the post-crisis period, using the sample of 2010-2017, shows that most families continued owning assets of some kind (Figure 3.1). The ownership rate after the 2008 financial crisis was around 97 percent for financial and 91 percent for non-financial assets. Thereafter, it remained relatively stable over the following 7 years, reaching almost 98 percent for financial and 91 percent for non-financial assets in 2017.

Median asset holdings in the early part of the sample (2010) were about 153 100 EUR, decreasing to 141 600 EUR in 2017 (HFCS Network (2013), HFCS Network (2020)). Over the same period, median outstanding balance of households' liabilities grew from 23 900 EUR in 2010 to 29 300 EUR in 2017. Composition-wise, financial assets accounted for 17.2 percent of total assets after the 2008 financial crisis, mostly concentrated in deposits, savings and retirement accounts. Over the following 7 years, the share of financial assets grew up to 19.1 percent of total assets, mainly driven by increases in deposits and savings, and minor changes in trading or retirement accounts. However, Figure 3.1 clearly shows that the majority of total assets remained highly concentrated on real assets and particularly on housing. The housing-related share of assets shrank a bit over this time, but continued to account for more than 60 percent of total assets.

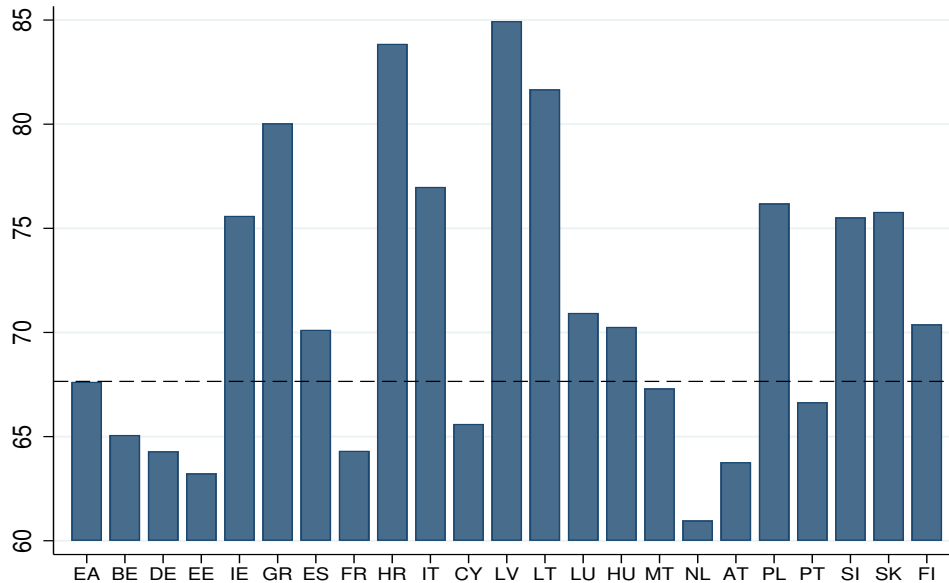


Notes: The composition of assets is captured at the specific year, indicated at the bottom of the graph.

Figure 2.1: Portfolio Composition in Europe

As Figure 3.1 indicates, housing assets represent a highly significant portion of the average household portfolio in Europe: more than 60 percent of the total portfolio is related to housing.

However, heterogeneity remains strong between different countries, as can be seen in the following figure. Figure 2.2 shows that the share of the portfolio related to housing varies between 60 and 85 percent across different countries. Finally, heterogeneities in housing-related assets are perfectly correlated with homeownership, which could also lead to heterogeneous house price expectations in Europe. Therefore, I will include homeownership in the later empirical analysis in order to explain its relationship with house price expectations.



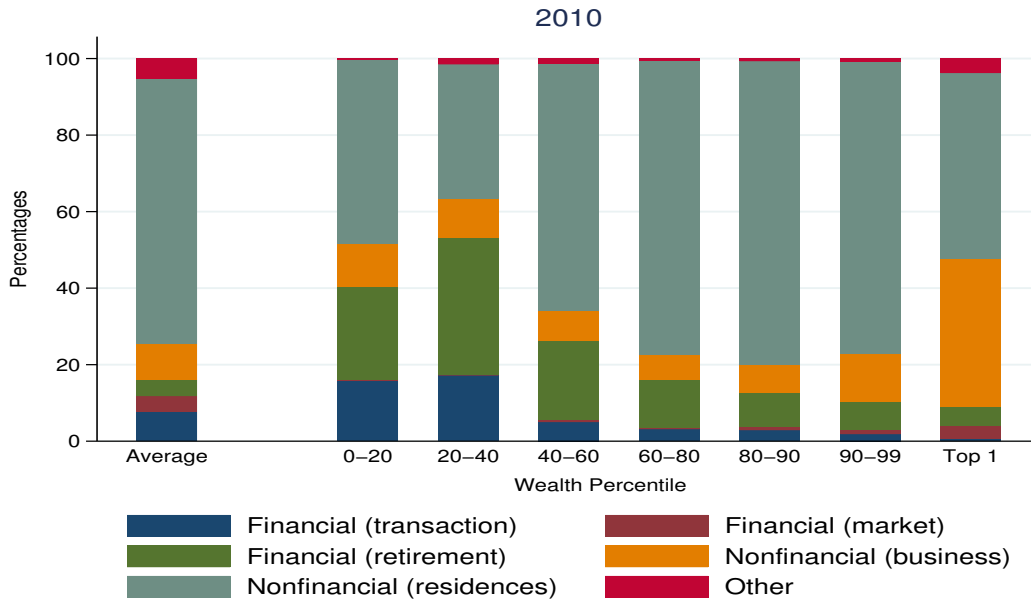
Notes: The dashed line highlights the relative of average share of housing assets to the total assets in Euro area. Results are taken from HFCS wave 2017.

Figure 2.2: Share of housing-related assets to total assets

2.3 Portfolio Composition Across the Wealth Distribution

Though the average or median household asset portfolio is a mix of real and financial market assets, the main asset for most families in Europe is housing, with financial assets representing a relatively small portion of the portfolio (HFCS Network (2020)). In fact, because asset (especially financial) holdings are highly concentrated at the top of the asset distribution (Bricker et al. (2020)), much of the change that appears in the aggregate portfolio is driven by asset changes in the top 10 percent of the asset distribution.

Figure 3.2 shows the asset composition of households at various points along the asset distribution and the average asset composition in 2010. The most noticeable feature is the degree to which asset portfolios vary across the distribution. Housing is the most common asset class for most households, except those in the top 1 percent of the wealth distribution. These households concentrate a smaller share of their wealth on housing and a much higher share on private equity in businesses. A similar composition of assets was captured in the US (Bricker et al. (2019)) and Sweden (Bach et al. (2016)), where the wealthiest families invest in private equity, while families from the 50th to 95th percentiles mainly concentrate their wealth in housing. This also means that leverage ratios decline as assets increase.

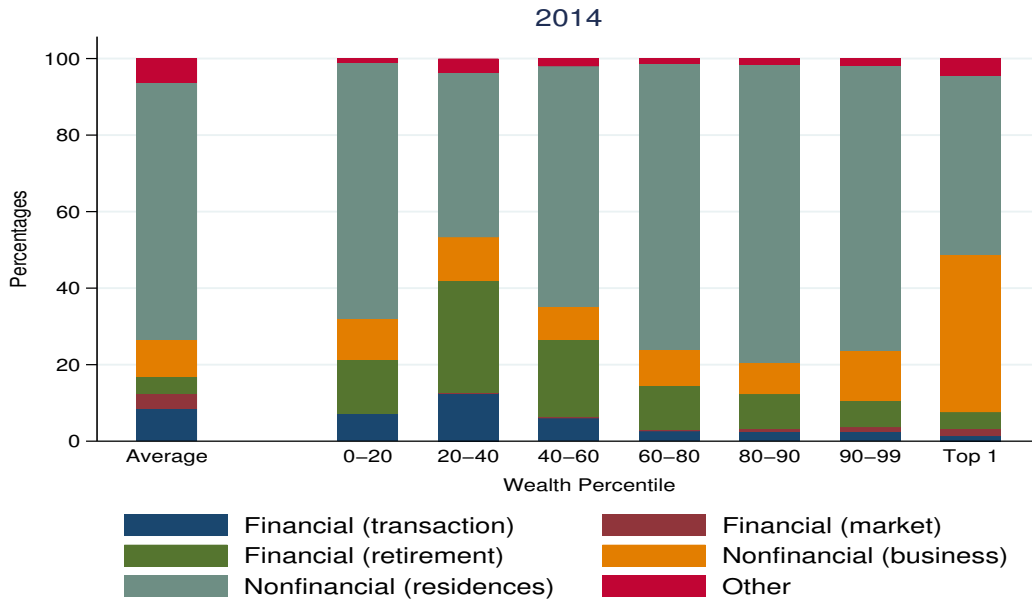


Notes: Percentages on the horizontal axis are based on wealth distribution derived from HFCS.

Figure 2.3: Portfolio Composition in Europe by Percentiles, 2010

The main assets of households in the bottom 40 percent of the wealth distribution are housing and retirement accounts. The same households also concentrate a high share of their assets in deposits and savings. The asset portfolio of families around the median (40th to 60th percentile) becomes more skewed toward housing reaching more than 60 percent of total asset portfolio, whereas the share of retirement accounts, deposits and savings shrinks. It becomes even more skewed toward housing for households between the 60th and 99th percentiles, with more than 70 percent of their total asset portfolio concentrated on residential assets. However, the portfolio composition of families at the top 1 percent shows a different distribution from the remaining percentiles. For families in the top 1 percent, the share of housing-related assets decreases to 50 percent or even less. Unlike the rest of the distribution, the wealthiest 1 percent of households concentrate about 40 percent of their asset portfolio on private equity in businesses. Retirement and financial accounts also represent a smaller share of their assets.

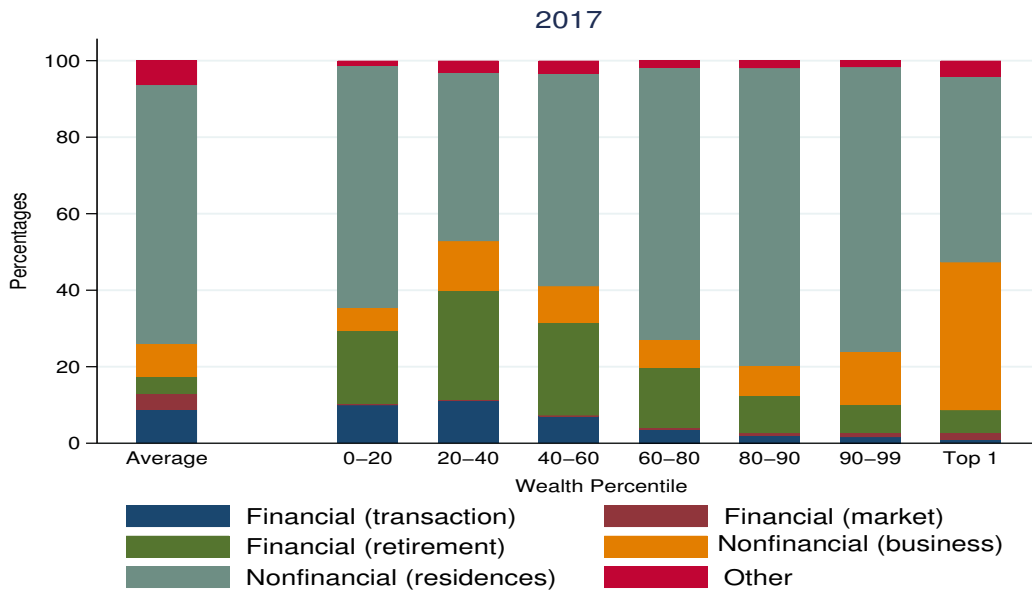
The next available data point in time, 2014, shows how portfolio composition across distribution changed over the first 4-5 after the financial crisis. Figure 3.3 shows that the housing-related share of assets recovered more quickly increasing their share in the poorest families' portfolio. More precisely, the housing-related share of assets increased by more than 10 percent for households in the bottom 40 percent of the wealth distribution. This took place alongside a drop in the share of assets related to deposits, savings and retirement accounts. For households in the 40th to 99th percent of the wealth distribution, portfolio composition remained stable. Minor changes for these families were seen in a small decrease in housing share and an increase in the share of wealth related to private equity in businesses. The wealthiest 1 percent of families also faced compositional changes in their assets portfolio over the first years after the financial crisis. From 2010 to 2014, their share of portfolio in housing, retirement and financial accounts shrank while the share related to private



Notes: Percentages on the horizontal axis are based on wealth distribution derived from HFCS.

Figure 2.4: Portfolio Composition in Europe by Percentiles, 2014

equity in businesses increased.



Notes: Percentages on the horizontal axis are based on wealth distribution derived from HFCS.

Figure 2.5: Portfolio Composition in Europe by Percentiles, 2017

The last point in time reaches 2017, showing the portfolio changes that appeared over a longer time period after the 2008 financial crisis. It shows how the household portfolio recovered over the medium-to-long term of 7 years. The household portfolio across the wealth distribution remained similar between 2014 and 2017, but significantly changed in comparison to 2010. Families in the

bottom 40 percent of the wealth distribution increased their share of total assets in housing, in parallel to a drop in the share of deposits, savings and retirement accounts (Figure 3.4). This indicates that household confidence in real estate recovered well, whereas confidence in financial and more liquid instruments did not. A more stable situation can be seen for households between the 40th and 99th percentiles, for which small decrease in the share of housing in their total asset portfolio was replaced with an increase in the share of their retirement accounts. Finally, the wealthiest 1 percent of families did not adjust their asset portfolio, keeping it similar to its composition in 2010.

2.4 House Price Expectations

In the third wave of HFCS data collection, many countries included an additional question on individuals' potential house price change in the upcoming year. Moreover, respondents were asked not only to say if they expected an increase or decrease in their house prices, but also to include probabilities of those possibilities. For example, one household might estimate a 100 percent chance that its house price would stay around the same level, while another could distribute percentages by assigning a 70 percent probability to a small change in its house price (0-2 percent) and the remaining 30 percent to a larger change in house prices (2-5 percent). Given the complex nature of the survey question about the house price expectations, this paper analyzes the expected value of personal house price expectations, which is calculated by multiplying each value by its probability that the individual provides in the answer. Therefore, descriptive statistics of the house price expectations variable are summarized in Table 2.1.

Table 2.1 summarizes responses of individuals that were interviewed in 2017 and asked about the expected house price change of their apartments in the upcoming year. Averages show highly heterogeneous results among countries in Europe. On the one hand there are pessimistic countries as Croatia, Italy or Greece, in which households expected house prices to decrease in the immediate future. On the other hand appear very optimistic countries as Malta, Austria or Luxembourg, in which individuals expected their house prices to grow by more than 2 percent in the upcoming year. Similar country polarization is confirmed by the skewness results from the last column in the table. Moreover, results from descriptive statistics suggest that the majority of countries remained at least slightly more optimistic about their house prices growing rather than decreasing in the immediate future. It is also important to mention that country weights can no longer be used in the following tables as not every household responded regarding their house price expectations. Therefore, the following analysis concentrates on the large set of households across Europe, analyzing individual-level determinants of house price expectations.

Table 2.1: Descriptive statistics of house price expectations

House price expectations	Obs	Mean	Std. Dev.	Min	Max	Variance	Skewness
AT	1,147	2.712	1.983	-5	5	3.934	-1.419
BE	2,138	0.629	2.184	-5	5	4.772	-0.085
CY	1,303	0.510	2.034	-5	5	4.139	0.101
DE	4,617	1.512	1.851	-4	4	3.427	-0.681
EE	2,679	1.221	2.493	-5	5	6.215	-0.446
ES	6,413	1.056	2.477	-6	6	6.136	-0.292
GR	1,930	-0.714	1.201	-2	5	1.442	1.110
HR	1,199	-1.259	2.756	-5	5	7.594	0.257
IE	2,247	2.001	2.329	-5	5	5.422	-0.797
IT	7,420	-0.932	2.125	-5	5	4.517	-0.195
LT	55	0.879	2.998	-5	5	8.989	-0.170
LU	1,616	2.697	1.764	-5	5	3.112	-0.936
LV	899	1.120	2.734	-5	5	7.475	-0.464
MT	1,004	3.183	1.719	-5	5	2.954	-1.622
NL	1,253	1.977	1.862	-5	5	3.468	-0.856
PT	5,289	0.706	2.433	-5	5	5.920	-0.300
SI	2,014	0.303	2.483	-5	5	6.165	-0.028
SK	1,163	1.802	2.649	-5	5	7.019	-0.814

Calculations of house price expectations are based on HFCS wave3 results (from 2017).

3 Possible Determinants for House Price Expectations

3.1 Extrapolation and Personal Experiences

As mentioned in the beginning of this paper, the literature identifies extrapolation and personal experience as possible determinants in house price expectations. In order to check some particular statistics about households' experience, I look at Table 3.1 which summarizes income and house price growth between 2014-2017, as well as house price expectations. The first three columns summarize results from 18 countries based on aggregate statistics from HFCS. In other words, it provides weighted country averages for income and house price growth between 2014 and 2017. House price expectations are summarized based on cross-country averages in 2017. The table clearly shows heterogeneous results among different countries on all three parameters. We can also interpret the results as indicating that weighted country averages represent the local situation in the country and provide the local-economy experience for the households. Moreover, this local-country experience matters, as the negative average house price expectations tend to appear in countries (Greece, Italy) with negative house price growth, as well as lower income growth in the past. Of course, income and house price growth are not the only determinants of house price expectations. As all countries with positive income and house price growth expect house price increases in the immediate future, the magnitudes of expectations vary greatly between them. It is also important to remember that in this case, the income and house price growth represent the change over the preceding three years.

However, it could be that due to the recency effect, only the previous year’s experience matters in order to identify house price expectations for the future.

Table 3.1: Descriptive statistics of house price growth and future expectations

	Income growth	HP growth	HP expectations	Income growth	HP growth	HP expectations
	Aggregated			Panel households		
AT	16.397	0.139	2.712			
BE	8.462	9.061	0.629	1.846	0.194	0.479
CY	7.869	22.024	0.510	0.302	0.200	0.392
DE	9.711	11.841	1.512	0.371	0.199	1.432
EE	33.918	6.358	1.221	1.291	0.701	1.175
ES	10.473	2.186	1.056	0.472	0.145	1.042
GR	6.132	-13.171	-0.714			
HR			-1.259			
IE	19.231	65.666	2.001			
IT	1.198	-6.320	-0.932	5.377	0.037	-0.966
LT			0.879			
LU	6.766	14.231	2.697			
LV	0.704	18.482	1.120	3.677	0.934	0.853
MT	12.635	16.367	3.183	0.405	0.266	3.152
NL	8.946	11.726	1.977			
PT	14.419	9.963	0.706			
SI	12.626	15.312	0.303			
SK	31.818	38.230	1.802	0.960	0.339	1.636

All values are presented in percentages. All the results are based on either the 2014 or 2017 HFCS waves. Aggregated values are calculated as the mean values for particular countries based on household responses. Panel values are estimated as changes between periods for the same households.

While the first three columns account for the aggregated data and suggest some insights about the local-country experience, the last three columns in Table 3.1 reflect the panel data and personal experience. In this case, I reduce the number of households included by only considering the panel households that provided answers in both periods – 2014 and 2017. By using this procedure I analyze a smaller number of countries and observations, but I am able to look at the same households and compare their answers in 2014 and in 2017. Moreover, the individual differences that I identify can be seen as a personal experience for each household. The last three columns from Table 3.1 show the averages per individual changes in income and house prices based on my reduced sample. In most cases, we can see that personal experience (last three columns) tends to be much smaller than the average changes (first three columns) in the country. In contrast, house price expectations remain extremely similar among both groups of observations. Moreover, house price expectations are much closer in their magnitudes to the personal experience than the aggregated changes among countries. This suggests that individuals place much more weight on their personal experience regarding income and house price changes and form future house price expectations in a similar manner.

An individual’s position along the income or wealth distribution could also play a role in shaping future expectations. A majority of households from the lowest income quintiles could be without employment income, thus making it harder for them to experience significant income changes. Therefore, a poor experience with income could lead to low house price expectations. A similar mechanism could also appear regarding the wealth distribution. Many households from the lowest wealth quintiles do not own their own houses or any other real estate. Therefore, it is hard for the lowest wealth quintiles to gain experience regarding house prices that could affect formation of their future house price expectations.

Table 3.2: Descriptive statistics of house price expectations by country-specific income quintiles

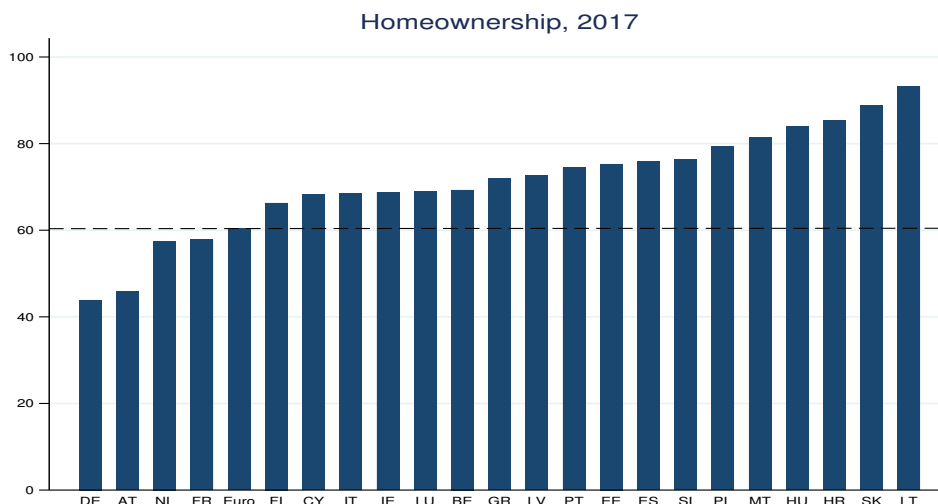
House price expectations	Obs	Mean	Std. Dev.	Min	Max	Variance	Skewness
All	44,386	0.774	2.505	-6	6	6.275	-0.290
Q1	6,772	0.256	2.576	-6	6	6.635	-0.141
Q2	7,642	0.431	2.601	-6	6	6.768	-0.179
Q3	8,152	0.718	2.515	-6	6	6.327	-0.243
Q4	9,408	0.861	2.430	-6	6	5.910	-0.288
Q5	12,412	1.239	2.362	-6	6	5.578	-0.432

Calculations of house price expectations are based on HFCS wave3 results (from 2017). Income quintiles are derived separately for each country and based on HFCS wave 2017 results.

Tables 3.2 and A.1 summarize average house price expectations over the country-specific income and wealth distributions. Table 3.2 shows that house price expectations tend to increase over the income distribution. The bottom quintile expects only a 0.256 percent house price change in the upcoming year while the top quintile expects 1.239 percent. Moreover, average house price expectations increase with each higher income quintile. Interestingly, higher quintiles tend to have lower variance than the bottom ones. Overall, Table 3.2 suggests that the average house price expectations tend to be higher among the top quintiles, while the variance of expectations remains lower. Similar conclusions can be derived from Table A.1, which summarizes average house price expectations over the country-specific wealth distribution. It shows that the average house price expectations are much lower among the bottom two quintiles, whereas the top wealth quintile has higher expectations and lower variance.

3.2 Housing and Homeownership

As previous results about household portfolio showed, housing still remains crucially important in describing household total assets and wealth overall. Therefore, in the following section, I consider homeownership further and discuss its possible effects in the different countries. From Figure 3.1, we can see that homeownership variation in Europe is high - from a bit more than 40 percent in Germany or Austria to as high as 90 percent in Slovakia or Lithuania. At the same time, the average for the euro area remains at 60 percent. Accordingly, it is crucial to check whether the same factor of ownership-status holds in Europe and if results differ across countries.

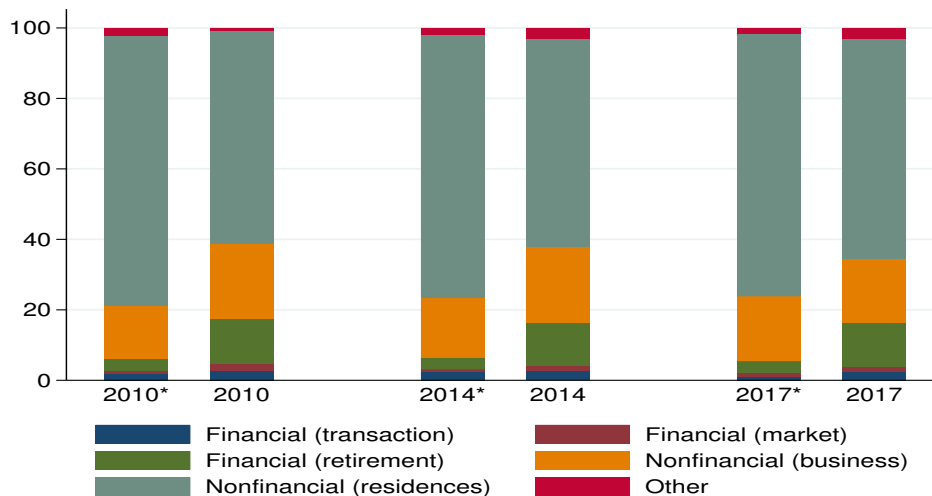


Notes: The dashed line highlights the average Euro area homeownership rate.

Figure 3.1: Homeownership rates in Europe in 2017, HFCS results

I start by looking at the total asset portfolios based on different homeownership groups. Figure 3.2 shows that in 2010 (at the end of the recent financial crisis) households in homeownership countries (defined as those with homeownership rates higher than the Euro area average) concentrated their total assets on housing – about 80 percent of total assets. More than 15 percent of their total assets were represented by business-related private equities and only minor shares were left for the other asset classes. A somewhat different situation was captured in the same years for non-homeowner countries (defined as countries with homeownership rates lower than the Euro area average). In their case, housing maintained an important role, but only 60 percent of total assets were represented by real estate properties. A further 20 percent of total assets were represented by business related private equities and an additional 15 percent was concentrated in retirement accounts. From the time perspective, we can see that portfolios remained stable over the decade after the financial crisis. For homeownership countries, the business-related private equity share of assets increased slightly between 2010 and 2017, replacing the parallel negative change in housing assets. For non-homeownership countries, business-related private equity shares decreased between 2010 and 2017, whereas an equivalent increase appeared in other assets (cars, jewelry and others). This indicates that households remained apprehensive about housing-related assets after the recent financial crisis, and accordingly, they decided to decrease their portfolio share related to housing and redistribute it to other asset classes. It also suggests that house price expectations could be lower in comparison to normal times. Overall, results from Figures 3.1 and 3.2 show that the housing share in household portfolios did not change significantly over the period under study, remaining important for all households but differing between high and low homeownership countries.

The richness of the HFCS data and its panel component also enables me to look at how particular households reacted in situations where their housing status was changing from renter to homeowner or vice versa. Notably, I examined how such households were changing position over the wealth distribution, how portfolio components were changing and how this interacted with the ensuing



Notes: Country groups are based on their homeownership rates. Countries without the * include Austria, Germany, France and Netherlands (countries with homeownership rates below the Euro area average. The group of countries with the * include those whose homeownership rates are above the Euro area average.

Figure 3.2: Portfolio composition in Europe for homeownership rate based subgroups

household behavior. To investigate this, I used household-level HFCS data and looked at the changes in variables for the same households between 2014 and 2017. More specifically, I looked at changes in country-specific wealth quintiles, income, homeownership status, share of household portfolio in financial assets, and share of household portfolio in housing-related assets.

In Table 3.3, we can see the first set of results showing numbers of panel households which did or did not change their homeownership status, and how they shifted position on wealth distribution between 2014 and 2017. To be more precise, a change in wealth quintiles shows by how many quintiles households' position along the wealth distribution changed. For example, if the change in wealth quintile is equal to -1, this means that the household in question dropped by one quintile in wealth distribution. This can be a drop from 5th quintile to 4th, from 4th to 3rd and so on. Positive numbers in this case mean that household moved up over the wealth quintiles in the period between 2014 and 2017. Table 3.3 shows that over the time period being analyzed 19528 households, which repeatedly participated in HFCS, retained the same housing status, 759 households moved from homeownership to becoming renters, and 795 households became homeowners. What is intriguing in these results is the appearance of distributions for each situation of homeownership status. Results show that moving between wealth quintiles supports the normal distribution idea for the case when homeownership status remained the same as in the beginning of the period (column 2). Analysis of the scenario of a homeowner becoming a renter (column 1) suggests a left-skewed distribution of changes in wealth quintiles. This means that the majority of households that switched from homeownership to renting tended to remain in the same wealth quintile or even dropped to a lower quintile. The opposite situation appears when analyzing the scenario of a renter becoming a homeowner (column 3). In this case, I capture a right-skewed distribution of changes in wealth quintiles. Such results mean that households which switched from renters to homeowners also tended to remain in the same wealth quintile as before or even moved up along the wealth distribution.

It is important to mention that no causation was analyzed in Table 3.3. Theoretically, the fact of becoming a homeowner should not bring any advantage to the balance sheet. The process of purchasing a new house should be supported by individual savings or by the mortgage loan. In both cases, net wealth should remain the same. However, from the microdata we can see that house ownership creates a difference, allowing owners to increase their net wealth more quickly. Results also suggest that becoming a house owner after the recent financial crisis allowed households to advance more easily over the wealth distribution. The position in wealth distribution affects households' prior experiences and thus house price expectations.

Table 3.3: Changes in homeownership status between 2014 and 2017

Change in Wealth Quintiles	Homeownership status		
	Owner → Renter	No change	Renter → Owner
-4	67	25	0
-3	152	105	3
-2	196	447	11
-1	190	2742	23
0	119	12663	220
1	29	2868	254
2	5	518	172
3	1	122	83
4	0	38	29
Total number of obs	759	19528	795

All the results are based on either the 2014 or 2017 HFCS waves. This shows the amount of households in a given wealth quintile changing their housing status between 2014 and 2017.

Another way to analyze household behavior through the micro perspective is by looking at the separate case of changes in wealth distribution. Instead of looking at how people moved over the wealth distribution by changes in their homeownership status, I look at how other factors – income, homeownership status, shares of portfolio in financial and in housing-related assets – change based on different scenarios. In this case, scenarios represent by how many quintiles households moved over the wealth distribution in comparison to their distributional positions in previous HFCS waves. Table 3.4 shows all the related statistics and changes that occurred between 2014 and 2017. From the results, we can see that majority of households did not change their position in wealth distribution (column 5). Over the analyzed period, their average income increased slightly, homeownership status did not change, the share of portfolio in housing assets increased by 0.3 percent, and the share of portfolio in financial assets increased by 0.5 percent.

Table 3.4 also shows that by moving in any direction away from 0 (no change) of wealth distribution, average statistics of other variables change significantly and in the same direction. Moving to the left along the wealth distribution means analyzing households that moved down to lower wealth quintiles in 2017 compared to their position in 2014. Results show that average income decreased significantly for households that dropped by 2 or more wealth quintiles. Homeownership status also changed for many of these households, from being owners to becoming renters. Finally,

these households on average also faced significant changes in their portfolio composition. The share of their portfolio related to housing assets dropped by 22-57 percent on average, while the share of the portfolio in financial assets rose by 15-33 percent.

Table 3.4: Summary of household changes in income, homeownership and portfolio between 2014 and 2017

Summary statistics	Change in Wealth Quintiles								
	-4	-3	-2	-1	0	1	2	3	4
Change in Income	-.5015	-.2036	-.0478	.0490	.1007	.1731	.2857	.2224	.1344
Change in Homeownership	-.7283	-.5731	-.2829	-.0565	.0078	.0714	.2403	.3981	.4328
Change in Share of Housing	-57.44	-42.01	-22.02	-2.946	.2785	4.245	18.63	30.89	30.99
Change in Share of Fin Assets	33.39	27.02	14.75	1.905	.5385	-.9295	-11.15	-15.76	-23.19
Total number of obs	92	260	654	2955	13002	3160	695	206	67

The opposite situation obtains when the other side of the wealth distribution is analyzed. Columns 6-9 in Table 3.4 show households that moved up by 1, 2, 3 or 4 quintiles over the wealth distribution between 2014 and 2017. From the statistics of these households, we can see that their income tended to increase over the period, while homeownership status also changed positively – many such households became owners instead of renters. Unsurprisingly, the portfolio compositions of these households also changed towards the housing side. The share of portfolio in housing-related assets increased by 18-31 percent for households that moved up by 2 or more quintiles in wealth distribution. In contrast, the share of the portfolio in financial assets dropped by 11-23 percent for the same pool of households between 2014 and 2017.

Previous results have showed heterogeneous effects among households based on their homeownership status. Moreover, the situation can quickly change once the household changes its ownership status, leading to varying individual situations (experience) that informs their subsequent behavior. In this case, household personal experience, housing and homeownership status can generate heterogeneous house price expectations. Accordingly, descriptive statistics from Table 3.5 summarize house price expectations based on ownership status.

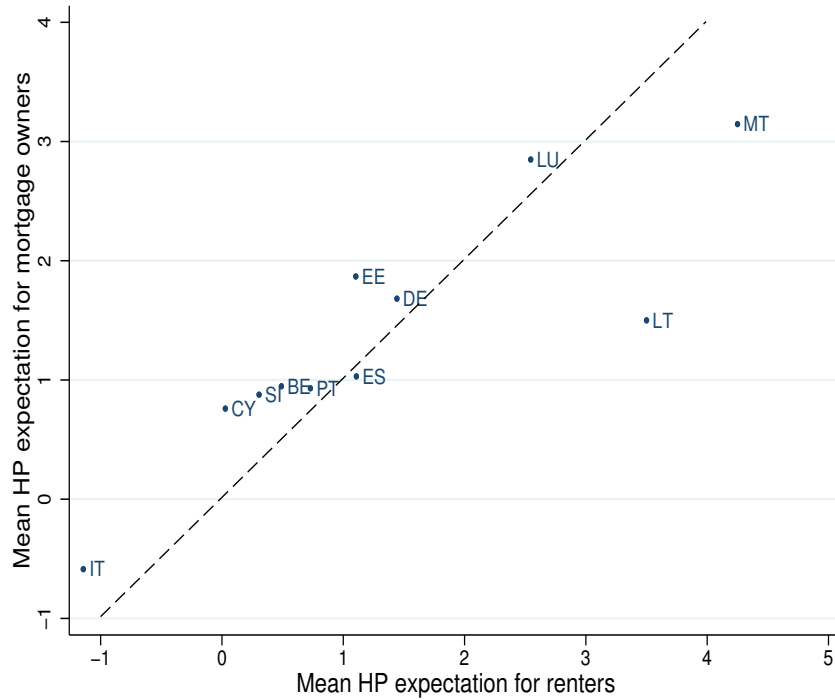
Table 3.5: Descriptive statistics of house price expectations

House price expectations	Obs	Mean	Std. Dev.	Min	Max	Variance	Skewness
All	44,386	0.774	2.505	-6	6	6.275	-0.290
Owners	25,874	0.584	2.531	-6	6	6.404	-0.205
Mortgage	10,229	1.397	2.312	-6	6	5.344	-0.516
Renters	8,283	0.599	2.530	-6	6	6.401	-0.246

Valuation of house price expectations are based on HFCS wave3 results (from 2017). Moreover, results are concentrated using the sample of 18 countries that provided respondents' answers about their house price expectations.

Table 3.5 shows that our analysis shrinks to 18 countries which provide results on specific variables using 44,386 observations. The average house price expectation for the following year

was around 0.774 of the current one with a standard deviation of 2.5. Table 3.5 also summarizes results over different house ownership status – owners, owners with mortgages, and renters. Based on the previous discussion, it would be natural to expect different expectations between owners and renters. However, the results do not support this expectation. Renters have only slightly higher average house price expectations than owners, 0.599 compared to 0.584. However, owners with mortgages show different results, combining much higher average house price expectations by almost 1.4 percent. Moreover, owners with mortgages also tend to have lower variance and higher negative skewness compared to other house ownership groups. Finally, these results suggest that owners with mortgages tend to be more optimistic about future house price changes than both owners without mortgages and renters.

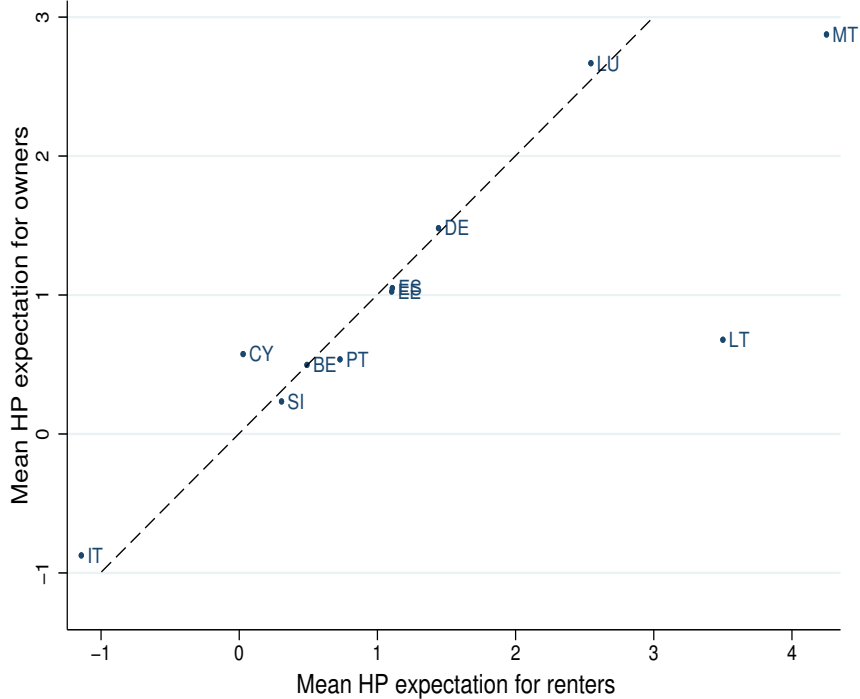


Notes: The dashed line represents the 45 degree line between analyzed variables.

Figure 3.3: Average house price expectations between mortgage owners and renters

Similar results are confirmed in Figure 3.3, Figure 3.4, and Figure A.1. They all compare countries based on their average house price expectations by different homeownership status. Moreover, each figure also includes a 45 degree line, which describes the situation if both analyzed house ownership groups had the same expectations. Figure 3.3 summarizes results between owners with mortgages and renters. It shows that owners with mortgages tend to be above the 45 degree line and more optimistic about future house prices than renters in Italy, Cyprus, Slovenia, Belgium, and Estonia. Similar expectations between these groups are identified in Portugal, Spain, Germany, and Luxembourg, whereas results show renters to be much more optimistic about house prices in Lithuania and Malta. However, these results should be interpreted carefully, as results for Lithuania and Malta are limited due to the low number of renter respondents. Similar results are captured in Figure A.1, where owners with and without mortgages are analyzed. The results show that Greece is the only country in which owners without mortgages have higher average house price expectations than owners with mortgages. The remaining countries show either similar results between these groups, or owners with mortgages being more optimistic about future house price changes than owners without mortgages.

Different dynamics are captured once renters are analyzed against owners without mortgages. Figure 3.4 shows that in Italy and Cyprus, owners tend to be more optimistic than renters. The opposite is seen in Malta, Lithuania, and Portugal, whereas similar expectations for both groups appear among the rest of analyzed countries (Slovenia, Belgium, Spain, Estonia, Germany, Luxembourg). Overall, the results indicate that owners without mortgages and renters tend to be less optimistic about future house price changes than owners with mortgages in most countries in Europe.



Notes: The dashed line represents the 45 degree line between analyzed variables.

Figure 3.4: Average house price expectations between non-mortgage owners and renters

4 Results

The previous section suggested different channels by which personal experience, housing, and home-ownership status can influence household expectations about future house prices. Some descriptive statistics at the country level brought additional perspectives which factors, such as whether a house owner has a mortgage or not, can explain heterogeneous house price expectations in Europe.

I begin the empirical section with a simple model analyzing house price expectations over local economic conditions and household individual characteristics (Niu et al. (2014), Hjalmarsson and Osterholm (2020)). In other words, aggregated macrodata-based results should represent households' local experience with house prices and income on the country level. More precisely, equation 4.1 shows that individual level house price expectations are regressed over the aggregated house price growth (local country-level experience about house prices) and income growth (local experience of income changes) at the country level¹. In this exercise, I use individual-level data from HFCS as well as aggregated country-level variables from National Account Statistics. The final specification is:

$$HP_exp_i = \beta_1 HP_growth_n + \beta_2 Income_growth_n + \beta_3 X'_i + \epsilon_i, \quad (4.1)$$

where i is an individual, n is a country-level index, and matrix X' summarizes results over the individual-level control variables. Moreover, house price expectations account for the future change

¹All the growth variables are taken as percentage changes over the analyzed period.

between 2017 and 2018, whereas the growth variables account for the percentage change between 2014 and 2017².

Results (with different control variables) from equation 4.1 are shown in all four columns of Table 4.1. It identifies recent (3-year) house price growth as the main factor explaining the house price expectations for the immediate future of 12 months. At the same time, income growth does not play a crucial role. Results in all four columns also show that the model explains about 20 percent of fluctuations in individual house price expectations. Different columns in Table 4.1 include additional regressors such as individual-level risk attitude, age, education and expectations about future income and price changes. It is important to include control variables about household-level characteristics, as they allow me to control additional household-level factors that can affect overall expectations. In this case, I control for individual risk level, age cohort, level of education, and additional expectations about future income and general price changes. However, the main results regarding the importance of the local house price experience remain robust even after accounting for individual-level controls.

Table 4.1: Cross-sectional estimation for macro-aggregated variables

	(1)	(2)	(3)	(4)
g_HP	.0957*** (.0194)	.0984*** (.0169)	.0895*** (.0155)	.0887*** (.0157)
g_income	-.0634* (.0341)	-.0536 (.0460)	-.0645 (.0410)	-.0640 (.0413)
risk attitude		-.0376 (.0764)	-.2526*** (.0462)	-.2475*** (.0438)
age [bracket]			-.0038 (.0031)	-.0031 (.0034)
education			.2215*** (.0399)	.2192*** (.0371)
labour status			+	+
exp_income_vs_price				+
Number of obs	41,452	41,391	41,383	41,383
Number of countries	16	16	16	16
R ²	0.1986	0.1995	0.2238	0.2244

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

²This uses three-year growth rate to keep results consistent with the rest of HFCS data. This is because HFCS waves use 2014 and 2017 as the reference years and the whole survey is run repeatedly every 3-4 years.

As the previous model used aggregated macrodata from the National Accounts, I continue with a similar approach by using cross-country average growth rates in house price and income from HFCS data. In other words, I use household answers about valuation of their income and houses, and compare those averages between 2014 and 2017. Therefore, equation 4.2 looks like this:

$$HP_exp_i = \beta_1 HP_growth_n^{HFCS} + \beta_2 Income_growth_n^{HFCS} + \beta_3 X'_i + \epsilon_i, \quad (4.2)$$

where i is an individual, n is a country-level index, and matrix X' summarizes results over the individual-level control variables. By running equation 4.2, I aim to check if household responses and valuation are better determinants of house price expectations than statistical procedures of the National Accounts. Results from all four columns show that the recent house price growth remains an important determinant for future house price expectations. In other words, local experience about house prices based on household level valuation tends to wield a significant effect on future house price expectations under both estimations (equations 4.1 and 4.2). At the same time, equation 4.2 also identifies that the local experience from income growth over the preceding years remained an insignificant determinant for house price expectations after controlling for individual-level characteristics.

In addition to the local house price and income growth experience, Table 4.2 also provides results for other individual-level regressors such as risk attitude, labour status, age, and education. The final model from column 4 also includes individuals' expectations about their financial situation in the immediate future – whether their income is going to increase more than prices or not. Table 4.2 shows that under any of the models, recent house price growth remains a robust and important determinant of house price expectations in the future. Results from the model 3 and 4 in Table 4.2 also show that risk attitude and education also affects house price expectations. Risk-averse and more educated individuals tend to have higher expectations about house price changes in the immediate future.

Survey data usually raises the question of whether averages or medians should be used for analysis. For this purpose, I run a robustness check using median values to compute percentage changes in house prices and income. The final results and conclusions from Table A.5 remain the same, favoring for risk attitude, education, and, most importantly, the country's median house price growth (taken as local experience of recent changes in house prices) as the most significant determinants.

Finally, I conclude this section by running a model that uses individual level results to analyze determinants of house price expectations. The model looks like this:

$$HP_exp_i = \beta_1 HP_growth_i^{HFCS} + \beta_2 Income_growth_i^{HFCS} + \beta_3 X'_i + \epsilon_i, \quad (4.3)$$

where i is an individual, n is a country-level index, and matrix X' summarizes results on the individual-level control variables. By running equation 4.3, I aim to check whether individual level house price expectations can be determined by personal experience in house price and income growth, as well as the individual-level characteristics. Results from equation 4.3 show that change in house prices (at the individual-level of experience) is one of the main determinants explaining

Table 4.2: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables

	(1)	(2)	(3)	(4)
g_HP_mean	.0290** (.0128)	.0290** (.0128)	.0262** (.0117)	.0258** (.0114)
g_income_mean	.0459** (.0156)	.0450* (.0239)	.0366 (.0238)	.0357 (.0231)
risk attitude		.0041 (.1138)	-.1922*** (.0590)	-.1872*** (.0577)
age [bracket]			-.0038 (.0038)	-.0024 (.0042)
education			.2125*** (.0422)	.2061*** (.0413)
labour status			+	+
exp_income_vs_price				+
Number of obs	43,132	43,074	43,066	43,066
Number of countries	16	16	16	16
R^2	0.1731	0.1732	0.1963	0.1998

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

individual house price expectations, whereas personal experience in income growth is not. Different models presented in Table 4.3 extend the results by including additional control variables such as individual risk attitude, labour status, age, education and individual expectations about income and prices. Therefore, the final results from model 4 shows that personal experience from house price changes remains an important determinant of future house price expectations, after considering all the controls. Other important drivers also remain the same – individual risk attitude and level of education. Model 4 also explains almost 12 percent of the variance in individual expectations, after considering results from 12 countries.

In general, all three methods suggest a similar outcome - either local or personal house price experience remains significant. At the same time, experience from income growth does not matter for house price expectation formation. Other characteristics also retain the same effects and significance under all three methods. Risk attitude, education and expectations about future income and price levels significantly affect house price expectations, while age and labour status do not (Tables A.2, A.3, A.4). Therefore, based on the importance of local and individual experience in house price growth expectations, the next sections delve deeper into housing, homeownership and the results driven by these factors.

4.1 Homeownership Importance

Earlier sections presented some possible mechanisms for house price expectations could be formed between different homeownership groups. In this section, I will not only check whether house price changes remain an important determinant of expectations, but also if the magnitude differs between groups. Model 1 in Table 4.4 uses the specification from equation 4.2. More importantly, main

Table 4.3: Personal house price expectations from micro-level HFCS data

	(1)	(2)	(3)	(4)
g_HP_personal	.0644*** (.0100)	.0299*** (.0098)	.0233** (.0096)	.0232** (.0095)
g_income_personal	-.0003 (.0004)	-.0007* (.0004)	-.0005 (.0004)	-.0004 (.0004)
risk attitude		.1643*** (.0055)	-.1179*** (.0324)	-.1165*** (.0323)
age [bracket]			-.0041** (.0020)	-.0024 (.0020)
education			.3202*** (.0143)	.3078*** (.0143)
labour status			+	+
exp_income_vs_price				+
Number of obs	15,223	15,209	15,207	15,207
Number of countries	12	12	12	12
R^2	0.0026	0.0581	0.1085	0.1172

The number of analyzed countries shrinks to 12, due to the lack of observations for panel variables in some of the countries. Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

results come from the models 2 and 3, which uses the same specification but runs it over different homeownership subgroups. The results show that income change is an important determinant of expectations only among owners with mortgages, while house prices changes are important among both groups of homeowners – with and without mortgages. However, in terms of magnitude, the effect from house price changes tends to be higher for owners without mortgages.

To follow the literature, I expand the analysis by looking at renters as well as owners. In order to do this, I need to shrink the analysis sample to 11 countries due to many missing variables and lack of information about renters in certain countries. Table 4.5 summarizes the results based on the same specification from equation 4.2. It is important to use the smaller sample of 11 countries as it allows us to analyze effects on renters and to compare them with owners. Therefore, Table 4.5 splits the results for owners, owners with mortgages, and renters. Results from Table 4.5 suggest that owners show a higher local house price changes effect in comparison to owners with mortgages. However, model 4 indicates that renters tend to have a similar and even a slightly higher local house price change effect on their expectations than owners. The other determinants, such as individual risk attitude and education, remain similarly important among all the models.

Tables 4.4 and 4.5 both analyze effects of aggregated country average changes in house prices, which suggest something about the local experience of house prices, giving an idea of how people form their house price expectations based on the general country changes in house prices and income. The results from Table A.6 not only check the robustness of changes in house price and income effects, but also the importance of personal experience and the extrapolation of expectations from it. Table A.6 compares local and personal experience in changes in house prices and in income, and shows that local experiences are more significant in determining individual house

Table 4.4: Cross-sectional (mean) estimation for micro-aggregated (HFCS) data

	(1) All	(2) Owners	(3) Owners with mortgage
g_HP_mean	.0258** (.0114)	.0256** (.0096)	.0154* (.0077)
g_income_mean	.0357 (.0231)	.0351 (.0209)	.0270* (.0190)
risk attitude	-.1872*** (.0577)	-.1772*** (.0572)	-.2880*** (.0588)
age [bracket]	-.0024 (.0042)	.0004 (.0045)	.0005 (.0063)
education	.2061*** (.0413)	.2079*** (.0454)	.1556*** (.0245)
labour status	+	+	+
exp_income_vs_price	+	+	+
Number of obs	43,066	24,736	10,076
Number of countries	16	16	16
R^2	0.1998	0.1690	0.3184

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

Table 4.5: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables for different homeownership subgroups

	(1) All	(2) Owners	(3) Owners with mortgage	(4) Renters
g_HP_mean	.0753** (.0302)	.0733** (.0289)	.0563 (.0334)	.0864** (.0351)
g_income_mean	.0257 (.0160)	.0223 (.0146)	.0263 (.0165)	.0311 (.0212)
risk attitude	-.2343*** (.0388)	-.2167*** (.0363)	-.3191*** (.0571)	-.2212** (.0681)
age [bracket]	.0014 (.0036)	.0035 (.0039)	.0004 (.0072)	.0028 (.0029)
education	.1843*** (.0458)	.1998*** (.0536)	.1517*** (.0265)	.1578** (.0615)
labour status	+	+	+	+
exp_income_vs_price	+	+	+	+
Number of obs	34,448	18,957	7,237	8,254
Number of countries	11	11	11	11
R^2	0.1865	0.1559	0.2624	0.1982

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval. A subsample of 11 countries (Belgium, Cyprus, Germany, Estonia, Spain, Italy, Lithuania, Luxembourg, Malta, Portugal, and Slovenia) is used due to missing observations for renters for the other countries.

price expectations. Local house price experience remains an important determinant among owners without mortgages, while local experience from income affects house price expectations for all owners – with and without mortgages. Notably, personal experience from income growth significantly affects house price expectations among owners with mortgages (see model 3). This is reflected in the fact that more than 25 percent of the variation in house price expectations for owners with mortgages is explained using model 3 in Table A.6. However, we should also keep in mind that variables for personal experience have much more noise than local experience variables, which are based on aggregated results. Additionally, we decrease the number of analyzed countries by including personal experience variables. This could also affect overall results and significance of local and personal results. Nonetheless, such results can be explained by the fact that owners with mortgages, in contrast to owners without mortgages, have to pay attention to the value of their consumption which comes in the form of mortgage payments (Kindermann et al. (2021)). Therefore, experience from personal income changes becomes an important factor for owners with mortgages in describing their future house price expectations. Finally, Table A.6 suggests that local experience plays a higher role for owners without mortgages and for renters, while personal experience in income growth remains more important factor for owners with mortgages in describing their personal house price experiences. Additionally, risk attitude and education appeared as important drivers of house price expectations for all categories of households.

4.2 Distributional Effects over Income and Wealth

Summary statistics in previous sections showed that house price expectations can vary over the income and wealth distributions. This could occur due to differences in household portfolios and working status, which could affect prior experience and expectations formation. At the same time, different determinants could play a role in forming expectations for each of the quintiles. To analyze this, Table 4.6 provides the results of using the specification from equation 4.2. The first column represents aggregated results, whereas the following 5 columns summarize results for each income quintile. Results show that local house price changes remain an important expectations determinant for all the income quintiles except the top one. The magnitude of effect also remains similar between all quintiles. However, change in income acts differently, remaining an important expectations driver only for the top two income quintiles. Table 4.6 also shows that education remains a strong and important driver of house price expectations for all the income quintiles. Finally, the results show that the current model can explain behavior in the top quintiles better than in the bottom. It explains only 11 percent of variation in house price expectations for the bottom income quintile, while it captures almost 30 percent of variation in expectations in the top income quintile.

Position in wealth distribution could play an even larger role, as many households from the lowest wealth quintiles do not own their homes or own very little other real estate. Also it is hard for the lowest wealth quintiles to collect experience from house prices, which could affect formation of future house price expectations. Moreover, lack of wealth could also contribute to the fact that majority of households from the lowest wealth quintiles are renters. In addition, empirical results from portfolio analysis show that housing or other real assets tend to play a smaller role for the top wealth quintiles, while the importance of financial and business related assets tend to grow over the

Table 4.6: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables over income quintiles

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Q1	Q2	Q3	Q4	Q5
g_HP_mean	.0258** (.0114)	.0293** (.0105)	.0351*** (.0116)	.0304** (.0124)	.0255** (.0113)	.0181 (.0111)
g_income_mean	.0357 (.0231)	.0256 (.0212)	.0278 (.0222)	.0354 (.0243)	.0411* (.0220)	.0420* (.0235)
risk attitude	-.1872*** (.0577)	-.1993** (.0728)	-.1619 (.0979)	-.1502* (.0836)	-.1101 (.0734)	-.1812*** (.0506)
age [bracket]	-.0024 (.0042)	-.0041 (.0039)	-.0029 (.0058)	-.0046 (.0053)	-.0050 (.0047)	-.0009 (.0053)
education	.2061*** (.0413)	.2144*** (.0447)	.1525*** (.0506)	.1485*** (.0363)	.1424*** (.0417)	.1775*** (.0452)
labour status	+	+	+	+	+	+
exp_income_vs_price	+	+	+	+	+	+
Number of obs	43,066	6,520	7,373	7,881	9,160	12,132
Number of countries	16	16	16	16	16	16
R^2	0.1998	0.1172	0.1431	0.1857	0.2112	0.2945

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval. Income quintiles are derived separately for each country and based on HFCS wave 2017 results.

wealth quintile. This could reduce the impact of the local experience from house price changes on house price expectations among the top wealth households. Results in Table 4.7 confirm this by showing that house price changes exert the highest effect on households in the bottom quintile. In general, the results show that changes in house prices remain an important driver for expectations of the top four wealth quintiles, whereas the magnitude of the effect differs and increases for the bottom quintile. In addition, income change remain an important factor in forming house price expectations for the 3rd and 4th wealth quintiles. The magnitude of the income change effect is even stronger for the top quintiles than that from house price changes. This could be due to the fact that housing corresponds to a lower share of total wealth for the richest households than for the poorest. Results also show that house price expectations among the top quintiles are affected by individuals' risk attitude and education. Finally, the model based on the specification from equation 4.2 explains about 12 percent of the variation in house price expectations among the bottom quintiles, while it is more effective for the top quintile, explaining almost 28 percent of variations in expectations.

Overall, Tables 4.6 and 4.7 showed that both income and wealth distributions matter in explaining heterogeneous house price expectations among households in Europe. Results show that changes in house prices and income remain important drivers for the most of quintiles. Education and risk attitude also play a role in forming household expectations about house prices in the immediate future. Finally, Tables 4.6 and 4.7 show that the model used tends to capture variation in expectations better for the top quintiles than for the bottom ones.

Table 4.7: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables over wealth quintiles

	(1)	(2)	(3)	(4)	(5)	(6)
	All	Q1	Q2	Q3	Q4	Q5
g_HP_mean	.0258** (.0114)	.0594** (.0270)	.0295** (.0118)	.0306*** (.0098)	.0262** (.0106)	.0158 (.0103)
g_income_mean	.0357 (.0231)	.0139 (.0194)	.0225 (.0168)	.0332* (.0189)	.0448* (.0238)	.0439 (.0253)
risk attitude	-.1872*** (.0577)	-.1561** (.0683)	-.0392 (.0753)	-.1413 (.0915)	-.1849** (.0685)	-.1539** (.0554)
age [bracket]	.0024 (.0042)	-.0008 (.0040)	-.0137** (.0048)	-.0176*** (.0037)	-.0051 (.0048)	-.0005 (.0047)
education	.2061*** (.0413)	.1469** (.0574)	.1682*** (.0551)	.1069** (.0469)	.1513*** (.0414)	.1500*** (.0413)
labour status	+	+	+	+	+	+
exp_income_vs_price	+	+	+	+	+	+
Number of obs	43,066	5,222	6,409	8,182	9,479	13,774
Number of countries	16	16	16	16	16	16
R^2	0.1998	0.1220	0.1319	0.1972	0.2287	0.2793

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval. Wealth quintiles are derived separately for each country and based on HFCS wave 2017 results.

5 Conclusions

Understanding the determinants of household expectation formation about house prices is becoming increasingly important. In order to identify the causes and consequences of heterogeneous expectations, as well as to monitor household economic behavior, it is crucial to understand the main determinants of house price expectations over the income and wealth distributions.

The data from the Household Finance and Consumption Survey (HFCS) that I reviewed establishes clear patterns that allow me to draw some stylized facts. First, more than 60 percent of the average household portfolio in Europe is concentrated on real estate. In the period following the 2008 financial crisis, the share of portfolio in real estate swung slightly but remained a significant majority in comparison to other asset classes. Second, average house price expectations and variance tend to be highly heterogeneous across 18 European countries. While on average some countries expected a house price decrease in the immediate future, others expected more than a 3 percent increase over the same period. This suggests that local factors are key to forming household expectations about house prices.

Third, my results support the current literature by showing that recent household experience in house price changes and income are important drivers for future expectations, though the local household experience tends to exert more weight on expectations formation than personal experience. Additionally, results showed that prior experience in the form of homeownership status or position along income or wealth distribution are important factors in explaining expectation heterogeneity among households. Households from the top income or wealth quintiles tend to have

higher house price expectations, whereas mortgages owners are associated with lower expectations than renters or owners without mortgages.

Fourth, I tried to identify relationships between different determinants and household expectations about house prices in European countries. I used three different models to estimate the relationship between changes in house price, changes in income, and house price expectations. Models were built by using one of the following three sources: 1) aggregated country-specific information on house prices and income from National Accounts; 2) aggregated results from the Household Finance and Consumption Survey; 3) individual household-level information from HFCS. All three models delivered similar conclusions, showing that changes in house prices play a key role in explaining household expectations about future house prices. Moreover, this happens on both levels – local and personal experience in house price changes. Education remains an another important factor in explaining households' formation of expectations of house prices; higher expectations were associated with a higher level of education. In light of the fact that some related literature has found opposite results, showing that individuals with lower education tend to expect higher increases in house prices, I will note that my analysis concentrates only on post-financial crisis results. Possibly, the recent financial crisis affected less educated people more by making them more pessimistic about future expectations in house prices. In contrast, better performance and a positive experience from a growth in house prices after the financial crisis affected highly educated people more and formed their higher expectations for the immediate future.

Finally, the model used in this paper also showed that house price growth remained not only important driver in forming household expectations, but wielded a greater effect on renters. This can mostly be explained by the fact that renters pay every month for their housing services thus pay more attention to its value. The distributional factor was another determinant, playing a key role in forming house price expectations. Households from the lowest wealth quintile were associated with a higher effect than the other households, while the effect of changes in house prices remained similar across all the income quintiles.

I leave some important questions for future research. It is not clear if these stylized facts regarding households also hold for income distribution from the pre-financial crisis periods. Most importantly, we still know very little about the mechanisms or causations leading to these stylized facts.

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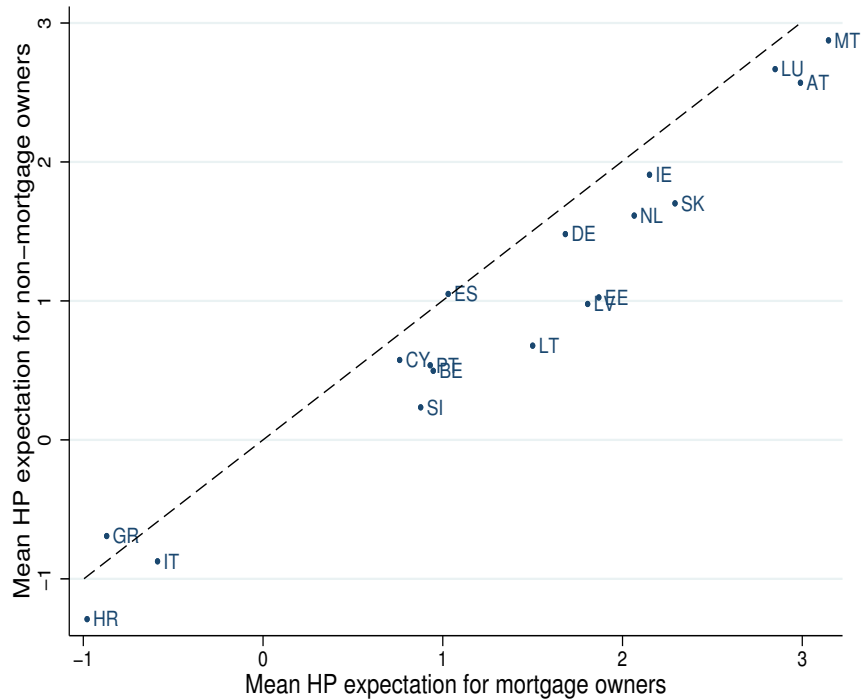
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A Online Appendix

Table A.1: Descriptive statistics of house price expectations by wealth quintiles

House price expectations	Obs	Mean	Std. Dev.	Min	Max	Variance	Skewness
All	44,386	0.774	2.505	-6	6	6.275	-0.290
Q1	5,347	0.300	2.571	-6	6	6.969	-0.193
Q2	6,695	0.293	2.312	-6	6	6.608	-0.121
Q3	8,469	0.640	2.510	-6	6	6.301	-0.212
Q4	9,763	0.837	2.442	-6	6	5.963	-0.294
Q5	14,112	1.220	2.377	-6	6	5.649	-0.414

Calculations of house price expectations are based on HFCS wave3 results (from 2017). Wealth quintiles are derived separately for each country and based on HFCS wave 2017 results.



Notes: The dashed line represents the 45 degree line between analyzed variables.

Figure A.1: Average house price expectations between owners with mortgages and owners without

Table A.2: Cross-sectional estimation for macro-aggregated variables (extended)

	(1)	(2)	(3)	(4)
g_HP	.0957*** (.0194)	.0984*** (.0169)	.0895*** (.0155)	.0887*** (.0157)
g_income	-.0634* (.0341)	-.0536 (.0460)	-.0645 (.0410)	-.0640 (.0413)
risk attitude		-.0376 (.0764)	-.2526*** (.0462)	-.2475*** (.0438)
age [bracket]			-.0038 (.0031)	-.0031 (.0034)
education			.2215*** (.0399)	.2192*** (.0371)
labour status (employee)			.5500 (.3323)	.3064 (.2934)
labour status (self-employed)			.4936 (.3142)	.2429 (.2970)
labour status (unemployed)			.2345 (.2888)	-.0227 (.2556)
labour status (retired)			.5224 (.3334)	.2729 (.2928)
labour status (other)			.4032 (.2859)	.1587 (.2684)
exp_income_higher_than_price				.3693 (.2198)
exp_income_lower_than_price				.2125 (.2279)
exp_income_similar_as_price				.1714 (.1987)
Number of obs	41,452	41,391	41,383	41,383
Number of countries	16	16	16	16
R^2	0.1986	0.1995	0.2238	0.2244

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

Table A.3: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables (extended)

	(1)	(2)	(3)	(4)
g_HP_mean	.0290** (.0128)	.0290** (.0128)	.0262** (.0117)	.0258** (.0114)
g_income_mean	.0459** (.0156)	.0450* (.0239)	.0366 (.0238)	.0357 (.0231)
risk attitude		.0041 (.1138)	-.1922*** (.0590)	-.1872*** (.0577)
age [bracket]			-.0038 (.0038)	-.0024 (.0042)
education			.2125*** (.0422)	.2061*** (.0413)
labour status (employee)			.4446 (.7003)	-.3159 (.4410)
labour status (self-employed)			.3716 (.6551)	-.4050 (.3930)
labour status (unemployed)			.0720 (.6182)	-.6994* (.3664)
labour status (retired)			.4422 (.6880)	-.3292 (.4351)
labour status (other)			.2121 (.6822)	-.5306 (.4138)
exp_income_higher_than_price				1.0437*** (.3312)
exp_income_lower_than_price				.6950* (.3440)
exp_income_similar_as_price				.6645* (.3426)
Number of obs	43,132	43,074	43,066	43,066
Number of countries	16	16	16	16
R^2	0.1731	0.1732	0.1963	0.1998

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

Table A.4: Personal house price expectations from micro-level HFCS data (extended)

	(1)	(2)	(3)	(4)
g_HP_personal	.0644*** (.0100)	.0299*** (.0098)	.0233** (.0096)	.0232** (.0095)
g_income_personal	-.0003 (.0004)	-.0007* (.0004)	-.0005 (.0004)	-.0004 (.0004)
risk attitude		.1643*** (.0055)	-.1179*** (.0324)	-.1165*** (.0323)
age [bracket]			-.0041** (.0020)	-.0024 (.0020)
education			.3202*** (.0143)	.3078*** (.0143)
labour status (employee)			.2643 (1.1430)	-1.0987 (.7511)
labour status (self-employed)			.3267 (1.1567)	-1.0665 (.7592)
labour status (unemployed)			-.1194 (.9977)	-1.4928** (.5964)
labour status (retired)			.3290 (1.1583)	-1.0443 (.7674)
labour status (other)			-.0779 (1.1121)	-1.4086* (.7000)
exp_income_higher_than_price				1.7543*** (.3827)
exp_income_lower_than_price				1.2425** (.4678)
exp_income_similar_as_price				1.2977** (.4533)
Number of obs	15,223	15,209	15,207	15,207
Number of countries	12	12	12	12
R^2	0.0026	0.0581	0.1085	0.1172

The number of analyzed countries shrinks to 12, due to the lack of observations for panel variables in particular countries. Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

Table A.5: Cross-sectional (median) estimation for micro-aggregated (HFCS) variables

	(1)	(2)	(3)	(4)
g_HP_median	.0243** (.0103)	.0257** (.0101)	.0230** (.0094)	.0229** (.0091)
g_income_median	.0366 (.0210)	.0226 (.0224)	.0169 (.0215)	.0161 (.0205)
risk attitude		.0767 (.1034)	-.1866*** (.0563)	-.1822*** (.0558)
age [bracket]			-.0045 (.0038)	-.0029 (.0042)
education			.1949*** (.0427)	.1892*** (.0417)
labour status			+	+
exp_income_vs_price				+
Number of obs	43,132	43,074	43,066	43,066
Number of countries	16	16	16	16
R^2	0.1631	0.1687	0.1911	0.1955

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval.

Table A.6: Cross-sectional (mean) estimation for micro-aggregated (HFCS) variables for different homeownership subgroups

	(1) All	(2) Owners	(3) Owners with mortgage	(4) Renters
g_HP_mean	.0499* (.0253)	.0480* (.0228)	.0290 (.0224)	.0804 (.0425)
g_HP_personal	.0005 (.0156)	.0022 (.0140)	.0359 (.1022)	-
g_income_mean	.0324* (.0144)	.0278* (.0127)	.0382*** (.0115)	.0422 (.0265)
g_income_personal	-.0002 (.0001)	.0001 (.0002)	.0456*** (.0085)	-.0009 (.0009)
risk attitude	-.2436*** (.0586)	-.2690*** (.0618)	-.1523** (.0589)	-.2452* (.1157)
age [bracket]	.0035 (.0040)	.0044 (.0041)	.0105* (.0053)	.0065 (.0038)
education	.2005*** (.0577)	.2197** (.0692)	.1438*** (.0321)	.1264 (.0857)
labour status	+	+	+	+
exp_income_vs_price	+	+	+	+
Number of obs	15,207	9,147	2,849	3,211
Number of countries	9	9	9	9
R^2	0.1852	0.1683	0.2523	0.2083

Standard errors are clustered for robustness. * corresponds to the 10% confidence interval, ** to the 5% confidence interval, and *** to the 1% confidence interval. A subsample of 9 countries (Belgium, Cyprus, Germany, Estonia, Spain, Italy, Latvia, Malta, and Slovakia) is used due to missing observations on renters for certain countries.