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Public Perceptions of the Linkage between Monetary Policy Decisions and the Housing Market

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How do monetary policy decisions relate to price changes in housing markets? An assessment of public perceptions across five European countries

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– Preliminary Draft
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Abstract

How do non-experts believe monetary policy works, especially with regard to the housing market? To investigate this question, we conduct a survey experiment among 3,800 residents from Austria, Germany, Italy, Sweden and the United Kingdom. First, when asked directly about monetary policy, more than half of the respondents seem to understand the basic principles of conventional monetary policy (higher prices will lead to an increase in policy rates). For unconventional monetary policy (quantitative easing), only one tenth of the respondents select the correct answer. Second, 75% of respondents think there is a connection between interest rates and housing prices. Third, survey participants overwhelmingly link interest rate decreases to increasing house prices, in line with economic theory. Fourth, a limited number of participants correct an initially wrong assessment of the nexus between monetary policy and house prices when presented with information by academic economists or central bankers. Participants are more reactive to information provided by academic economists. Our paper thus provides a first insight into the public perception of the link between monetary policy and housing prices. This information is crucial for implementing successful monetary policy.

Keywords: Monetary policy, housing markets, survey
JEL codes: E52, R31, D84

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1 Introduction

Ever since the global financial crisis (GFC) hit, the connection between monetary policy (MP) actions and (price) movements in housing markets has been under scrutiny by both academics (Taylor, 2007; Jordà et al., 2015; Hedlund et al., 2017) and policy-makers (Bernanke et al., 2010). A common reasoning of this nexus can be summarised as follows: Changes in interest rates are expected to affect agents' decision-making and, thus, generate movements in real estate prices. Specifically, a reduction in interest rates decreases the cost of borrowing, alleviates credit constraints and, by that, increases the demand for housing. As the supply of housing is fixed in the short run, only prices can react and, thus, increased demand for housing triggers a rise in house prices.

Despite the importance of this nexus (Syz, 2008, estimates that roughly one third of global private wealth is tied up in real estate), relatively little is known about how this relationship between MP and housing is *perceived* by the public. This is not only interesting per se, but also because previous research has found that house price expectations play an important role in driving actual house prices (Glaeser and Nathanson, 2017). There are only few papers empirically linking MP directly to future house price expectations. One such exception is Binder et al. (2023) who have recently shown how house price expectations respond to communication about interest rate changes. Their survey-experiment finds that information about the mortgage channel of MP affects consumers' house price expectations.

Despite a rapidly growing body of literature on the influence of communication on expectations in the context of MP (see Blinder et al., 2008, for a survey of this literature), there is a lack of research on the link between house price inflation expectations and monetary policy. There is also increasing interest by policymakers in monitoring and influencing expectations that accompany the increase in research on the formation of these expectations. Generally, economic dynamics depend on the interaction between the actual conduct of monetary policy and agents' understanding of it (Eusepi and Preston, 2010). Specifically, households' expectations about future MP might not only affect their beliefs but also their behaviour. Carvalho and Nechio (2014) show that US households are, at least in part, aware of the basic principles underlying the Fed's MP principles – the Taylor rule.

For instance, Coibion et al. (2022) investigate the communication of monetary policy using randomized control trials. They find that providing simple information about inflation reduces households' forecasts by about one percentage point in a low-inflation setting. This effect is smaller if the respondents are given information about MP meetings via a news article, casting doubt on the diffusion of central bankers' messages via conventional media outlets. In terms of the targeted consumers, the study predominantly reports quite homogeneous responses. Related research analyses the effects of forward guidance (D'Acunto et al., 2022), information about inflation targets (Binder and Rodrigue, 2018) or information about past inflation (Cavallo et al., 2017).

This study contributes to this branch of literature by investigating if and, if so how, agents assume, on average, monetary policy actions influence specific prices, namely the aggregate level of house prices. To elicit this nexus, we designed and conducted an interactive, web-based survey-experiment. About 3,800 participants were recruited among residents in Austria, Germany, Italy, Sweden and the UK. We systematically ask questions about the assumed ex-ante nexus between MP and housing markets in the context of very heterogeneous housing markets and study the influence of extra information on changes in beliefs. We can study heterogeneity of updated beliefs by type of agent providing such information: either central bankers or academic economists.

We report various findings. First, when asked directly about the functioning of MP, more than half of the respondents appear to understand the basic principles of conventional MP (higher prices will lead to an increase in policy rates). For unconventional MP (quantitative easing), only one tenth of the respondents select the correct answer. Second, 75% of respondents think that there is a connection between interest rates and housing prices. Third, survey participants overwhelmingly link interest rate decreases to increasing house prices, in line with economic theory. Fourth, a non-negligible number of participants correct an initially wrong assessment of the nexus between MP and house prices when presented with indicative information by academic or central bank economists. This corroborates the recent findings of Binder et al. (2023). We also contribute the novel finding that participants are more reactive to information provided by academic economists as compared to central bankers. This result suggests that the public is more reluctant to incorporate statements by central bankers as compared to academic economists, with important implications for central bank communication. Our study thus provides one of the first insights into the perceived link between monetary policy and housing prices.

The remainder of this article is structured as follows: Section 2 presents the study design and the collected data. The main part of our analysis is documented in Section 3 and Section 4 concludes.

2 Data

2.1 Data Collection

The experiment was run in May 2023, jointly with a cross-country data-collection endeavour for measuring tax preferences in Austria, Germany, Italy, Sweden and the UK (see also Disslbacher et al., 2023).[1]

For recruiting participants, we made use of a company (CINT–GapFish) maintaining subject pools in various countries mainly used for digital market research (see `https://gapfish.com/` for details).

In each country, we recruited around 800 participants which were stratified by socio-economic characteristics (age, gender, highest level of education attained and region, i.e., urban vs. rural).

Upon log-in via the CINT–GapFish platform, participants were re-directed to a web-based survey they filled by themselves. Participants were paid for completing the study via the payment system used by CINT–GapFish. Participants only received a remuneration for a completely filled questionnaire. Different language versions were available acknowledging the different sets of languages used in each country. The experiment (designed in English) was thus translated (and – to ensure cross-language consistency – also back-translated) to German, Swedish and Italian. In general, participants could always choose their preferred language – no matter from which country-sample they were drawn.

Questions were in general the same for all participants – no matter from which country-sample they were drawn – yet options like the region of residence, currency used or the name of the respective central bank were adapted accordingly.

[1] A pilot study was run in Luxembourg, see Appendix C.

2.2 Study Participants

Table 1: Summary statistics of participants' socioeconomic characteristics

Variable	Value	Frequency	Percent	Cum. Percent
Sex	female	1996	51.67	51.67
	male	1755	45.43	97.10
	other	14	0.36	97.46
	NA	98	2.54	100.00
	TOTAL	3863		
Marital Status	single	1013	26.22	26.22
	partnership/married	2433	62.98	89.20
	divorced/widowed	319	8.26	97.46
	NA	98	2.54	100.00
	TOTAL	3863		
Having min. one child	yes	2021	52.32	52.32
	no	1743	45.12	97.44
	NA	99	2.56	100.00
	TOTAL	3863		
Probability of job loss				
low	1	1726	44.68	44.68
	2	503	13.02	61.79
	3	302	7.82	69.61
	4	185	4.79	74.40
	5	237	6.14	80.54
	6	268	6.94	87.48
	7	155	4.01	91.49
	8	153	3.96	95.45
	9	79	2.05	97.50
high	10	158	4.09	48.77
	NA	97	2.51	100.01
	TOTAL	3863		
Degree of life satisfaction				
low	1	124	3.21	3.21
	2	145	3.75	13.22
	3	225	5.82	19.04
	4	268	6.94	25.98
	5	391	10.12	36.10
	6	513	13.28	49.38
	7	671	17.37	66.75
	8	784	20.30	87.05
	9	404	10.46	97.51
high	10	242	6.26	9.47
	NA	96	2.49	100.00
	TOTAL	3863		
Highest level of education attained				
	below tertiary	2451	63.45	63.45
	tertiary	1314	34.02	97.47
	NA	98	2.54	100.01
	TOTAL	3863		
Did vote in the last election eligible				
	Yes	3434	88.89	88.89
	No	427	11.05	99.94
	NA	2	0.05	99.99
	TOTAL	3863		
Self-assessed position in the earnings distribution				
lowest quintile	1	753	19.49	19.49
	2	753	19.49	38.98
	3	752	19.47	58.45
	4	752	19.47	77.92
highest quintile	5	752	19.47	97.39
	NA	101	2.61	100.00
	TOTAL	3863		

Notes: The table reports overall socio-economic characteristics across all five countries.

Participants filled the survey by themselves. It was not possible to break the survey and continue at a later stage nor to participate multiple times using the same IP-address to ensure clean data.

We end up with 781 respondents from Austria, 738 from Germany, 818 from Italy, 836 from Sweden and 688 from the UK. Table 1 reports socio-economic and demographic attributes of survey participants.

Apart from the socioeconomic questions, *job loss* refers to the subjective expectation to lose their job during the next 6 months with 1 referring to "very unlikely" and 10 to "very likely". *Life satisfaction* is the reported general life satisfaction with 1 the lowest value. Respondents also disclose whether they *vote*d in the last election they were eligible. The respondents are asked six questions about monetary policy and the housing market, with two to four answer options. These variables will be discussed in detail when the results are presented below.

3 Empirical Analyses

3.1 Monetary Policy Literacy

We start with testing for participants' general MP literacy. Therefore, we elicit both: understanding of *conventional* and *unconventional* MP.

In a first step, question 1 asks respondents about conventional monetary policy (CMP) in general. By this question, we aim to understand whether respondents have a general knowledge about how interest rates emerge.[2]

Question 1 *(CMP 1)*
The European Central Bank (ECB) together with national central banks decides upon the key policy interest rate, which affects the interest rates people have to pay when taking out mortgages. Suppose the prices in the Eurozone in general will go up in the next 12 months. How do you expect the ECB to react?

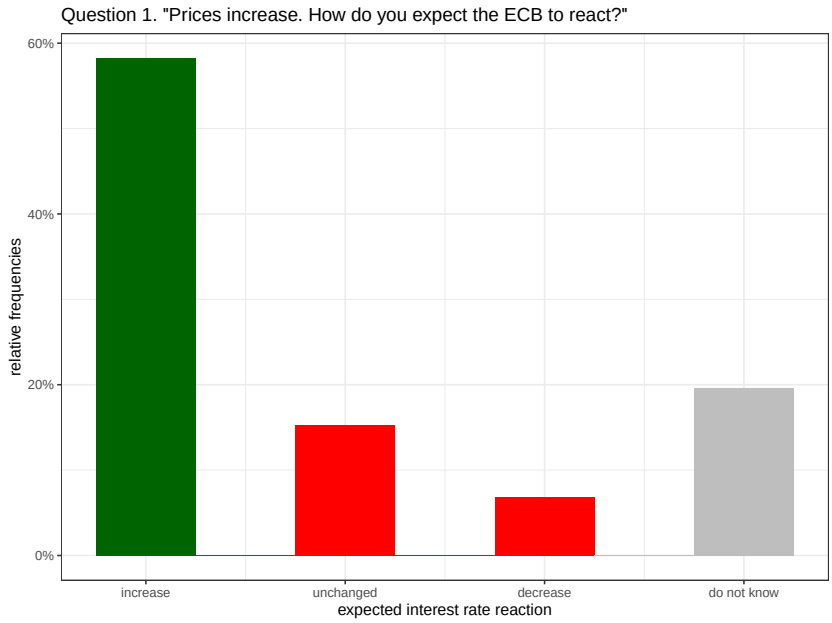
1. ***The ECB will increase their interest rate.***
2. *The ECB will leave their interest rate unchanged.*
3. *The ECB will decrease their interest rate.*
4. *I do not know.*

As shown in Figure 1, more than half of all respondents state that rising prices will trigger an increase in interest rates by the ECB.[3] About 22% expect the ECB to act differently. Figure 10 shows the corresponding answers in absolute counts. The survey was conducted in May 2023, amidst a period of rising inflation rates and rising policy rates (see Figure 3).

[2]To avoid lengthy text in the questions, we exemplarily print "ECB" here whenever referring to the MP-conducting central bank. In the original questionnaires all text mentioning a central bank, the name of the institution is country-specific. Thus, for Austria, Germany and Italy the text refers to the ECB, while that for Sweden and the UK refer to the (Sveriges) Riksbank and the Bank of England, respectively.

[3]Throughout this paper, we will mark the answers most likely classified as correct by economists with bold letters in text and with green bars in figures.

Figure 1: Answers to Question 1 (CMP)



There is some variation in country responses (Figure 1, Table 2): Respondents from Austria are most likely to expect an interest rate increase after price increases, while respondents in Germany and Italy do significantly less so. Interestingly, all of these countries have the same central bank (the ECB) which sets the same interest rates, and very similar inflation rate dynamics at the time of the survey.

Figure 2: Answers to Question 1 (CMP), by countries

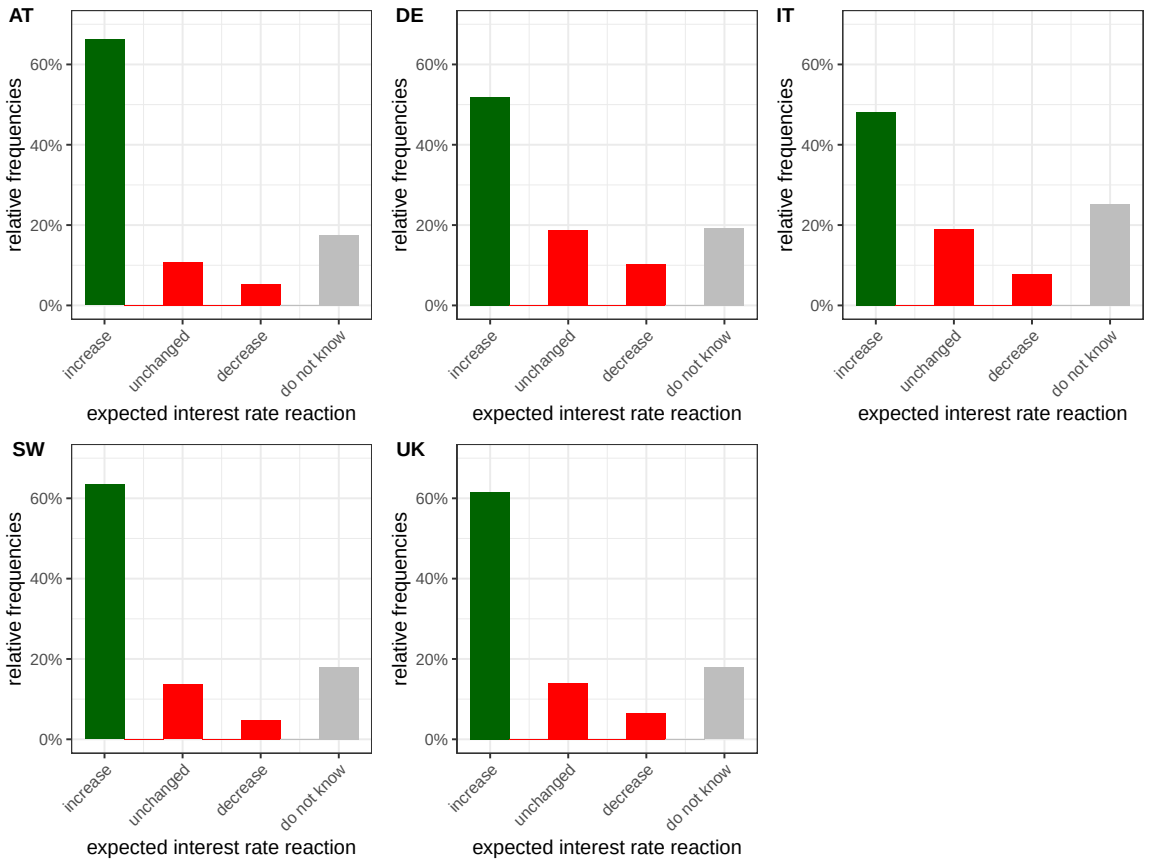
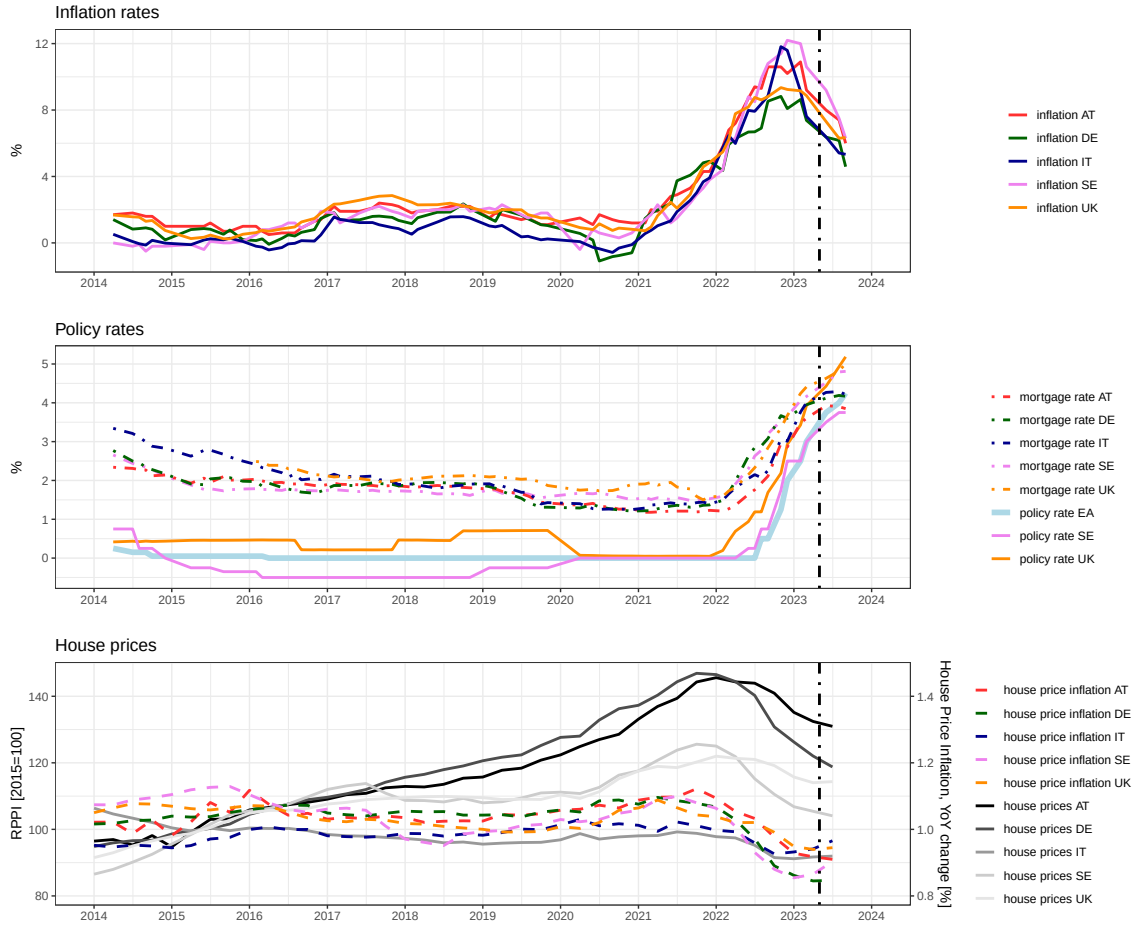


Table 2: Answers to Question 1 (CMP), by countries

Country	Question 1 (CMP)	n	Share
Austria	increase	515	0.659
Austria	unchanged	84	0.108
Austria	decrease	42	0.054
Austria	do not know	137	0.175
Austria	NA	3	0.004
Germany	increase	370	0.501
Germany	unchanged	134	0.182
Germany	decrease	73	0.099
Germany	do not know	137	0.186
Germany	NA	24	0.033
Italy	increase	387	0.473
Italy	unchanged	152	0.186
Italy	decrease	62	0.076
Italy	do not know	202	0.247
Italy	NA	15	0.018
Sweden	increase	524	0.627
Sweden	unchanged	113	0.135
Sweden	decrease	40	0.048
Sweden	do not know	149	0.178
Sweden	NA	10	0.012
UK	increase	389	0.565
UK	unchanged	89	0.129
UK	decrease	41	0.060
UK	do not know	113	0.164
UK	NA	56	0.081
	NA	2	1

Notes: The table reports answers to Question 1 (Conventional Monetary Policy).

Figure 3: Inflation, policy rates and house prices



Data sources: FRED, OECD, Statistics Sweden, OeNB, Bank of England, Banca d'Italia, Bundesbank. RPPI = "Residential Property Price Indices"

Next, question 2 asks about unconventional monetary policy (UMP).

Question 2 *(UMP)*
Besides fixing the interest rate, the ECB also bought a range of financial assets, including government bonds and corporate bonds. Such purchases influence broader financial conditions and, possibly, inflation. Assume, again, that prices in the Eurozone in general increase over the next 12 months. How do you think the ECB will react?

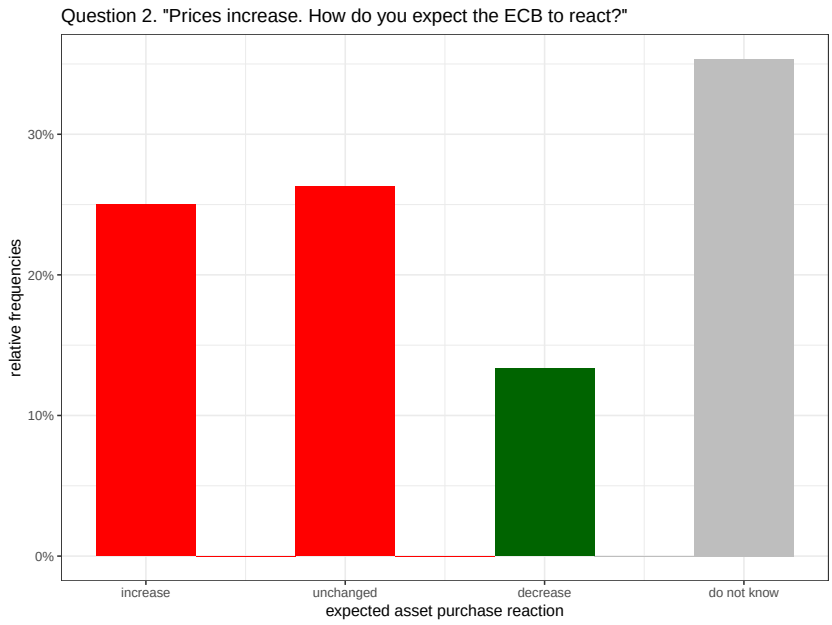
1. *The ECB will purchase more assets.*
2. *The ECB will not change its asset purchase programme.*
3. ***The ECB will purchase less assets.***
4. *I do not know.*

Figure 4 reveals that UMP is much less understood than CMP. More than one third of respondents explicitly state not to know how the ECB would react. About half of respondents think that the ECB would increase asset purchases or leave the amount unchanged. Only 13%

correctly expect a decrease in asset purchases. The remaining 87% either state not to know the correct answer or tick a wrong answer. There is some cross-country heterogeneity (Figure 5). But strikingly, the most common answer selected in all countries is "I do not know". Thus, we conclude that both revealed and stated knowledge of UMP is quite limited. Adding the two shows that the vast majority (roughly 87%) does not understand UMP and thus hints toward gaps in MP communication.

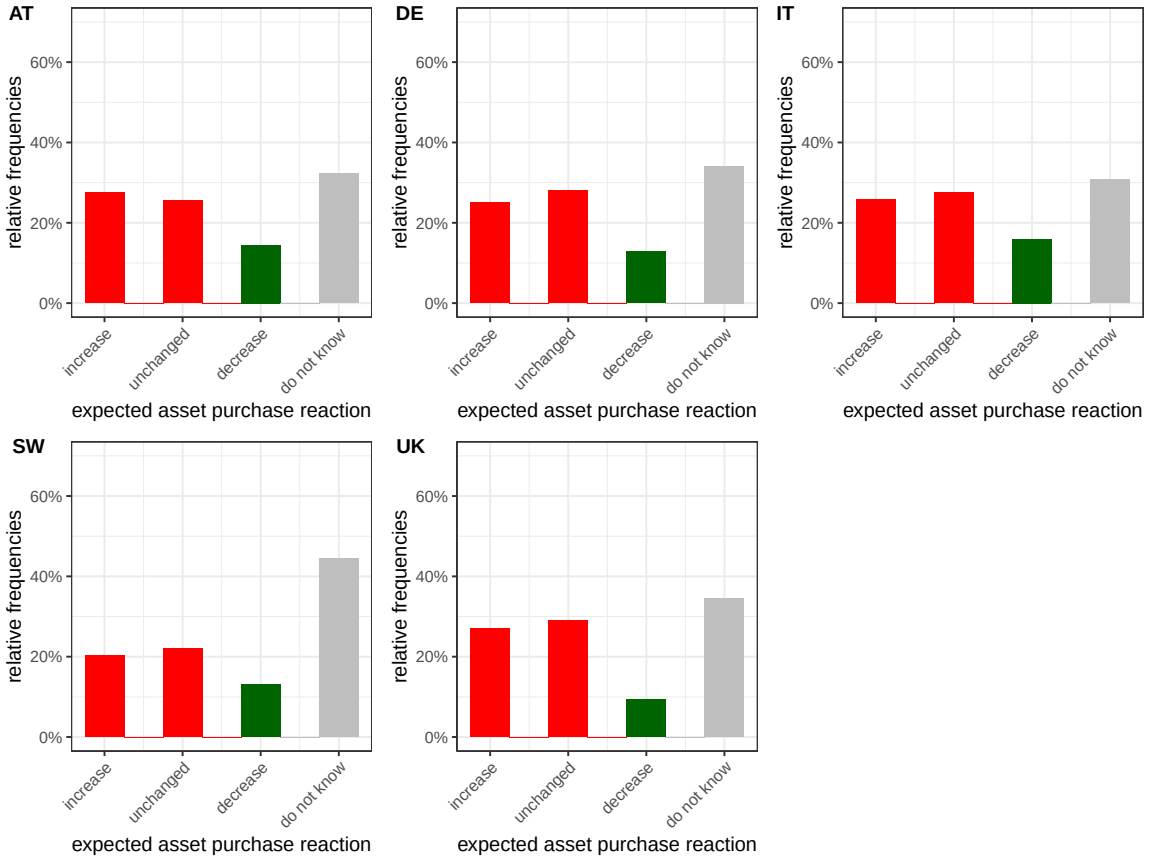
The poor understanding of UMP could stem from the fact that it constitutes a relatively recent policy tool: formal inflation targeting was pioneered by New Zealand in the early 1990s (see Haldane, 1995) and ever since then adopted in all advanced economies globally, while asset purchase programmes and other forms of UMP have only seen widespread application in the aftermath of the GFC in 2007/2008[4] (Bernanke and Mishkin, 1997; Werner, 1995).

Figure 4: Answers to Question 2 (UMP)



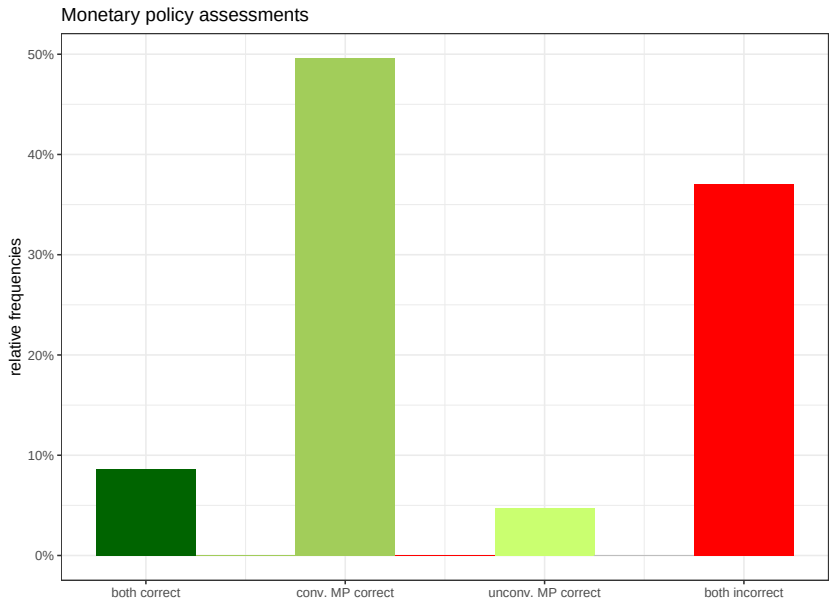
[4]With the notable exception of Japan, where quantitative easing has been undertaken since 2001.

Figure 5: Answers to Question 2 (UMP), by countries



Overall, only about 9% of respondents can be identified as "MP experts" as they have answered correctly to both MP questions (Figure 6). Austria has the highest shares of "MP experts" with over 10%, the UK has the lowest share with 6%. On the contrary, 15% give wrong answers on both questions (highest: Italy and Germany 18%, lowest: Austria 11%). Finally, a large share answer with "do not know" on both questions: 15% overall, whereas the share is largest in Italy (20%) and lowest in Austria (13%). A pairwise Pearson's χ^2 test rejects the null hypothesis of independence between the two outcomes at the $p < 0.01$ level.

Figure 6: Answers to both monetary policy questions



Next, we explore the socioeconomic characteristics that are associated with answers to those two questions. To that end, we estimate two logit regression models – one for each type of MP – with an indicator as outcome variable that takes the value one if the respondent has correctly answered the respective MP question and zero otherwise. Table 3 and Table 4 report results.

Overall, the models reaffirm the descriptive statistics above: the intercept associated with the UMP model is substantially lower than that for CMP. This reaffirms that on average people are more familiar with CMP than with UMP.

First, in column (1), we look at sociodemographiccharacteristics of respondents. We find that on average men have a better understanding of both conventional and unconventional MP. This finding is in-line with previous studies that have found lower levels of financial literacy among women (Cupák et al., 2018). With regard to age, we would expect a humped-shape profile that is interpreted as a learning process reaching its maximum when people reach the age of usual first home purchase and a decline thereafter. While we indeed see such a humped-shaped profile in correct responses to the CMP question, we find no age effect at all for the UMP question. Non-surprisingly, variation in education levels attained also significantly explain variation in correct answers: having attained tertiary education is associated with a roughly 30% higher likelihood to tick the right answer in both CMP and UMP questions. Those who expect to loose their job during the next 6 months have a worse understanding of conventional monetary policy. We further report some differences across countries: In comparison to Austrian respondents, all others are more likely to not expect interest rate hikes following price increases. Yet, in terms of magnitude there are differences across the remaining countries: people in Germany and Italy are much less likely to expect the correct CMP reaction. Regarding asset purchase programmes, UK respondents are least likely to give the correct answer. Lastly, respondents that reported to not have voted in the last election are less likely to associate inflation with interest hikes. The following variables have no explanatory power for giving correct answers: relationship status (single is the baseline), having children, employment status, earnings, rural/urban, class (self-evaluated), life satisfaction.

Second, in column (2), we include variables that capture financial literacy and expectations. First, we asked respondents about the development of residential property prices in their coun-

tries (in 10% bins from 0 to 100). We compared their answers with the actual price dynamics. If they are correct, then the variable "past house prices correct" takes 1, otherwise zero. We see that those with good knowledge of property prices are more likely to answer correctly both for the CMP and the UMP question. One explanation is that people with higher financial literacy have a better understanding about current price dynamics as well as posess knowledge about monetary policy. Next, we ask about the expectations about future property prices (<5% is the baseline). Those whop expect house prices to decrease considerably answer correctly for CMP and UMP. This shows that people who are aware of monetary policy actions rightly expect higher interest rates to decrease demand for housing (more details below).

Third, columns (3) to (8) include variables that reflect the respondents' experience with the housing market in general. As compared to renters (the baseline in column (3)), respondents who own their house with a mortgage get the CMP question right, but those without a mortgage do not. That might reflect that people with active mortgages monitor more intensly factors that influence their mortgage, interest setting by central banks. Interestingly, there is no effect for the UMP question, indicating that asset purchase programs are not directly associated with mortgages for the respondents. A similar pattern can be seen in column (4), where the baseline is people who purchased their homes, and have a better understanding about CMP than those who inherited or rented it, and in column (6): people involved in transactions of properties have a better understanding of conventional monetary policy. We do not see effects if respondents own other real estate, or are renters and want to become home owners. Home owners who do not want to become renters again have a better understanding of CMP.

Overall, we can characterise people that do not well understand CMP as young, female, low-educated and less engaged in political participation. Further, they are on average more likely to fear job loss and most likely reside – among the countries part of our study – in Germany or Italy and least likely in Austria.

The profile of people selecting wrong answers to the UMP question is similar: most uninformed people are on average again female and low-educated. They reside most likely in the UK. Age, perceived job loss risk and political participation do not play a role.

3.2 Monetary Policy and Housing Markets Beliefs

The next set of questions addresses the main research question, namely whether participants belief that there is a connection between interest rates and changes in housing prices, and, if so, which direction they assume.

Question 3 *(HM 1)*
"There is a connection between interest rates I have to pay to credit institutes when taking out a mortgage, and the price of houses/apartments."
*Disagree / **Agree***

Overall, the vast majority of respondents (75.72%, that is 1,746 in counts) think there is a nexus between interest rates and house prices, whereas 24.28% (560) reject this connection.

Subsequently, question 4 and question 5 ask about the suspected direction of this connection. In other words, we elicit whether people assume a direct (co-movement) or indirect (anti-movement) relationship between interest rates and house prices.

Table 3: Probability of expecting the correct conventional monetary policy reaction to inflation

	Dependent variable:							
	CMP correct							
	Socioeconomics	Financial Literacy	Housing market experience:					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
male	0.215**							
	(0.095)							
high education	0.299**							
	(0.144)							
age	0.038*							
	(0.023)							
age^2	−0.0003							
	(0.0003)							
partnership	−0.044							
	(0.098)							
widowed/divorced	−0.031							
	(0.157)							
no children	0.120							
	(0.086)							
job loss	−0.049***							
	(0.018)							
life satisfaction	0.016							
	(0.018)							
Germany	−0.679***							
	(0.120)							
Italy	−0.647***							
	(0.121)							
Sweden	−0.332**							
	(0.138)							
UK	−0.290**							
	(0.129)							
did not vote	−0.370***							
	(0.122)							
self-employed	−0.005							
	(0.139)							
unemployed	−0.061							
	(0.151)							
retired	0.134							
	(0.147)							
low earnings	−0.022							
	(0.107)							
high earnings	0.041							
	(0.117)							
rural	−0.011							
	(0.079)							
middle class	0.073							
	(0.100)							
upper class	−0.360*							
	(0.211)							
male X higher educated	0.121							
	(0.158)							
high education X job loss	−0.038							
	(0.029)							
past house prices correct		0.449***						
		(0.070)						
house prices in country: -5% to -2%		−0.373**						
		(0.157)						
house prices in country: -2% to 2%		−0.742***						
		(0.144)						
house prices in country: 2% to 5%		−0.473***						
		(0.146)						
house prices in country: >5%		−0.727***						
		(0.161)						
own income will increase less than prices		0.292***						
		(0.091)						
own income will increase the same as prices		−0.016						
		(0.103)						
own house w/o mortgage			0.099					
			(0.075)					
own house with mortgage			0.487***					
			(0.090)					
house gifted				−0.378**				
				(0.171)				
house inherited				−0.463***				
				(0.136)				
house other				−0.028				
				(0.215)				
owns other real estate					−0.0005			
					(0.085)			
was not involved in housing transactions in the past						−0.460***		
						(0.069)		
is renter, does not want to become home owner							−0.057	
							(0.109)	
is home owner, does not want to become home renter								0.228**
								(0.114)
Constant	−0.294	0.546***	0.183***	0.511***	0.331***	0.614***	0.218**	0.233**
	(0.597)	(0.149)	(0.053)	(0.049)	(0.037)	(0.054)	(0.085)	(0.105)
Observations	3,178	3,733	3,721	2,252	3,743	3,752	1,433	2,310
Log Likelihood	−2,073.815	−2,480.917	−2,513.461	−1,502.315	−2,544.027	−2,526.808	−987.144	−1,548.543
Akaike Inf. Crit.	4,197.630	4,977.834	5,032.923	3,012.630	5,092.054	5,057.616	1,978.289	3,101.086

Note: *p<0.1; **p<0.05; ***p<0.01

Table 4: Probability of expecting the correct unconventional monetary policy reaction to inflation

	Dependent variable:							
	UMP correct							
	Socioeconomics	Financial Literacy	Housing market experience:					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
male	0.328**							
	(0.141)							
high education	0.439**							
	(0.215)							
age	−0.017							
	(0.031)							
age2	0.0003							
	(0.0003)							
partnership	−0.049							
	(0.137)							
widowed/divorced	−0.177							
	(0.232)							
no children	0.122							
	(0.123)							
job loss	0.026							
	(0.025)							
life satisfaction	−0.048*							
	(0.026)							
Germany	−0.182							
	(0.167)							
Italy	0.193							
	(0.163)							
Sweden	−0.220							
	(0.186)							
UK	−0.634***							
	(0.195)							
did not vote	0.098							
	(0.176)							
self-employed	0.247							
	(0.183)							
unemployed	0.058							
	(0.216)							
retired	−0.034							
	(0.210)							
low earnings	−0.076							
	(0.156)							
high earnings	0.120							
	(0.163)							
rural	−0.147							
	(0.112)							
middle class	0.041							
	(0.147)							
upper class	0.355							
	(0.282)							
male X higher educated	0.200							
	(0.221)							
high education X job loss	−0.069*							
	(0.042)							
past house prices correct		0.238**						
		(0.098)						
house prices in country: -5% to -2%		−0.137						
		(0.187)						
house prices in country: -2% to 2%		−0.543***						
		(0.176)						
house prices in country: 2% to 5%		−0.440**						
		(0.176)						
house prices in country: >5%		−0.611***						
		(0.211)						
own income will increase less than prices		0.152						
		(0.134)						
own income will increase the same as prices		−0.041						
		(0.157)						
own house w/o mortgage			0.170					
			(0.110)					
own house with mortgage			0.046					
			(0.129)					
house gifted				0.246				
				(0.230)				
house inherited				0.238				
				(0.185)				
house other				−0.292				
				(0.341)				
owns other real estate					0.116			
					(0.120)			
was not involved in housing transactions in the past						−0.033		
						(0.098)		
is renter, does not want to become home owner							−0.080	
							(0.163)	
is home owner, does not want to become home renter								−0.048
								(0.162)
Constant	−1.868**	−1.649***	−1.950***	−1.871***	−1.901***	−1.852***	−1.902***	−1.789***
	(0.834)	(0.186)	(0.080)	(0.070)	(0.054)	(0.075)	(0.125)	(0.148)
Observations	3,183	3,739	3,727	2,254	3,749	3,758	1,437	2,312
Log Likelihood	−1,219.806	−1,457.154	−1,462.349	−900.873	−1,466.306	−1,475.490	−540.082	−929.528
Akaike Inf. Crit.	2,489.613	2,930.308	2,930.698	1,809.747	2,936.611	2,954.979	1,084.163	1,863.056

Note: *p<0.1; **p<0.05; ***p<0.01

Question 4 *(HMD 1)*
"When the interest rate decreases, house prices decrease too."
Disagree */ Agree*

Question 5 *(HMD 2)*
"When the interest rate decreases, house prices rise."
Disagree / ***Agree***

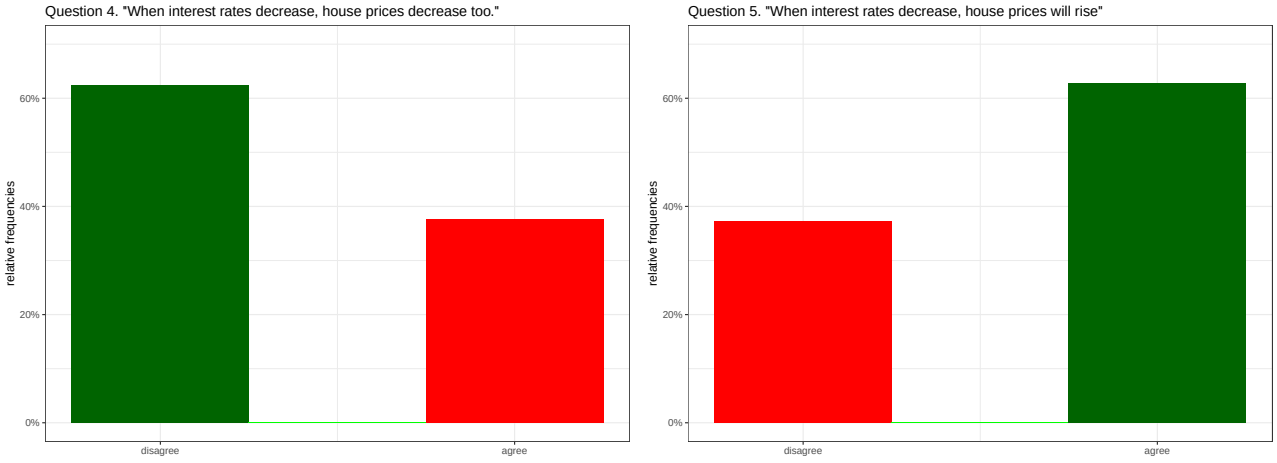
Responses are quite symmetric. In Figure 7, we can see in panel (a), that 61% of respondents disagree with the notion that decreases in interest rate are associated with falling house price. This is in-line with economic reasoning (Hedlund et al., 2017). In panel (b), we see 63% agreeing with the mirrored statement (interest rate decreases lead to house price increases).

Assessing both questions simultaneously, we identify a share of 46% answering correctly to both questions and 21% answering wrongly both times (Table 5).

Table 5: Responses to HMD 1 and HMD 2

	HMD 2: disagree	HMD 2: agree
HMD 1: disagree	594	1,754
HMD 1: agree	807	612

Figure 7: House price reactions to interest rate decreases.



(a) Direct relationship

(b) Indirect relationship

3.3 Future House Price Expectations Across Heterogeneous Housing Markets

3.4 The Impact of Experts' Knowledge

Communication can shape expectations. Central bank communication indeed influences financial markets (Swanson, 2021) and information about inflation can shape households' future

inflation expectations (Coibion et al., 2022; Hoffmann et al., 2021). Central bank communication thus aims to make use of this and has accordingly changed substantially over the last decades.

While central banks' interest in shaping inflation expectations is comprehensible, communication with the broader public may influence other – potentially unintended – aspects of monetary policy perceptions as well. Can information about the monetary policy-house price nexus shape households' expectations?

To answer this question, we introduce a randomised information treatment into our study to test how different types of communicators affect expectations. We repeat questions 4 and 5, but provide additional information on experts' opinions on a nexus between housing prices and interest rates. We differentiate between a central bank (question 6) and an academic (question 7) economist providing this information. Both economists argue in favour of an indirect relationship between interest rates and housing prices, namely that if interest rates decrease, house prices will most likely increase.

Question 6 *(CBT 1)*
"There are central bankers arguing that when interest rates fall, house prices will rise. For example, Deputy Governor Chen Nan-kuang of Taiwan's central bank states that "loose monetary policy [note: meaning low interest rates] is indeed one of the main reasons for rising house prices". (Source: The Taiwan Banker NO.145)
In the light of this claim, we will present you the last two statements again. Do you rather agree or disagree?"

Question 7 *(RT 1)*
"There are researchers arguing that when interest rates fall, house prices will rise. For example, Ozkan at the University of Toronto and his coauthors state that a "reduction in the interest rate reduces the cost of borrowing, alleviates credit constraints and increases the demand for housing. The increase in demand for housing increases real house prices." (Source: Ozkan et al. 2017)
In the light of this claim, we will present you the last two statements again. Do you rather agree or disagree?"

Every participant was randomly selected into one of two groups that differed in whether they were shown the information provided by the central banker or academic economist. The aim of this information treatment is to provide participants with some guidance on how this nexus is generally seen by economists. Selecting these two quotes was driven by the fact that they clearly state a direction of influence.

To assess the updating of beliefs upon provision of experts' opinions, we focus on switching behaviour. After presenting this information, participants could again choose between two statements mentioning two directions of how house prices and interest rates could be related. We thus focus on the switching behaviour of participants after having been presented this extra information.

We depict the respondents' aggregate switching behaviour after they have been presented either of the extra information in Figure 8.

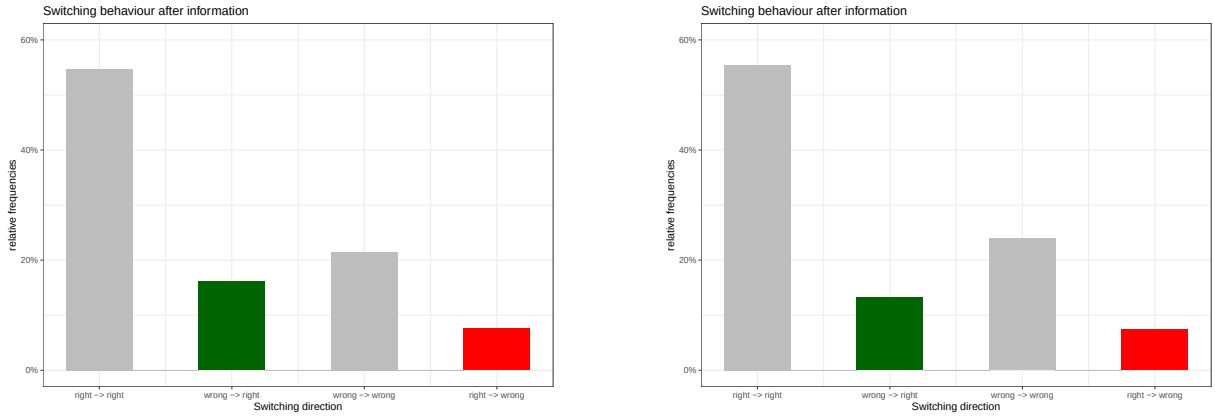
First, we observe that the majority of respondents does not switch: 76% and 79%, respectively, do not alter their responses after having received extra information. Second, there are about 13% to 16% of "good switchers", i.e., switching from the "wrong" to the "correct" answer. These respondents have apparently been convinced by the experts' statements. About 7% have initially answered correctly, but switched to the wrong answer after the information. We label those participants "bad switchers". While the information treatment does not motivate the majority of people initially giving a wrong response a switch yet still a sizeable share does so (36%-43%).

Table 6 reports results for the first question[5] split by country. There is indeed considerable heterogeneity across countries. The shareof those who initially picked the wrong answer and after the information treatment switch to the correct one ranges between 32% and 37% in most countries, but amounts to 69%[6] in Sweden. Hence, it appears that respondents in Sweden are most likely to reverse their opinion in line with experts' statements. This high level of trust in experts is in-line with findings of the EUROBAROMETER (European Commission, 2021) eliciting general trust in different institutions, professions or people. Sweden achieves the highest rates of trust in scientists across all participating countries: 84% state that scientists working at a university or government-funded research organisations are the best qualified to explain the impact of scientific and technological developments on society.

Conversely, Germans are most likely to reverse their opinion to be the opposite of what the expert statements suggest: 17% of those choosing the right answer in the first place switch to the wrong answer after the information treatment. Germans are indeed among the most sceptical in Europe regarding trust in experts. Only 59% agree with the EUROBAROMETER statement above.

For the other countries, the share of people switching to the opposite of what experts suggest is relatively low and ranges between 8% (UK) and 15% (IT).

Figure 8: Switching behaviour (total)



(a) Direct relationship: interest rate decreases, house prices decrease

(b) Indirect relationship: interest rate decreases, house prices rise

Figure 9 splits the information effect by information provider: a central banker or a research economist. While there is only little variation in replies to the question on a direct connect (Question 4), there is a substantial change in switching behaviour when stating an indirect relationship (Question 5). Central banker information triggers 12% of respondents to correct

[5]Table 10 in the Appendix reports the same results for the indirect question.

[6]This number results from: 258/(258+115)=0.69.

Table 6: Respondents switching after information treatment, by country

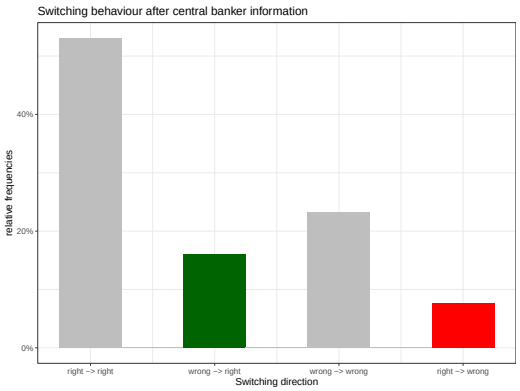
country	switch	n	freq
Austria	right → right	493	0.631
Austria	wrong → right	77	0.099
Austria	wrong → wrong	157	0.201
Austria	right → wrong	53	0.068
Austria	NA	1	0.001
Germany	right → right	375	0.508
Germany	wrong → right	86	0.117
Germany	wrong → wrong	178	0.241
Germany	right → wrong	75	0.102
Germany	NA	24	0.033
Italy	right → right	408	0.499
Italy	wrong → right	119	0.145
Italy	wrong → wrong	210	0.257
Italy	right → wrong	74	0.090
Italy	NA	7	0.009
Sweden	right → right	402	0.481
Sweden	wrong → right	258	0.309
Sweden	wrong → wrong	115	0.138
Sweden	right → wrong	53	0.063
Sweden	NA	8	0.010
the UK	right → right	383	0.557
the UK	wrong → right	68	0.099
the UK	wrong → wrong	148	0.215
the UK	right → wrong	32	0.047
the UK	NA	57	0.083
NA	2	2	1

their answer, while researcher information animates 15% to do so.

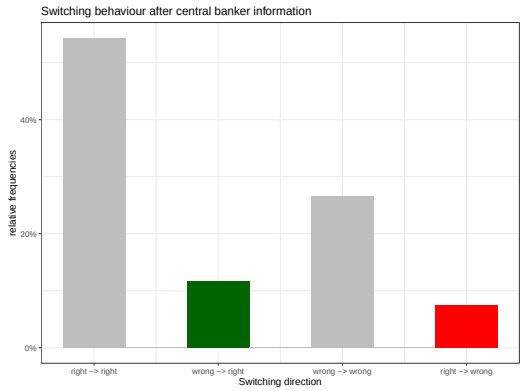
This result suggests that information provided by central bankers is slightly less effective in aligning expectations with economic theory than information provided by a research economist.

Figure 9: Switching behaviour by source of information

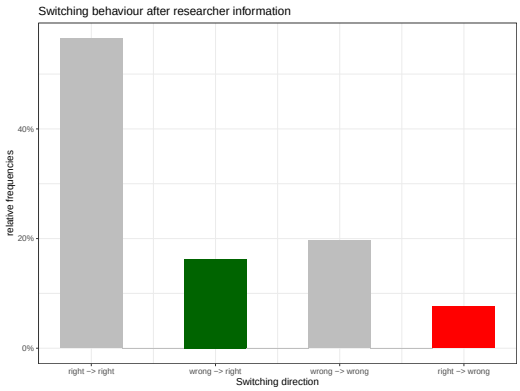
(a) interest rate decreases, house prices decrease



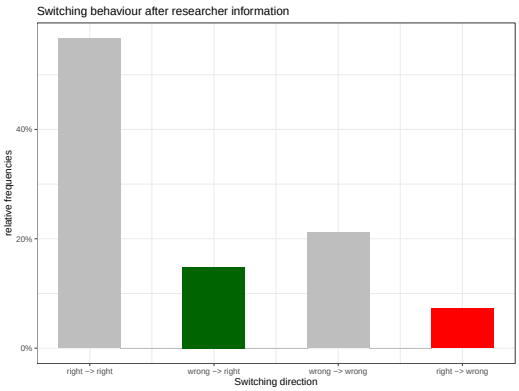
(b) interest rate decreases, house prices rise



(c) interest rate decreases, house prices decrease



(d) interest rate decreases, house prices rise



Next, we assess correlations between switching behaviour and participants' socio-economic characteristics. Table 7, thus, reports results of logit regression models with a specific kind of switcher, "good switcher" as dependent variable. We are interested in the characteristics of those who initially answered wrong, but were convinced by the information to switch their answer to the correct one. Identifying these respondents allows us to gain insight on who might be responsive to information.

Consistent with Figure 9, additional information provided by researchers prompts more participants to correct an initial incorrect answer upon being provided additional information, as compared to when the information is given by a central banker.

Younger people are more likely to switch from the right to the wrong answer, as well as renters and people who expect a moderate (2%-5%) increase in house prices. The answers in this table are for question 5: "When interest rates decrease, house prices will rise". Table 11 shows the characteristics for the mirrored question. Interestingly for this question, "When interest rates decrease, house prices decrease too.", the information type does not play a role.

Table 8 and Table 9 report the odds ratios for a multinomial logit estimation (control variables are omitted from the table). The relative risk ratio of switching from central banker to re-

Table 7: Determinants of Switching Behaviour (logit model)

	Dependent variable: Being a good switcher (from wrong to right answer after information)								
	Information type	Socioeconomics	Financial Literacy			Housing market experience:			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
information: researcher	0.273***	0.251**	0.279***	0.295***	0.380***	0.268***	0.282***	0.121	0.406***
	(0.097)	(0.107)	(0.097)	(0.097)	(0.135)	(0.097)	(0.097)	(0.143)	(0.132)
male		−0.120							
		(0.135)							
high education		−0.377*							
		(0.209)							
age		−0.089***							
		(0.032)							
age^2		0.001**							
		(0.0004)							
partnership		−0.052							
		(0.138)							
widowed/divorced		0.179							
		(0.218)							
no children		0.024							
		(0.123)							
job loss		−0.045*							
		(0.026)							
life satisfaction		−0.032							
		(0.026)							
Germany		−0.060							
		(0.165)							
Italy		−0.070							
		(0.163)							
Sweden		−0.686***							
		(0.208)							
the UK		0.010							
		(0.173)							
did not vote		0.156							
		(0.163)							
self-employed		0.079							
		(0.193)							
unemployed		0.393**							
		(0.197)							
retired		−0.539**							
		(0.239)							
low earnings		−0.047							
		(0.147)							
high earnings		−0.084							
		(0.163)							
rural		0.106							
		(0.115)							
middle class		0.076							
		(0.143)							
upper class		−0.075							
		(0.327)							
male X higher educated		−0.306							
		(0.233)							
high education X job loss		0.107***							
		(0.041)							
past house prices correct			−0.210**						
			(0.102)						
house prices in country: -5% to -2%			0.282						
			(0.234)						
house prices in country: -2% to 2%			0.272						
			(0.217)						
house prices in country: 2% to 5%			0.464**						
			(0.216)						
house prices in country: >5%			0.380						
			(0.239)						
own income will increase less than prices			−0.023						
			(0.131)						
own income will increase the same as prices			0.004						
			(0.150)						
own house w/o mortgage				−0.317***					
				(0.108)					
own house with mortgage				−0.601***					
				(0.136)					
house gifted					0.114				
					(0.263)				
house inherited					0.211				
					(0.202)				
house other					0.058				
					(0.330)				
owns other real estate						−0.135			
						(0.127)			
was not involved in housing transactions in the past							0.473***		
							(0.104)		
is renter, does not want to become home owner								0.356**	
								(0.152)	
is home owner, does not want to become home renter									0.034
									(0.181)
Constant	−2.294***	0.228	−2.538***	−2.089***	−2.685***	−2.261***	−2.610***	−2.053***	−2.695***
	(0.156)	(0.829)	(0.268)	(0.165)	(0.224)	(0.157)	(0.173)	(0.247)	(0.262)
Observations	3,768	3,190	3,748	3,736	2,260	3,758	3,767	1,440	2,318
Log Likelihood	−1,467.320	−1,203.585	−1,457.216	−1,441.935	−787.696	−1,463.611	−1,456.354	−634.217	−819.125
Akaike Inf. Crit.	2,938.639	2,459.171	2,932.432	2,891.869	1,585.391	2,933.221	2,918.709	1,274.433	1,644.249

Note: *p<0.1; **p<0.05; ***p<0.01

searcher information for the second question is 1.167 for switching to the correct answer versus staying with the wrong answer. The odds ratio is lower for the first statement.

Table 8: Multinomial logistic regression for question "interest rate decreases, house prices decrease" (Reference: wrong → wrong)

	(Intercept)	CMP correct	UMP correct	researcher information
wrong → right	0.147	1.001	0.817	1.167

Table 9: Multinomial logistic regression for question "interest rate decreases, house prices rise" (Reference: wrong → wrong)

	(Intercept)	CMP correct	UMP correct	researcher information
wrong → right	0.751	0.788	1.104	1.609

Overall, our results show that information provided by academic economists is more powerful in leading respondents to correct an initially wrong assessment.

For the second statement, there are almost as many switching to the correct answer as repeating the wrong answer when confronted with information by researchers. This result shows that information about economic relationships can be a powerful tool to shape economic agents' expectations, but there are significant differences with regards to the source of the information. An interpretation of the gap between the influence and central bankers is that the general public appear to trust assessments of central bankers less, than academic economists — at least with regards to the relationship between changes in interest rates and housing prices.

These results also have implications for central banks' communication with regards to monetary policy decisions. If aligning households' expectations with economic theory is warranted, then education and information by academic economists may be a more powerful tool than information provided by central bankers.

4 Conclusions

We ask 3,800 people in Austria, Germany, Italy, Sweden and the UK about their beliefs regarding the connection between monetary policy decisions and housing prices. In general, knowledge about monetary policy is limited, especially about unconventional monetary policy tools.

Two thirds of respondents think there is – in principal – a connection between interest rates and housing prices. Survey participants overwhelmingly link interest rate decreases to increasing house prices, in line with economic theory. Some participants correct an initially wrong assessment upon being presented additional information on this link by researchers or central bankers. Information provided by academic economists especially prompts respondents to correct initial incorrect answers to responses more in-line with economic theory. These findings suggest that central banker's communication success with the broader public might be of limited effect compared to information by academics.

Policy Recommendation:

- People not directly involved in housing purchases need to get more information

- People don't understand unconventional monetary policy
- Academics may be better explainer; results not entirely consistent - more research needed
- Country-differences

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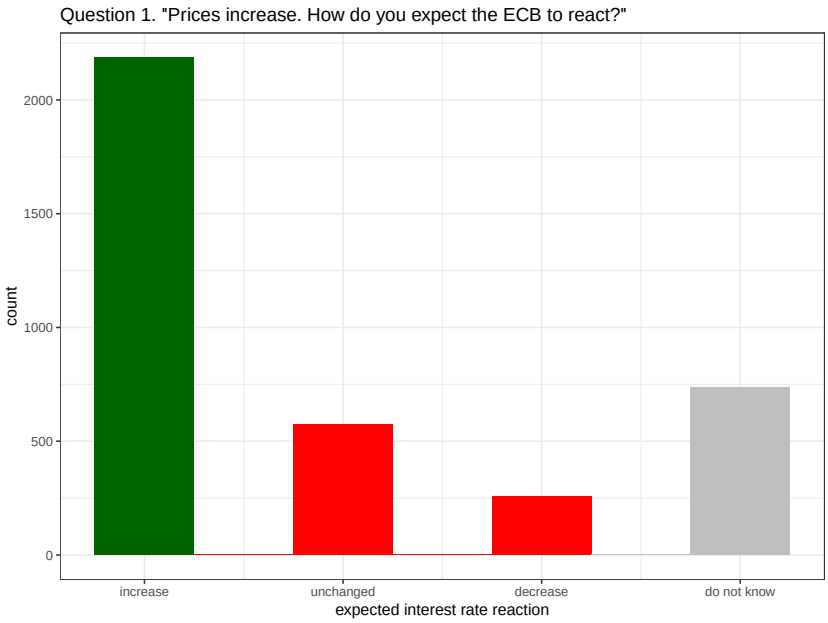
Appendix

A Additional Figures

Figure 10: Answers to Question 1 (CMP 1)



B Additional Tables

Table 10: Respondents switching after information treatment, by country

	country	switch2	n	freq
1	Austria	0	380	0.487
2	Austria	1	111	0.142
3	Austria	2	235	0.301
4	Austria	3	54	0.069
5	Austria	NA	1	0.001
6	Germany	0	367	0.497
7	Germany	1	96	0.130
8	Germany	2	188	0.255
9	Germany	3	63	0.085
10	Germany	NA	24	0.033
11	Italy	0	349	0.427
12	Italy	1	130	0.159
13	Italy	2	261	0.319
14	Italy	3	72	0.088
15	Italy	NA	6	0.007
16	Sweden	0	604	0.722
17	Sweden	1	68	0.081
18	Sweden	2	107	0.128
19	Sweden	3	49	0.059
20	Sweden	NA	8	0.010
21	the UK	0	387	0.562
22	the UK	1	93	0.135
23	the UK	2	112	0.163
24	the UK	3	40	0.058
25	the UK	NA	56	0.081
26		0	2	1

Table 11: Results

	Dependent variable:								
	switch1a								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
random_monetary	0.020	−0.080	0.029	0.014	−0.084	0.015	0.022	0.149	−0.073
	(0.089)	(0.100)	(0.089)	(0.089)	(0.120)	(0.089)	(0.089)	(0.136)	(0.118)
factor(gender)2		−0.098							
		(0.127)							
factor(edu)2		−0.054							
		(0.189)							
age		−0.099***							
		(0.028)							
age2		0.001***							
		(0.0003)							
factor(marital2)2		0.082							
		(0.129)							
factor(marital2)3		0.154							
		(0.206)							
children		0.084							
		(0.114)							
job_loss		−0.004							
		(0.024)							
life_satisfaction		0.012							
		(0.025)							
as.factor(country)Germany		0.283							
		(0.182)							
as.factor(country)Italy		0.481***							
		(0.177)							
as.factor(country)Sweden		1.445***							
		(0.184)							
as.factor(country)the UK		0.122							
		(0.198)							
vote		0.269*							
		(0.161)							
factor(employment3)2		0.211							
		(0.180)							
factor(employment3)3		0.229							
		(0.193)							
factor(employment3)4		−0.304							
		(0.203)							
relevel(as.factor(earningsthree), ref = "2")1		0.001							
		(0.156)							
relevel(as.factor(earningsthree), ref = "2")3		0.084							
		(0.170)							
factor(rural_urban)2		0.045							
		(0.108)							
factor(class_selfeval)2		0.165							
		(0.138)							
factor(class_selfeval)3		0.166							
		(0.293)							
factor(gender)2:factor(edu)2		−0.347							
		(0.213)							
factor(edu)2:job_loss		0.012							
		(0.039)							
past_prices_correct			0.023						
			(0.092)						
factor(expectations)2			0.018						
			(0.202)						
factor(expectations)3			0.266						
			(0.183)						
factor(expectations)4			0.090						
			(0.186)						
factor(expectations)5			−0.130						
			(0.215)						
factor(expected_income)2			0.062						
			(0.123)						
factor(expected_income)3			0.046						
			(0.140)						
factor(housing_status_det)2				−0.452***					
				(0.105)					
factor(housing_status_det)3				−0.026					
				(0.112)					
factor(house_acq_singletick)2					−0.210				
					(0.260)				
factor(house_acq_singletick)3					0.380**				
					(0.173)				
factor(house_acq_singletick)4					−0.067				
					(0.306)				
factor(other_real_estate)2						−0.272**			
						(0.121)			
factor(transactionInvolve)2							0.167*		
							(0.092)		
factor(ever_home_owner)2								0.316**	
								(0.143)	
factor(ever_renter)2									−0.135
									(0.155)
Constant	−1.677***	−0.694	−1.856***	−1.505***	−1.677***	−1.625***	−1.782***	−1.907***	−1.539***
	(0.139)	(0.769)	(0.234)	(0.149)	(0.189)	(0.141)	(0.151)	(0.234)	(0.221)
Observations	3,766	3,188	3,746	3,734	2,258	3,756	3,765	1,440	2,316
Log Likelihood	−1,664.764	−1,324.624	−1,650.044	−1,638.190	−934.380	−1,655.419	−1,662.920	−685.886	−965.489
Akaike Inf. Crit.	3,333.528	2,701.249	3,318.088	3,284.380	1,878.761	3,316.838	3,331.839	1,377.773	1,936.977

Note: *p<0.1; **p<0.05; ***p<0.01

C Information about the pilot study in Luxembourg

In Luxembourg, the experiment was jointly run with a data collection endeavour for measuring assessment biases of real estate in Luxembourg (see also Lepinteur et al., 2023). Participants were recruited among Luxembourg residents. We have used two strategies for recruiting participants: First, participants in the population-representative 2019 Luxembourg module of the European Union Statistics on Income and Living Conditions (EU-SILC)[7] had the opportunity to sign up to be contacted for participating in future experimental studies. As a second recruitment option, we relied on sponsored posts on several social media platforms (Facebook, Instagram and Twitter) exclusively targeted to users that could be localised in Luxembourg. We collected data between February and May 2022.

The possibility to gain up to 50 EUR in the form of vouchers acted as an incentive for participation. Participants could choose to conduct the experiment in English, French or German. Post-translation consistency checks across language versions were performed by native speakers familiar with the topic.

Recruits were redirected to an online-study they filled by themselves using the web-based *LIONESS Lab*[8] platform for interactive experiments.

We piloted the study in February 2022. The main study with participants recruited from the EU-SILC pool ran in February and March 2022, and with recruits via social media campaigns between March and May 2022.

In general, because of the difference in timing and sample selection, the results are of limited comparability. Results for the Luxembourg pilot study are available from the authors on request.

[7]The EU-SILC is a Europe-wide harmonised survey overseen bu EUROSTAT and serving as main source for European statistics on income, social inclusion and living conditions. In Luxembourg, the survey is led by Luxembourg's statistical institute STATEC and administered by LISER's survey department.

[8]See `https://lioness-lab.org/` developed by Giamattei et al. (2020) and was pre-registered as Waltl (2021).