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Information Frictions among Firms and Households

Abstract

We survey samples of German firms and households to document novel stylized facts about the extent of information frictions among the two groups. First, firms' expectations about macroeconomic variables are closer to expert forecasts and less dispersed than households', consistent with higher information frictions among households. Second, the degree of dispersion and the distance from expert forecasts varies more across groups of households than across groups of firms. Third, firms update their policy rate expectations less than households when provided with an expert forecast, consistent with holding stronger priors. Our results have implications for modelling choices, macroeconomic dynamics, and policies.

JEL-Codes: D830, D840, E710.

Keywords: information frictions, expectation formation, firms, households, interest rates.

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1 Introduction

Information frictions are at the core of models of expectation formation in macroeconomics (Sims, 2003). Such frictions can explain various empirical puzzles and stylized facts, and have important implications for the transmission of monetary and fiscal policy (Ball et al., 2005; Paciello and Wiederholt, 2014). The extent of information frictions likely varies across groups of agents in the economy, for instance, due to differences in stake size or information acquisition and processing costs (Fuster et al., 2020; Maćkowiak and Wiederholt, 2015; Mikosch et al., 2021; Reis, 2006). Given the importance of information frictions for expectation formation, it is crucial for both modeling choices and policy making to understand how the degree of these frictions differs across and within groups of decision makers in the economy.

In this paper we examine the relative strength of information frictions among firms and households in the context of expectations about inflation, unemployment, and the central bank's policy rate. Forecasting macroeconomic developments accurately is central for firms to predict their future product demand or the cost of raising capital. Households have an interest in holding accurate expectations about changes in the cost of living, the real interest rate earned on savings or paid on loans, or the development of the labor market. Both firms and households may therefore perceive high stakes in being informed about macroeconomic developments. At the same time, managers may face lower costs of acquiring and processing macroeconomic information than households.

We leverage micro data from Germany to document several novel stylized facts about the extent of information frictions among firms and households. Our main evidence

draws on two sets of almost identical surveys of 4,238 German firms and 4,925 households in total broadly representative of the German population, conducted at the same points in time. A key aspect of our firm surveys is that they are answered by managers who are responsible for high-stakes decisions in these firms. Crucially, our surveys use identical framing of key questions on expectations, addressing the importance of wording choices, e.g., when asking about inflation (Bruine de Bruin et al., 2012). Hence, our setup ensures a high level of comparability of survey responses between firms and households, allowing us to provide novel evidence on heterogeneity in information frictions.

We start by comparing the level and dispersion of households' and firms' macroeconomic expectations with those of professional forecasts. All else equal, higher information frictions should be reflected in greater dispersion of expectations. In addition, expectation dispersion has direct implications for the transmission of shocks and policies (Angeletos and Lian, 2018). Using surveys conducted with both firms and households in September 2020, we document that firms' expectations about the ECB policy rate, inflation, and unemployment are more closely aligned with the average professional forecast than those of households. The differences between households and firms are large: mean absolute deviations from expert benchmarks among firms are 0.39 p.p. for the policy rate, 0.96 p.p for the inflation rate, and 1.81 p.p. for the unemployment rate, while they are much higher at 1.98 p.p., 3.30 p.p., and 6.11 p.p., respectively, for households. Moreover, firms' expectations are more dispersed than those of experts, but substantially less dispersed than those of households. These facts are consistent with a stronger degree of information frictions among households than among firms.

We next examine heterogeneity in the degree of expectation dispersion within each

group of agents. We split the household and the firm sample into "sophisticated" and "non-sophisticated" respondents according to variables that are associated with significant differences in expectations. The expectations of a group of "sophisticated households" with higher numeracy, age, and financial wealth are mostly indistinguishable from those of firms. In contrast, expectations of "non-sophisticated" firms, i.e., smaller and non-exporting firms, are mostly not statistically different from "sophisticated" firms' expectations, and differ strongly from households' expectations. This is consistent with a larger degree of variation of information frictions across different groups of households than across different groups of firms.

Are differences in expectations between firms and households due to differential informedness about current realizations of macroeconomic variables? We inform random subsets of respondents in our September 2020 surveys about the current policy rate of zero percent before they predict future rates. Households' expectations about future policy rates become significantly less dispersed and shift towards expert forecasts when learning about the current policy rate. By contrast, information about the current policy rate has only negligible effects on firms' expectations about future rates. Approximately 50% of the difference between firms' and households' expectations about future policy rates is eliminated when respondents are informed about the current rate. This indicates that differential knowledge about current economic conditions potentially explains a large part of the differences in expectations about the future between households and firms.

A higher degree of information frictions should also be reflected in agents holding weaker priors about macroeconomic variables. To study the strength of households' and firms' prior expectations about monetary policy, we conducted additional surveys with

German firms and households in December 2019, in which we randomly assign our respondents into groups receiving differential truthful expert forecasts about the likely date of a hike in the ECB policy rate. Subsequently, we elicit a broad range of expectations about future policy rates, personal interest rates, as well as other macroeconomic and personal outcomes. We find that firms update their expectations about policy rates significantly less than households in response to the same expert forecasts, consistent with firms holding stronger priors about future ECB monetary policy. Firms also report to have acquired more information about monetary policy than households over the weeks before the survey, and, within each sample, those respondents that have acquired more information react significantly less to the expert forecasts. Furthermore, while households significantly change their expectations about interest rates they will personally face on savings accounts and loans, firms do not adjust their expectations about own loan rates in response to the expert forecast. Changes in households' expectations about policy rates and own rates persist at a reduced size in a four-week follow-up survey.

A joint explanation for the different findings reported in this paper is that information frictions are more pronounced among households than among firms. This has a number of implications for modeling choices. First, our evidence points to the importance of incorporating information frictions both on the household and on the firm side. However, abstracting from information frictions or using professional forecasts as a proxy for agents' expectations is even more difficult to justify for households than for firms. Second, our finding of substantial variation in expectation dispersion across groups of households suggests that incorporating heterogeneity in information frictions across different households could be a fruitful avenue for future research.

Our results also have implications for macroeconomic dynamics and policy making. For instance, lower information frictions should result in more rapid adjustment of beliefs and economic decisions to macroeconomic shocks among firms than among households. Moreover, monetary policy may be more effective in changing the economic decisions of firms, as it takes more time until changes in policy rates become part of households' information sets. Our findings also suggest that policymakers could increase the effectiveness of their communication by tailoring it according to the extent of information frictions and expectation dispersion across groups.

We contribute to a growing literature studying macroeconomic expectation formation of households and firms.[1] A set of recent papers compare the extent of information frictions and expectation dispersion between households and firms. Coibion et al. (2018b) document that the inflation expectations of firms in New Zealand exhibit a similar degree of dispersion as households' expectations. More in line with our findings, concurrent studies highlight stronger disagreement among households than among firms in the US (Candia et al., 2021) and in France (Savignac et al., 2021). We complement these papers by providing new evidence on expectation dispersion for a broader set of macroeconomic variables among German households and firms based on responses to identical survey questions elicited at identical points in time. Taken together, these studies and our paper suggest that, in most contexts, firms' expectations lie somewhere between those of experts

[1] Recent contributions on macroeconomic expectations include Afrouzi and Yang (2021), Armona et al. (2019), Bachmann et al. (2015), Bailey et al. (2018), Cavallo et al. (2017), Coibion et al. (2018a), d'Acunto et al. (2022), Dräger and Nghiem (2021), Fetzer et al. (2021), Goldfayn-Frank and Wohlfart (2020), Hanspal et al. (2021), Kuchler and Zafar (2019), Malmendier and Nagel (2016), Roth et al. (2021a), and Roth and Wohlfart (2020) for households and Afrouzi (2020), Bachmann et al. (2020, 2021), Coibion et al. (2020b, 2021, 2020c), Cornand and Hubert (2021), Dovern et al. (2020), Enders et al. (2019), and Frache and Lluberas (2018) for firms.

and those of households in terms of their level and dispersion. Another aspect in which we differ from these other studies is that we provide complementary experimental evidence highlighting that differences in knowledge about the current state of the economy explain a large fraction of differences in expectations about the future between firms and households, and that firm managers hold stronger priors about macroeconomic variables than households.

Several other papers study households' expectation formation in the context of monetary policy (Andre et al., 2022; Coibion et al., 2020b, 2022; d'Acunto et al., 2021; Roth et al., 2021b). Related to our paper, Coibion et al. (2020a) provide large-scale evidence that information treatments about current and next year's policy rates have strong effects on household expectations but treatments beyond one year do not have any additional impact. Our setting differs in that the ECB policy rate had been at the zero lower bound for a long time at the time of our surveys, while Coibion et al. (2020a) study an environment of positive rates in the US. At the zero lower bound, policy makers often resort to unconventional measures whose transmission heavily depends on the degree of information frictions, such as forward guidance about future interest rates (Wiederholt, 2015).

2 Descriptive Evidence on Expectation Dispersion

In this section, we use data from our September 2020 surveys to characterize the dispersion and similarity to professional forecasts of the macroeconomic expectations of households and firms. According to most prevalent models, a larger degree of information frictions will result in stronger belief disagreement, holding all else equal (Coibion and Gorodnichenko, 2012). For instance, a higher frequency of updating information sets

will reduce disagreement in Calvo-style sticky information models (Mankiw and Reis, 2002), and higher signal-to-noise ratios in private signals about the economy will be reflected in lower dispersion in noisy information models (Sims, 2003).[2] Moreover, expectation dispersion has direct implications for the transmission of shocks and policies (Angeletos and Lian, 2018). Characterizing the degree of dispersion across groups is therefore important for both modeling and policymaking.

2.1 Samples of September 2020 Surveys

Firm Sample We leverage the ifo Business Survey (IBS), which is conducted by the ifo Institute on a monthly basis, and that aims to be representative of the German economy. The survey provides the basis for the ifo Business Climate Index, the most recognized leading indicator of the German business cycle. Every month approximately 9,000 survey participants from firms in manufacturing, services, construction, wholesale, and retail assess various dimensions of their business activities, including their current and expected business conditions. The IBS has been used extensively in previous studies (e.g., Bachmann et al., 2019, 2013; Balleer et al., 2020; Buchheim et al., 2022; Enders et al., 2019; Link, 2019). More than 90% of respondents are in an upper management position such as owner, CEO, or department head. Hence, we survey individuals responsible for high-stakes economic decisions in these firms. Details on the IBS can be found in Sauer and Wohlrabe (2019).

The questions used in our study were supplemented to the online portion of the

[2] An alternative driver of belief disagreement is heterogeneity in the mental models agents rely on when thinking about macroeconomic developments (Andre et al., 2021). While different degrees of heterogeneity in mental models could partially explain differences in expectation dispersion between households and firms, we provide several additional pieces of evidence pointing to differences in information frictions, such as differential informedness about past realizations (Section 2.6), differences in the strength of prior beliefs about macroeconomic variables (Section 3.3), and different levels of self-reported information acquisition (Section 3.3).

September 2020 wave of the IBS covering 4,563 firms in manufacturing, services, retail, and wholesale. In total, 3,774 firms (83%) responded to our additional questions. Panel A of Table 1 shows summary statistics. Our sample covers a diverse set of sectors (36% in manufacturing, 38% in services, and 25% in retail and wholesale). The average (median) number of employees is 311 (41) and the average (median) firm age is 53 years (37 years). 64% of respondents from the sample hold a university degree.

Household Sample In September 2020, we collected a sample of 961 German respondents in collaboration with the online panel provider Dynata, which is widely used in the social sciences (Haaland et al., 2021). We drop respondents in the top and bottom percent of response time, who were likely inattentive to the survey. This leaves us with 933 respondents. Panel A of Table 2 shows summary statistics of our sample as well as benchmarks from the latest available wave (2019) of the German Socioeconomic Panel (GSOEP), a representative household survey. Our sample is roughly representative of the population in terms of gender, age, region, and household income. The main difference is a somewhat higher share of highly educated individuals, which is common in online surveys. To address this compositional difference, we construct weights using data from the GSOEP based on cells defined by age, gender, region of residence, income and education, and apply them to all evidence describing the distribution of households' expectations.

2.2 Design of September 2020 Surveys

Firms Due to space constraints, each participant in the IBS only responds to two additional questions on top of the regular survey. All firms respond to one question about the ECB policy rate: Two thirds report expectations about the policy rate in 2022, while

Table 1: Summary Statistics and Balance of Firm Surveys

	Full survey sample (2020 wave)				No anchor	Anchor	p-value
	(1) Mean	(2) Median	(3) SD	(4) N	(5) Mean	(6) Mean	(7) (5) = (6)
Panel A: 2020 wave							
Firm age	53	37	39	2739	52.48	53.73	0.40
Employees	310.99	41.00	2232.28	3761	261.50	361.85	0.17
Export share	0.18	0.09	0.22	3774	0.17	0.18	0.13
East Germany	0.12	0.00	0.33	3774	0.12	0.12	0.88
Negative impact of coronavirus	0.69	1.00	0.46	3660	0.69	0.69	0.86
Equity ratio	0.45	0.40	0.28	3008	0.45	0.46	0.77
Cash to total assets	0.22	0.15	0.21	1951	0.23	0.21	0.28
Any change in loan interest rate in last 6 months	0.08	0.00	0.27	3101	0.07	0.08	0.44
University	0.64	1.00	0.48	3063	0.65	0.63	0.18
Manufacturing Firm	0.36	0.00	0.48	3774	0.35	0.38	0.06
Services Firm	0.38	0.00	0.49	3774	0.38	0.39	0.76
Retail/Wholesale Firm	0.25	0.00	0.43	3774	0.27	0.24	0.02
	Full survey sample (2019 wave)				Increase 2020	Increase 2025	p-value
	(1) Mean	(2) Median	(3) SD	(4) N	(5) Mean	(6) Mean	(7) (5)=(6)
Panel B: 2019 wave							
Employees (2016-2018 mean)	815.96	151.65	6022.83	464	878.05	750.57	0.82
Revenues (2016-2018 mean; in mn.)	351.97	28.07	3643.01	464	430.10	269.69	0.64
Total Investment (2016-2018 mean; in mn.)	11.87	0.82	114.29	464	13.54	10.11	0.75
East Germany	0.30	0.00	0.46	437	0.30	0.29	0.73
High influence on decisions in firm	0.87	1.00	0.33	461	0.87	0.88	0.69

Notes: This Table presents summary statistics of the German firm surveys conducted in September 2020 (Panel A) and December 2019 (Panel B). Columns 5 and 6 of Panel A display the sample means separately for respondents that did not receive information about the current rate and those that received the anchor before making their prediction, respectively. Columns 5 and 6 of Panel B display the sample means separately for respondents that obtained information from an expert forecast predicting a policy rate increase in 2020 and for respondents that received an expert forecast predicting an increase in 2025 at the earliest, respectively. Column 7 presents the p-values of a t-test on the equality of the means depicted in Columns 5 and 6. "Negative impact of coronavirus" is a dummy for firms that reported a negative impact of the Covid-19 crisis on their business activity in September 2020. The "Equity ratio", the "Cash to total assets" ratio, and "Any change in loan interest rate in last 6 months" are elicited in the September 2020 wave of the IBS. "University" is a dummy for respondents with a diploma, master, or Ph.D. degree from the February 2020 IBS wave. Firm age and export share are calculated from responses to the September 2018 IBS wave. The number of observations differs across variables as we merge information from different modules and waves of the IBS. In our regressions we deal with non-response as described in the notes of Table 4. The variables in Panel B refer to average levels of the number of employees, revenues, and total investment the firms reported in the regular ifo Investment Survey during the three years prior to the special survey in December 2019. "High influence on decisions in firm" is an indicator for respondents stating that they personally have "very much influence" or "much influence" on investment or personnel decisions.

Table 2: Summary Statistics and Balance of Household Surveys

	GSOEP: Full	Full survey sample (2020 wave)				No anchor	Anchor	p-value
	(1) Mean	(2) Mean	(3) Median	(4) SD	(5) N	(6) Mean	(7) Mean	(8) (6) = (7)
Panel A: 2020 wave								
Female	0.51	0.46	0.00	0.50	933	0.46	0.45	0.783
Age	51.10	45.70	50.00	13.53	933	45.25	46.14	0.315
East	0.17	0.20	0.00	0.40	933	0.19	0.22	0.207
Log(HH net income)	7.92	7.90	8.01	0.61	933	7.89	7.90	0.782
Highschool	0.16	0.32	0.00	0.47	933	0.33	0.31	0.517
University	0.25	0.27	0.00	0.44	933	0.26	0.28	0.653
Log(HH financial assets + 1)		7.56	9.17	4.16	933	7.72	7.40	0.237
Stockowner		0.34	0.00	0.47	930	0.35	0.34	0.850
Homeowner		0.44	0.00	0.50	933	0.46	0.42	0.146
Debtor		0.37	0.00	0.48	933	0.38	0.35	0.432
	GSOEP: Employed	Full survey sample (2019 wave)				Increase 2020	Increase 2025	p-value
	(1) Mean	(2) Mean	(3) Median	(4) SD	(5) N	(6) Mean	(7) Mean	(8) (6)=(7)
Panel B: 2019 wave								
Female	0.48	0.47	0.00	0.50	3992	0.47	0.47	0.746
Age	45.59	46.18	50.00	11.84	3992	46.33	46.03	0.426
East	0.20	0.19	0.00	0.39	3992	0.17	0.21	0.004
Log(HH net income)	8.16	7.96	8.01	0.58	3992	7.96	7.97	0.512
Highschool	0.18	0.26	0.00	0.44	3992	0.27	0.24	0.096
University	0.32	0.33	0.00	0.47	3992	0.32	0.34	0.198
Log(HH financial assets + 1)		7.78	9.31	4.15	3992	7.68	7.88	0.132
Stockowner		0.38	0.00	0.49	3992	0.37	0.39	0.113
Homeowner		0.49	0.00	0.50	3992	0.49	0.49	0.945
Debtor		0.42	0.00	0.49	3992	0.42	0.42	0.969
Prior policy rate 2022		0.57	0.10	0.95	3880	0.58	0.55	0.313
Prior policy rate 2025		1.14	1.00	1.22	3796	1.13	1.14	0.928
Prior year policy rate increase		2023.41	2022.00	3.07	3686	2023.31	2023.51	0.042
Prior confidence policy rates (z)		0.00	-0.13	1.00	3992	-0.01	0.01	0.666

Notes: This Table presents summary statistics of the German household surveys conducted in September 2020 (Panel A) and December 2019 (Panel B). For comparison, Column 1 depicts benchmarks from the 2019 wave of the German Socioeconomic Panel (GSOEP), a representative household survey in Germany. Columns 6 and 7 of Panel A display the sample means separately for respondents that did not receive information about the current rate and those that received the anchor before making their prediction, respectively. Columns 6 and 7 of Panel B display the sample means separately for respondents that obtained information from an expert forecast predicting a policy rate increase in 2020 and for respondents that received an expert forecast predicting an increase in 2025 at the earliest, respectively. Column 8 presents the p-values of a t-test on the equality of the means depicted in Columns 6 and 7. "East" is a dummy for respondents living in East Germany, "Highschool" refers to respondents holding a *Abitur* or comparable degree (A-levels equivalent) but do not hold a university degree, and "University" is a dummy for respondents with a university degree. "Stockowner", "Homeowner", and "Debtor" are dummies for households owning stocks, owning their main residence, and with positive gross debt.

the remaining are asked for the expected rate in 2025. We randomize whether respondents are told that the current policy rate is zero percent before making their prediction. Columns 5 and 6 of Table 1 Panel A show that our firm sample is balanced between those who received the current rate and those who did not for most variables. In addition, respondents are either asked to predict the inflation rate in 2022 or the unemployment rate in 2022, or are asked about their trust in economic forecasts of experts. We also randomize whether the policy rate question or the other question is asked first. Online Appendix C.1 provides the wording of all survey questions we use from the IBS.

Households Crucially, we use identical framing of key questions on expectations in the household survey as in the firm survey, ruling out that wording choices are driving differences in reported expectations (Bruine de Bruin et al., 2012). We elicit respondents' expectations about the ECB policy rate in 2022 and in 2025 in randomized order. Moreover, a random half of our respondents are informed that the current policy rate is zero percent before making their prediction about future policy rates. Columns 6 and 7 of Table 2 Panel A show that our household sample is balanced across these two arms. We also ask our respondents to predict the average unemployment rate and the inflation rate in 2022. We randomize the order in which expectations about policy rates, inflation, and unemployment are elicited. In addition, we measure the respondents' confidence in their estimates, as well as various individual characteristics, such as household finances, labor market behavior, and numeracy. Furthermore, we elicit their trust in economic forecasts of experts. Online Appendix C.2 documents the survey instructions in detail.

Coding of Outcome Variables Our main survey items of interest are point forecasts of economic variables. As it is common in survey data, the responses to these questions contain some outliers. Extreme responses could indicate typos, inattention to the survey, or respondents not taking the survey seriously. Even if extreme responses reflected true beliefs, those could drive estimation results due to the sensitivity of OLS to outliers. We therefore trim predictions about interest rates, inflation, and unemployment at -1% and 25%, 0% and 35%, and 50%, respectively, commonly for the firm and household samples. This results in setting between three and four percent of responses in the household sample and less than one percent in the firm sample to missing. In our figures, we mostly winsorize these variables at lower values for expositional reasons. None of our findings are sensitive to the exact trimming or winsorization procedures used.

2.3 Descriptive Results

We start by presenting expectations about policy rates, the unemployment rate, and the inflation rate from the groups of households and firms that were not provided with information about the current policy rate.

Figure 1 displays the cumulative density functions of firms' and households' expectations about the ECB policy rate in 2022 and 2025, inflation in 2022, and the unemployment rate in 2022. For comparison, we add the distributions of forecasts about the 2022 policy rate from the October 2020 round of the ECB SPF (median forecast 0%) and of inflation and unemployment in 2022 (median predictions 1.5% and 5.75%, respectively) from the November 2020 survey of FocusEconomics, an established survey of professional forecasters. For the sake of readability, we winsorize expectations at -1% and 10%, 0% and

10%, and 20% for policy rates, inflation, and unemployment, respectively. Table 3 displays different moments of the expectations in the three samples.

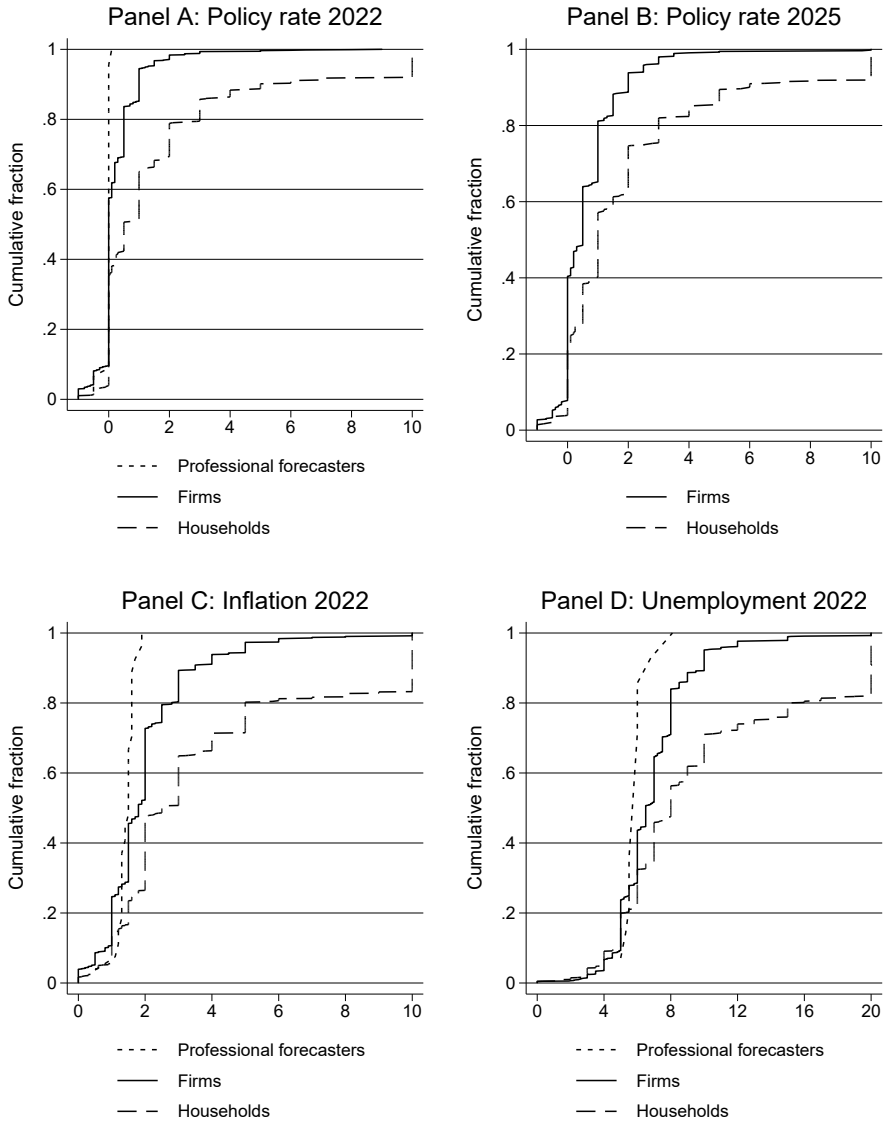
For all three variables, beliefs are the least dispersed among experts, more dispersed among firms, and by far the most dispersed among households. For instance, the cross-sectional standard deviation of the expected policy rate in 2022 is 0.1 p.p. among professional forecasters, 0.8 p.p. among firms, and 4.0 p.p. among households. For expected inflation in 2022 the standard deviations are 0.3 p.p., 1.7 p.p., and 5.7 p.p., for the expected unemployment rate in 2022 0.8 p.p., 2.5 p.p., and 9.5 p.p.. The patterns look similar for other measures of dispersion such as the interquartile range or the range between the 90th and the 10th percentile. Thus, while belief dispersion is significantly higher among firms than among experts, disagreement among households is several times higher than among firms. While both firms and households tend to over-predict interest rates, inflation, and unemployment relative to experts, firms' expectations are significantly closer to the median expert forecast than households'. For instance, for inflation the mean absolute deviation is 1.0 p.p. among firms and 3.3 p.p. among households.

Our first main result can be summarized as follows:

Result 1. *Firm expectations about policy rates, inflation, and unemployment are more dispersed than professional forecasts but less dispersed than household expectations. Firms' beliefs deviate significantly less from the median professional forecast than households'.*

Robustness One concern is that the timing of our survey during the coronavirus pandemic could threaten the external validity of our findings. In Online Appendix A.1.1, we use surveys conducted in 2019, i.e., before the pandemic, to show that expectations are

Figure 1: Macro Expectations among Households and Firms without Anchor: 2020 Survey



Notes: This Figure shows the cumulative distribution function of expectations from the German survey of September 2020 among the sample of respondents that did not receive information about the current ECB policy rate. The figures show expectations about the average 2022 ECB policy rate, the average 2025 ECB policy rate, the inflation rate over the year 2022, and the average unemployment rate in 2022 separately for households and firms. Household observations are weighted based on data from the 2019 wave of the GSOEP. The dotted lines indicate the distributions of forecasts of the 2022 policy rate from the October 2020 round of the ECB SPF and of inflation and unemployment in 2022 of the professional forecasters in FocusEconomics' November 2020 survey, respectively. For the sake of readability, we winsorize expectations at -1% and 10%, 0% and 10%, and 20% for policy rates, inflation, and unemployment, respectively.

Table 3: Dispersion of Macro Expectations among Households and Firms: 2020 Survey

	Mean	Median	SD	p75-p25	p90-p10	Mean abs. bias	N
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Professional Forecasters							
Expected policy rate 2022	-0.03	0.00	0.13	0.00	0.00		45
Expected inflation 2022	1.43	1.50	0.27	0.30	0.50		27
Expected unemployment 2022	5.91	5.75	0.76	0.50	1.50		14
Panel B: Firms							
Expected policy rate 2022 (*no anchor*)	0.28	0.00	0.75	0.50	1.00	0.39	1097
Expected policy rate 2025 (*no anchor*)	0.71	0.50	1.43	1.00	2.00		543
Expected Policy rate 2022 (*anchor*)	0.26	0.00	0.86	0.20	1.00	0.31	1249
Expected Policy rate 2025 (*anchor*)	0.78	0.50	1.10	1.00	2.00		579
Expected inflation 2022	2.07	1.80	1.69	1.30	2.50	0.96	1115
Expected unemployment 2022	6.92	6.50	2.51	2.50	5.00	1.81	1236
Panel C: Households							
Expected policy rate 2022 (*no anchor*)	1.95	0.50	4.01	2.00	4.00	1.98	450
Expected policy rate 2025 (*no anchor*)	2.29	1.00	3.96	1.80	5.00		449
Expected Policy rate 2022 (*anchor*)	1.30	0.00	3.15	1.50	3.00	1.32	458
Expected Policy rate 2025 (*anchor*)	1.87	1.00	3.88	2.00	4.00		456
Expected inflation 2022	4.57	2.50	5.72	3.40	9.00	3.30	902
Expected unemployment 2022	11.20	8.00	9.54	6.00	20.00	6.11	908

Notes: This Table presents summary statistics of expected average ECB policy rates in 2022 and 2025, the expected inflation rate over the year 2022, and the expected unemployment rate in 2022. Panel A summarizes benchmark statistics for professional forecasters that are taken from the October 2020 round of the ECB SPF (expected policy rate) and from FocusEconomics' November 2020 survey (expected inflation and unemployment), respectively. Panels B and C refer to our German firm and household surveys conducted in September 2020. Here, statistics on policy rate expectations are presented separately for respondents that received information about the current rate and those who did not receive the anchor before making their prediction. Household observations are weighted based on data from the 2019 wave of the GSOEP. Columns 1 through 5 depict the mean, median, standard deviation, interquartile range, and the range between the 90th and 10th percentile for each variable in the firm survey, respectively. Column 6 displays the mean absolute deviation of firms' and households' expectations from the median expert benchmark depicted in Column 2 of Panel A. The difference between the mean absolute deviations is statistically different between samples ($p < 0.01$ for all variables). Column 7 presents the number of observations.

more dispersed and more distant from expert forecasts among households than among firms. In addition, Online Appendix A.1.2 shows that the findings from our September 2020 are similar across groups with different degrees of exposure to the pandemic.

Another concern could be that firms' expectations are less dispersed and more closely aligned with professional forecasts than households' because firms are more experienced in responding to questions on macroeconomic expectations (Kim and Binder, 2020). However, we were the first to elicit quantitative expectations about the ECB policy rate, inflation, and the unemployment rate in the IBS. Moreover, Online Appendix A.2 shows that firms' expectations do not vary with length of participation in the IBS.

Comparison to Related Evidence How do our findings compare with other recent evidence? While Coibion et al. (2018b) show that the expectations of firms in New Zealand are similarly dispersed and different to professional forecasts as household expectations, evidence from concurrent studies is more in line with our findings: Candia et al. (2021) show that US firms disagree more about future inflation than US households but less than professional forecasters, while in terms of their average level, firms' inflation expectations are sometimes similar to household expectations and sometimes between expectations of households and experts. Savignac et al. (2021) highlight that French firms hold less widely dispersed expectations than French households. Together with our study, these findings suggest that, in most contexts, firms' expectations lie somewhat between those of households and professional forecasts, consistent with more pronounced information frictions among households. In Online Appendix A.3, we present additional evidence showing greater belief dispersion and stronger deviations from expert forecasts among

Italian firms than among Italian households.

2.4 Correlates of Beliefs

We leverage our rich data on background characteristics to study the correlates of firms' and households' expectations. Both firms and households tend to over-predict macroeconomic variables compared to experts, so higher expectations are associated with greater differences to experts. We focus our discussion on the strongest predictors of expectations in the two samples.

Firms Table 4 displays multivariate regressions of expectations on respondent characteristics. Larger firms predict a lower policy rate in 2025 and lower inflation and unemployment rates in 2022 ($p < 0.01$, respectively). Moreover, firms with a higher subjective exposure to the coronavirus crisis expect higher rates of inflation ($p < 0.1$) and unemployment ($p < 0.01$). Managers of firms with a higher export share ($p < 0.01$) and managers of services ($p < 0.01$) or of retail and wholesale firms ($p < 0.01$) predict lower inflation rates. Lastly, firms stating to have experienced a change to their loan interest rates over the previous six months expect lower policy rates in 2022 ($p < 0.1$) and 2025 ($p < 0.05$).

Households Table 5 presents the corresponding analysis for households. Higher financial asset holdings are associated with lower policy rate ($p < 0.01$) and inflation expectations ($p < 0.05$), while homeowners hold higher expectations (mostly $p < 0.05$). This is consistent with higher stakes of being well-informed among households investing in financial assets, as the real return on these assets is affected by movements in nominal interest rates and inflation, against which real estate should be protected. Moreover, more numerate respondents' expectations are lower and therefore more closely aligned with

Table 4: Correlates of Firms' Beliefs: 2020 Survey

	Policy rate 2022	Policy rate 2025	Inflation rate 2022	Unempl. rate 2022
	(1)	(2)	(3)	(4)
Log(Firm age)	0.003	-0.056	-0.066	-0.002
	(0.024)	(0.053)	(0.078)	(0.121)
Log(Employees)	0.000	-0.090***	-0.118***	-0.185***
	(0.014)	(0.032)	(0.034)	(0.048)
Export share	-0.004	0.175	-0.887***	-0.081
	(0.087)	(0.202)	(0.226)	(0.421)
Negative impact of coronavirus	0.014	-0.014	0.207*	0.532***
	(0.035)	(0.092)	(0.108)	(0.151)
Services Firm	0.077	0.129	-0.528***	-0.235
	(0.048)	(0.088)	(0.174)	(0.184)
Retail/Wholesale Firm	-0.009	-0.007	-0.497***	0.112
	(0.048)	(0.105)	(0.185)	(0.205)
Equity ratio	-0.062	-0.099	0.119	-0.235
	(0.082)	(0.136)	(0.194)	(0.309)
Cash to total assets	0.057	-0.234	0.354	0.594
	(0.149)	(0.185)	(0.288)	(0.569)
Any change in loan interest rate in last 6 months	-0.087*	-0.226**	0.035	-0.026
	(0.046)	(0.100)	(0.192)	(0.278)
University	-0.064	0.066	-0.181	-0.030
	(0.042)	(0.089)	(0.130)	(0.160)
Anchored on current policy rate	-0.023	0.064		
	(0.034)	(0.078)		
Observations	2338	1115	1111	1233
R^2	0.01	0.03	0.03	0.03
Mean dep. variable (no anchor)	0.28	0.71	2.06	
SD dep. variable (no anchor)	0.75	1.43	1.69	
Mean dep. variable (anchor)	0.26	0.78		6.92
SD dep. variable (anchor)	0.86	1.10		2.52

Notes: This Table displays regressions of firms' expectations on respondent characteristics based on the German firm survey of September 2020. "Firm age" and "Export share" are elicited in the September 2018 IBS wave. "Negative impact of coronavirus" is a dummy for firms that reported a negative impact of the Covid-19 crisis on their business activity in September 2020. The indicators "Services firm" and "Retail/Wholesale firm" capture the effect of firms in the respective sectors relative to manufacturing firms. "Equity ratio", "Cash to total assets", and "Any change in loan interest rate in last 6 months" are elicited in the September 2020 IBS wave, while the latter indicates firms stating to have experienced a change to loan interest rates over the previous six months. "University" indicates respondents with a diploma, master, or Ph.D. degree as elicited in February 2020. We code missing values of all covariates to zero (except for the export share which we set to the average of the two-digit industry if missing) and include dummies indicating missings in the respective variable. "Anchored on current policy rate" is a dummy that is one if respondents received information about the current rate before making their prediction. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

expert forecasts ($p < 0.01$), in line with recent evidence on an important role of cognitive abilities in macroeconomic expectation formation (d'Acunto et al., 2022).[3] In addition, consistent with prior evidence (e.g., d'Acunto et al., 2021), the expectations of females are higher and therefore less well-aligned with expert forecasts (mostly $p < 0.05$). Older individuals hold lower expectations ($p < 0.01$), in line with learning over the life cycle.

2.5 Within-Group Heterogeneity

We next examine how the degree of expectation dispersion and deviation from the median expert forecast varies within the household and within the firm sample. For both firms and households we define groups of "sophisticated" and "non-sophisticated" respondents based on those observables that are most predictive of holding expectations that are more consistent with expert benchmarks. For households, the "sophisticated" group consists of 19% of respondents, who are at least 45 years old, have high numeracy, and hold above-median financial assets. Those respondents have had more time to learn over the life cycle, arguably face lower information acquisition and processing costs, and have higher stakes in being informed (at least about inflation and nominal rates). As shown in Panels A through D of Figure 2 for the no-anchor condition, the expectations of this group are much less dispersed and more aligned with expert benchmarks compared to expectations of "non-sophisticated" households. Indeed, mean absolute deviations from expert benchmarks in this group are 0.6 p.p., 1.3 p.p., and 2.9 p.p. for the policy rate, inflation, and unemployment in 2022, almost as low and—in the case of expected policy rate and inflation—statistically indistinguishable from the results in the firm sample.

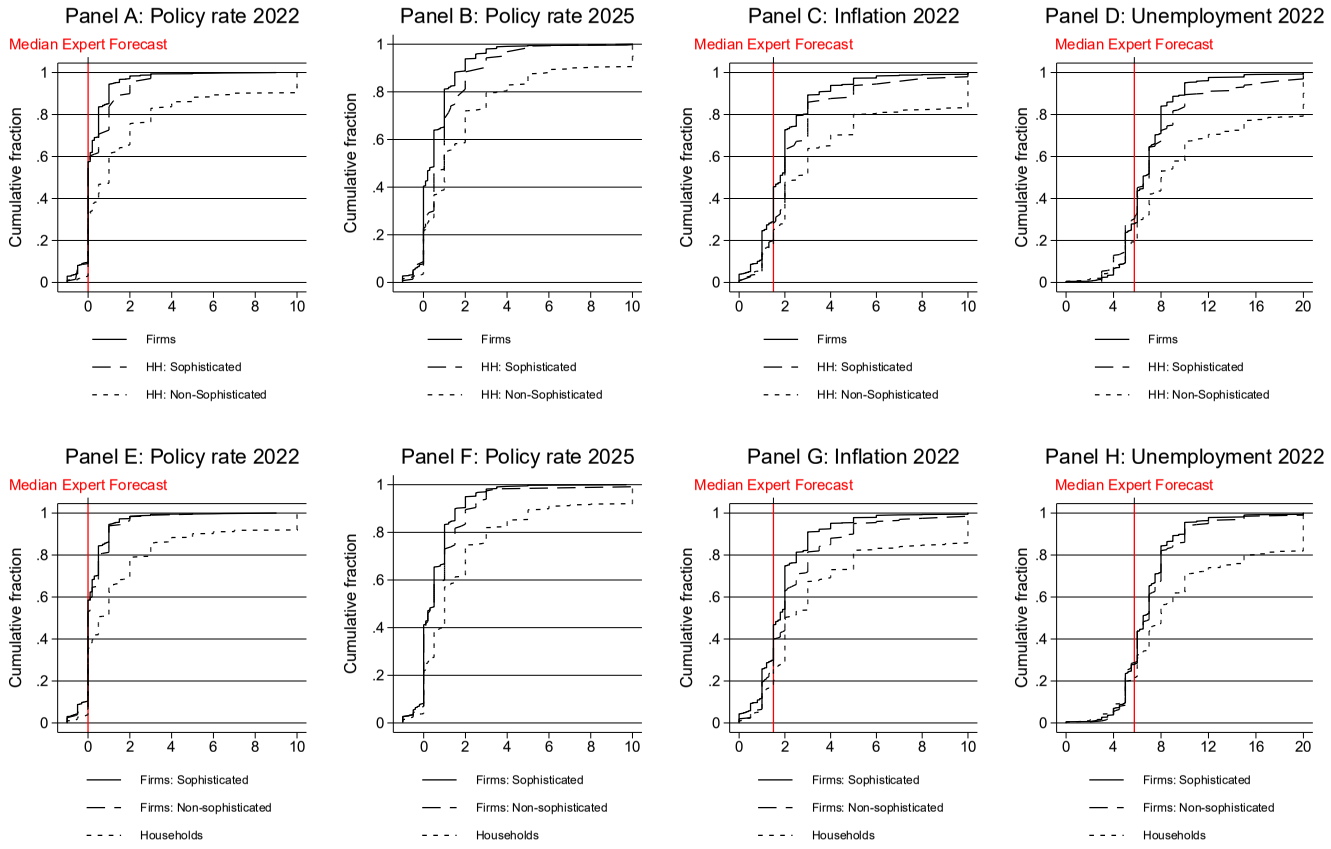
[3]We measure numeracy using seven questions adapted from the New York Fed's Survey of Consumer Expectations (see the survey instructions in Online Appendix C.2), and define respondents who respond to at least six questions correctly as highly numerate (46% of our sample).

Table 5: Correlates of Households' Beliefs: 2020 Survey

	Policy rate 2022	Policy rate 2025	Inflation rate 2022	Unempl. rate 2022
	(1)	(2)	(3)	(4)
Female	0.458*	0.341	0.942**	2.831***
	(0.267)	(0.281)	(0.398)	(0.627)
Age at least 50	-1.029***	-1.031***	-1.265***	-2.097***
	(0.252)	(0.282)	(0.395)	(0.604)
Highschool	-0.095	-0.180	-0.171	-1.907**
	(0.295)	(0.331)	(0.475)	(0.759)
University	-0.314	-0.647**	-0.431	-2.078***
	(0.263)	(0.259)	(0.431)	(0.674)
Covid-19 worsens economic situation	-0.051	-0.279	0.571	2.060***
	(0.262)	(0.277)	(0.415)	(0.674)
Employed	-0.126	0.030	0.811	1.155
	(0.572)	(0.679)	(0.931)	(1.460)
Unemployed	1.611	0.433	1.607	1.316
	(1.499)	(1.157)	(2.123)	(3.393)
Income > €3,000	-0.052	0.070	-0.849**	-0.744
	(0.248)	(0.291)	(0.377)	(0.620)
Financial assets > €11,000	-0.619***	-0.771***	-1.052**	-1.056
	(0.235)	(0.279)	(0.433)	(0.706)
Stockowner	0.004	0.145	-0.458	-0.222
	(0.262)	(0.337)	(0.417)	(0.755)
Homeowner	0.535**	0.540*	1.028**	0.428
	(0.267)	(0.294)	(0.426)	(0.606)
Debtor	-0.097	-0.188	0.280	0.572
	(0.252)	(0.261)	(0.402)	(0.613)
High numeracy	-1.384***	-1.327***	-2.247***	-3.643***
	(0.244)	(0.262)	(0.377)	(0.561)
Main earner	0.175	0.186	0.541*	0.071
	(0.184)	(0.194)	(0.278)	(0.382)
High recession exposure	-0.383	-0.056	-0.229	-1.599**
	(0.263)	(0.271)	(0.391)	(0.643)
Anchored on current policy rate	-0.804***	-0.602**	-0.753*	-0.255
	(0.237)	(0.252)	(0.384)	(0.662)
Observations	903	900	897	903
R^2	0.13	0.10	0.14	0.16
Mean dep. variable (no anchor)	2.04	2.40	4.72	11.01
SD dep. variable (no anchor)	4.24	4.20	6.10	9.38
Mean dep. variable (anchor)	1.18	1.76	3.91	11.06
SD dep. variable (anchor)	2.93	3.54	4.71	9.32

Notes: This Table displays regressions of households' expectations on respondent characteristics based on the German household survey of September 2020. "Anchored on current policy rate" is a dummy that is one if respondents received information about the current rate before making their prediction. All other covariates are coded as dummies. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Figure 2: Heterogeneity in Expectations by Sophistication: 2020 Survey



Notes: This Figure shows the cumulative distribution function of household and firm expectations about the average ECB policy rate in 2022 and 2025, the inflation rate over the year 2022, and the average unemployment rate in 2022 from the German survey of September 2020 using only respondents in the "no anchor" condition. Panels A through D display these expectations separately for "sophisticated" households (above median age, financial assets, and numeracy), which applies to 19% of households, and the remaining, "non-sophisticated" households against the benchmark of firms. Panels E through H displays these expectations separately for "non-sophisticated" firm (non-exporting firms with below median number of employees), which applies to 18% of firms, and the remaining, "sophisticated" firms against the benchmark of households. Household observations are weighted based on data from the 2019 wave of the GSOEP. The vertical red lines indicate median expert forecasts from Table 3. For readability, we winsorize expectations at -1% and 10%, 0% and 10%, and 20% for policy rates, inflation, and unemployment, respectively.

We also study a group of "non-sophisticated" firms, whose number of employees is below the sample median and which are not exporting (18% of respondents). As shown in Panels E through H of Figure 2, even non-sophisticated firms hold macroeconomic expectations that are substantially less dispersed and more aligned with expert benchmarks than the expectations of households. Indeed, differences in mean absolute deviations from expert benchmarks between non-sophisticated and sophisticated firms are 0.04 p.p., 0.4 p.p., and 0.2 p.p. for the policy rate, inflation, and unemployment, respectively, which is only statistically different in the case of inflation expectations. In contrast, differences between households and non-sophisticated firms are much larger at 1.6 p.p., 1.8 p.p., and 4.2 p.p., and highly significant in all cases ($p < 0.01$).

Thus, our second main result can be summarized as follows:

Result 2. *The degree of expectation dispersion and deviation from professional forecasts varies substantially more across different groups of households than across different groups of firms.*

2.6 The Effects of the Anchor on Beliefs

Is differential informedness about current realizations of macroeconomic variables driving differences in expectations about the future between households and firms? To shed light on this, we compare expectations between respondents who received an anchor about the current policy rate before making their predictions and those who did not.

As can be seen in Table 3, the difference in the average expected policy rate for 2022 between firms and households shrinks from 1.6 p.p. in the no anchor condition (2.0% among households vs. 0.4% among firms) to 1.0 p.p. in the anchor condition (1.3% vs. 0.3%). The effects of the anchor are statistically significant among households (Table 5) and insignifi-

cant among firms (Table 4). Moreover, in the no-anchor condition, the difference in belief dispersion between firms and households as measured by the cross-sectional standard deviation is 3.2 p.p. (4.0 p.p. among households vs 0.8 p.p. among firms), while it is only 2.3 p.p. (3.2 p.p. among households vs. 0.9 p.p. among firms) in the anchor condition. Thus, differential information frictions regarding the current policy rate account for approximately 40% of the difference in average deviations from professional forecasts and for approximately 30% of the difference in belief dispersion between households and firms. Given that the current policy rate likely only partially captures the relevant information set about the state of the economy, these numbers should be viewed as a lower bound. The anchor has similar effects on expectations about the policy rate in 2025.[4] Taken together, our third main result can be summarized as follows:

Result 3. *Learning about the current ECB policy rate reduces expectation dispersion among households but not among firms. Thus, differential information frictions regarding the status quo partially explain differences in expectations about the future between households and firms.*

This finding is striking considering that the policy rate had been at the zero lower bound for 4.5 years at the time of the survey. It is not easily explained by sticky information models in which households update their information sets every few quarters on average, as in Mankiw and Reis (2002) or Carroll (2003), but points to a corner solution in which groups of households are completely inattentive to policy rates.

[4]Having received the anchor somewhat reduces households' inflation expectations, consistent with households inferring from rates being at the zero lower bound to an environment of lower inflation (see Table 5). The anchor has no significant effect on their unemployment expectations. Due to constraints to the survey programming, we have no arm in the firm survey in which respondents received information on the current policy rate before reporting their inflation or unemployment expectations.

3 Learning from Expert Forecasts

Besides shaping the level of dispersion and deviation from benchmarks in expectations, the degree of information frictions should be reflected in the strength of priors about macroeconomic variables. In this Section, we examine the strength of households' and firms' priors by studying the degree of learning from expert forecasts about future policy rates using information provision experiments conducted in December 2019.

3.1 Samples of December 2019 Surveys

Firms Given the more extensive set of questions compared to our September 2020 survey, we could not include this experiment in the monthly IBS. Instead, we conducted a special survey on the sample of firms regularly participating in the ifo Investment Survey (IIS), a semi-annual survey of the German manufacturing sector, run by the ifo Institute since 1955 (see Sauer and Wohlrabe, 2020, for details). The sum of investment expenditures covered by firms in the IIS corresponds to roughly 40% of the total investment volume in the German manufacturing sector (Bachmann et al., 2017). As for the IBS, the IIS micro data have been used in recent research (e.g., Bachmann and Zorn, 2020).

Similar to the regular IIS, the special survey was conducted as a paper and pencil survey, which was mailed to the firms and returned by the respondents. Although this was the first time a special survey was conducted among participants of the IIS, 471 firms completed the survey, corresponding to a response rate of 20.3%—largely comparable to first waves of other firm surveys, e.g., Coibion et al. (2018b). In contrast to the regular IIS, which is usually completed by executives in controlling, we sent the questionnaires to the firms' executive board. Accordingly, 87% of respondents indicate that they personally

have "very much influence" or "much influence" on investment or personnel decisions. The pool of firms that completed our special survey does not differ significantly from the regular IIS sample with respect to total investment, number of employees, and revenues.

We merge data on average levels of investment, number of employees, and revenues reported in the regular IIS during the three years prior to the special survey. Panel B of Table 1 shows summary statistics. The median firm employs 152 workers, has annual revenues of approximately €28 million, and has annual investments of €820,000. While firms are on average slightly larger compared to manufacturing firms in our September 2020 survey, the firm size distribution does not differ strongly between the two samples.

Households We collect a sample of 4,072 employed respondents (both self-employed and individuals in paid employment, both full-time and part-time) with the same online panel provider as in the September 2020 survey. We drop respondents in the top and bottom percent of response time, as these were likely inattentive to the survey. This leaves us with 3,992 observations. The main survey was conducted in December 2019 and a follow-up survey in January 2020, which was started by 2,615 of the individuals in our final sample of the main survey, among which 2,394 completed it. For each outcome elicited in the follow-up, we focus on the largest available set of respondents. Panel B of Table 2 shows summary statistics of our sample and again a comparison to benchmarks from the 2019 wave of the German Socioeconomic Panel (GSOEP). Our sample is roughly representative of the employed German population in terms of gender, age, region, and household income. As in the September 2020 wave, our respondents are slightly more educated on average than the general population, as is common in online surveys.

3.2 Design of December 2019 Surveys

3.2.1 Firms

Anchoring on Current Interest Rate While in our September 2020 surveys we examine how information about the current policy rate affects expectations, in our December 2019 surveys we study how expert forecasts about future rates affect expectations. Our interest lies in understanding whether—conditional on knowledge of current realizations—firms hold stronger priors about future realizations than households. We therefore inform all respondents that the *current* ECB policy rate lies at zero percent before providing forecasts about future rates. Online Appendix D.1 presents the instructions of the firm survey.

Information Treatment The firm survey starts with our information treatment on future interest rates. Our respondents are randomly assigned either into the "Increase 2020" arm or into the "Increase 2025" arm, which both provide the respondents with a truthful expert forecast about the point in time the ECB interest rate will increase back to a higher level. Respondents in the "Increase 2020" group are told that according to an expert who regularly participates in an expert survey of the ECB, the key interest rate of the ECB will rise to a higher level in the third quarter of 2020. This information is based on the forecast of a participant in the fourth quarter of 2019 wave of the ECB Survey of Professional Forecasters. Respondents in the "Increase 2025" group are told that according to an expert from a large German bank, the key interest rate of the ECB will rise to a higher level at the earliest in 2025.[5] Columns 5 and 6 of Table 1 Panel B in the Online Appendix show that our firm sample is balanced across these two arms according to key covariates.

[5]Source: `https://www.diepresse.com/5702921`.

Thus, respondents in the two arms receive information that differs in the timing the expert attaches to a rate hike.[6] Our design therefore features an active control group, which has several advantages relative to designs that provide a subset of respondents with information and another subset (a passive control group) with no information (see Haaland et al. (2021) for a discussion). Most relevant in our setting, identification in alternative designs hinges on prior beliefs, which determine the expected direction and strength of the information treatment. We could not elicit priors, as the firm survey was administered in paper and pencil rather than as an online survey, so we had no control over the order in which respondents received the information and responded to the different questions.

Post-treatment Beliefs Subsequently, we measure respondents' expectations about inflation and the unemployment rate at different horizons. As for policy rates, the wording includes information about the current values of these rates, to hold constant these beliefs across firms and households. Next, we elicit perceptions about current and future credit access as well as interest rates on loans for firms similar to the respondent's firm. We also measure expectations about firm-level outcomes such as product demand or employee wages. To study whether the information provision successfully shifts the managers' interest rate expectations, we also elicit their beliefs about the year of a rate hike and the level of the policy rate in 2022 and in 2025 as well as respondents' confidence in these predictions. Finally, we ask the respondents how often they have heard news about the policy rate of the ECB over the last two weeks.

[6]Respondents might perceive the forecasts from different sources as differentially credible. However, in unreported regressions, we found no significant differences across treatment arms in the weight households put on their prior beliefs when reporting their posterior beliefs about interest rates.

3.2.2 Households

Prior Beliefs and Information Treatment We use the same instructions as in the firm survey whenever possible, with some differences. Since the household survey was conducted as an online survey, we elicit priors about the timing of a rate hike and future rates before the information provision. The treatment is identical to the one in the firm survey. Columns 6 and 7 of Table 2 Panel B show that the sample is mostly balanced across arms according to key covariates.[7] Online Appendix D.2 shows exact instructions.

Post-treatment Beliefs After the information provision, and after eliciting expectations about inflation and unemployment using identical questions as in the firm survey, we measure households' perceptions about their own credit access and borrowing rates now and in the future, separately for consumer credit and mortgages, as well as interest rates on their savings account. We then elicit the respondents' posterior expectations about policy rates and measure news acquisition about the ECB policy rate using the same questions as for firms. Moreover, we elicit expectations about own labor market outcomes.

Follow-up To examine the persistence of treatment effects, we conducted a follow-up survey about four weeks after the initial survey, in which no additional treatment information is provided and in which people are not reminded of the initial information. In the follow-up survey, we re-elicit some of the key outcome questions from the main survey, such as expectations about future policy rates and own interest rates. Online Appendix D.3 shows the exact instructions of the follow-up survey.

[7] The expected year of a rate hike is 0.2 years higher in the "Increase 2025" arm, a statistically significant but economically small difference. To address any concerns, we include controls in all estimations.

3.2.3 Coding of Outcome Variables

As in the September 2020 wave, we deal with outliers by trimming all quantitative point forecasts at thresholds that are common across firms and households. We again choose the thresholds such that the two to four percent most extreme answers in the households sample are set to missing. This results in thresholds of 2030 for the year of a rate hike, of -1% and 5% for policy rates, of 0% and 5% for inflation, of 15% for unemployment, of 0% and 15% for own interest rates, and of -20% and 40% for income growth.[8] When point beliefs are included as controls, they are winsorized at these thresholds to keep the sample as large as possible. None of our findings are sensitive to the exact trimming or winsorization procedures used. We z-score outcomes elicited on categorical scales using the means and standard deviations in our samples.

3.3 Effects on Expectations about Policy Rates

We examine the extent to which households and firms update their expectations about policy rates in response to the expert forecast. We estimate the following specification separately in the household and in the firm sample:

$$\text{posterior}_i = \alpha_0 + \alpha_1 \, \mathbb{1}(\text{Increase 2020}_i) + \Pi X_i + \varepsilon_i \tag{1}$$

where posterior_i are post-treatment beliefs on the trajectory of the ECB policy rate. The indicator $\mathbb{1}(\text{Increase 2020}_i)$ takes value one for respondents receiving the "Increase 2020" treatment and value zero for those receiving the "Increase 2025" treatment. X_i is a vector of controls that we include to address small imbalances and to increase statistical power

[8] The thresholds for policy rates, inflation, and unemployment are lower than in the September 2020 wave because respondents were anchored on current realizations in the December 2019 survey.

for estimating treatment effects. The controls are described in detail in the table notes.

Given our active control group design, comparing respondents in the "Increase 2020" with those in the "Increase 2025" arm is informative about the average learning rate from the information. In particular, the coefficient estimate indicates the *differential* change in beliefs between those who received the 2020 and those who received the 2025 forecast. Scaling the treatment effect by the difference in signals – 4.5 years – gives the learning rate from the information. Since everyone is treated (with a forecast that is orthogonal to prior beliefs), no interaction term between the prior and the treatment dummy needs to be included to identify learning rates (Haaland et al., 2021).

Panel A of Table 6 shows that households who receive the "Increase 2020" treatment think that a rate increase will happen 1.6 years earlier compared to those in the "Increase 2025" arm (Column 1, $p < 0.01$). The direct learning rate from the information is therefore given by $1.6/4.5 = 0.36$, which is in the range of estimates from other information provision experiments on macroeconomic expectations (Haaland et al., 2021). Moreover, households in the "Increase 2020" treatment think that the ECB policy rate will be 0.29 p.p. higher in 2022 (Column 2, $p < 0.01$) and 0.27 p.p. higher in 2025 (Column 3, $p < 0.01$). Households that are more confident in their priors respond less to the forecasts, consistent with Bayesian updating (see Panels A, C, and E of Figure 3). In Online Appendix B.1, we document that changes in beliefs persist in the follow-up at about one third of the initial effect sizes, in line with typical estimates in the literature (Haaland et al., 2021). Moreover, in Online Appendix B.1 we demonstrate that updating about policy rates is reflected in changes in households' beliefs about other outcomes, such as real policy rates or the perceived probabilities of a rate hike, and that changes in beliefs are fairly uni-

form across different groups of households. Taken together, these findings highlight that households' expectations are quite responsive to the provision of expert forecasts, consistent with households having relatively weak priors about the ECB policy rate.

Panel B of Table 6 highlights that firms are substantially less responsive to expert forecasts. While firms change their expectations about the timing of the next rate increase by about half a year (Column 1, $p < 0.05$), they do not significantly adjust their expectations about the policy rate in 2022 and 2025 (Columns 2 and 3). This is consistent with firms having stronger priors about the ECB policy rate than households. The treatment effects on policy rate expectations differ significantly between firms and households ($p < 0.01$ for the expected year of a rate hike and policy rates in 2022 and 2025). Taken together, our fourth main finding can be summarized as follows:

Result 4. *Firms update their policy rate expectations less in response to expert forecasts than households, in line with firms being better informed and holding stronger priors.*

Robustness Belief updating experiments could be subject to numerical anchoring and experimenter demand effects (de Quidt et al., 2018). Our evidence is less prone to these issues for two reasons: First, policy rate expectations are elicited on a different scale than the scale on which the information is communicated (year of increase). Second, the persistence of households' belief changes suggests that at least part of the effects operate through genuine learning rather than numerical anchoring or demand effects (Haaland et al., 2021). Moreover, Online Appendix B.1 demonstrates robustness of our main findings to a different treatment of extreme responses and to excluding controls.

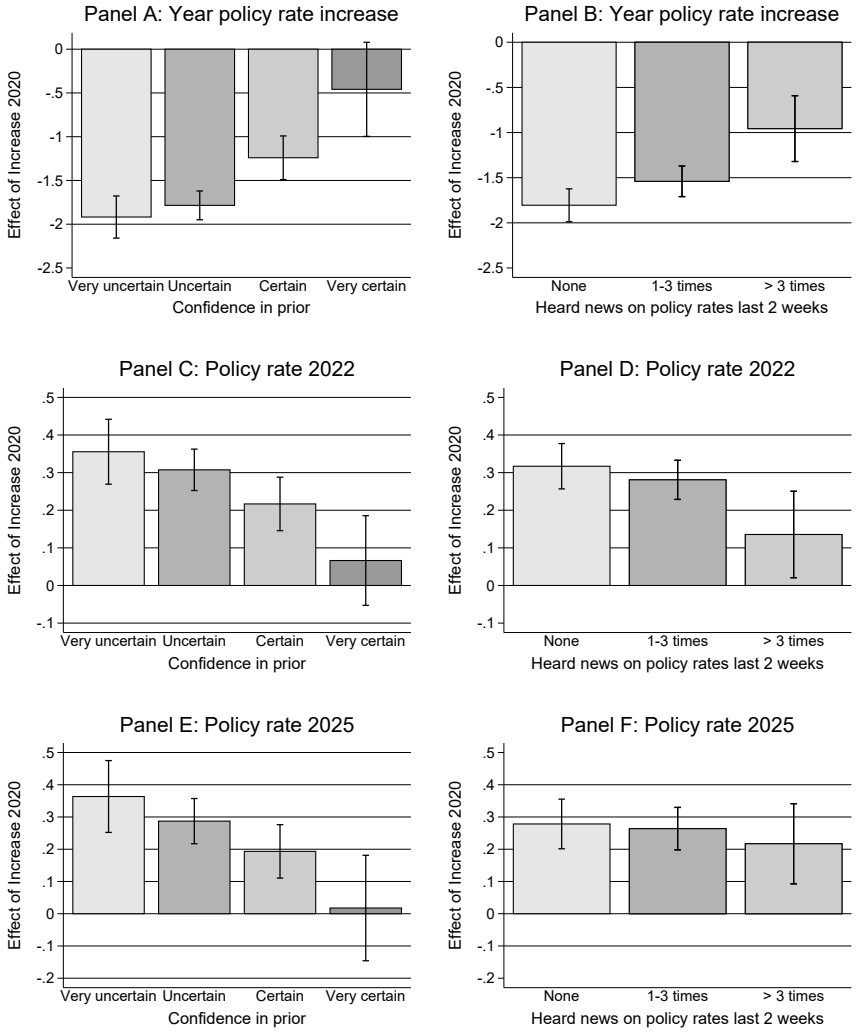
Table 6: Learning from Experts' Policy Rate Forecasts among Households and Firms: 2019 Survey

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Mortgage rate 2022	Consumer loan rate 2022	Savings account rate 2022	Mortgage access 2022	Consumer loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Households								
Increase 2020 (A)	-1.612***	0.287***	0.266***	0.180***	0.145***	0.127***	-0.043**	-0.046**
	(0.072)	(0.023)	(0.029)	(0.040)	(0.044)	(0.020)	(0.017)	(0.019)
Observations	3758	3896	3828	3859	3864	3818	3992	3992
R^2	0.46	0.40	0.46	0.83	0.80	0.65	0.70	0.63
Mean dep. variable	2023.32	0.63	1.22	4.05	4.63	0.62	-0.00	0.00
SD dep. variable	2.93	0.92	1.22	3.04	3.08	1.03	1.00	1.00

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Firm loan rate 2022	Firm loan access 2022
	(1)	(2)	(3)	(4)	(5)
Panel B: Firms					
Increase 2020 (B)	-0.519**	0.035	0.018	-0.020	-0.038
	(0.244)	(0.057)	(0.093)	(0.071)	(0.058)
Observations	401	430	428	436	463
R^2	0.03	0.03	0.04	0.85	0.62
Mean dep. variable	2023.45	0.26	0.95	2.80	0.00
SD dep. variable	2.43	0.59	0.95	1.87	1.00
p-value(A=B)	0.000	0.000	0.010		

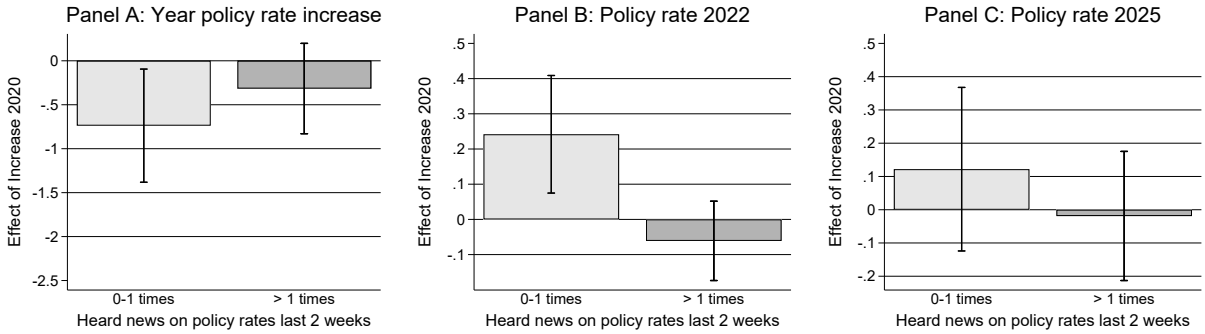
Notes: This Table examines the effect of the randomized information provision on posterior expectations of households (Panel A) and firms (Panel B) based on the German firm and household surveys of December 2019. "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. The outcomes in Panel A Columns 7 and 8 and Panel B Column 5 are z-scored using the mean and the standard deviation in the corresponding sample. The regressions on the household sample control for respondents' prior beliefs about policy rates and confidence in these beliefs, perceptions of the respondents' access to and rates faced on mortgages, consumer loans, and savings accounts, gender, age, educational attainment, employment status, household income and net wealth, homeownership, stock ownership, household size, living in East Germany, numeracy, risk aversion, patience, being the financially knowledgeable person or main earner in the household, and perceptions of exposure to macroeconomic risk. The regressions on the firm sample control for firms' perceptions of access to and rates faced on loans, location in East Germany, and firms' total investment, number of employees, and revenues (all in logs) stated in the regular ifo Investment Survey. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Figure 3: Heterogeneity in Learning from Experts among Households: 2019 Survey



Notes: This Figure presents the estimated response of households' expectations regarding the year of policy rate increase (Panels A and B), the policy rate in 2022 (Panels C and D), and the policy rate in 2025 (Panels E and F) to randomized information from an expert forecast predicting a policy rate increase in 2020 relative to respondents that received an expert forecast predicting an increase in 2025 at the earliest. All estimations are based on the German household survey from December 2019. Panels A, C, and E present separate estimations for the different confidence in priors reported by households and Panels B, D, and F estimate the effects separately for different prior news consumption about the ECB policy rate. The regressions control for respondents' prior beliefs about policy rates and confidence in these beliefs, perceptions of the respondents' access to and rates faced on mortgages, consumer loans, and savings accounts, gender, age, educational attainment, employment status, household income and net wealth, homeownership, stock ownership, household size, living in East Germany, numeracy, risk aversion, patience, being the financially knowledgeable person or main earner in the household, and perceptions of exposure to macroeconomic risk. Confidence bounds are depicted at the 90% level.

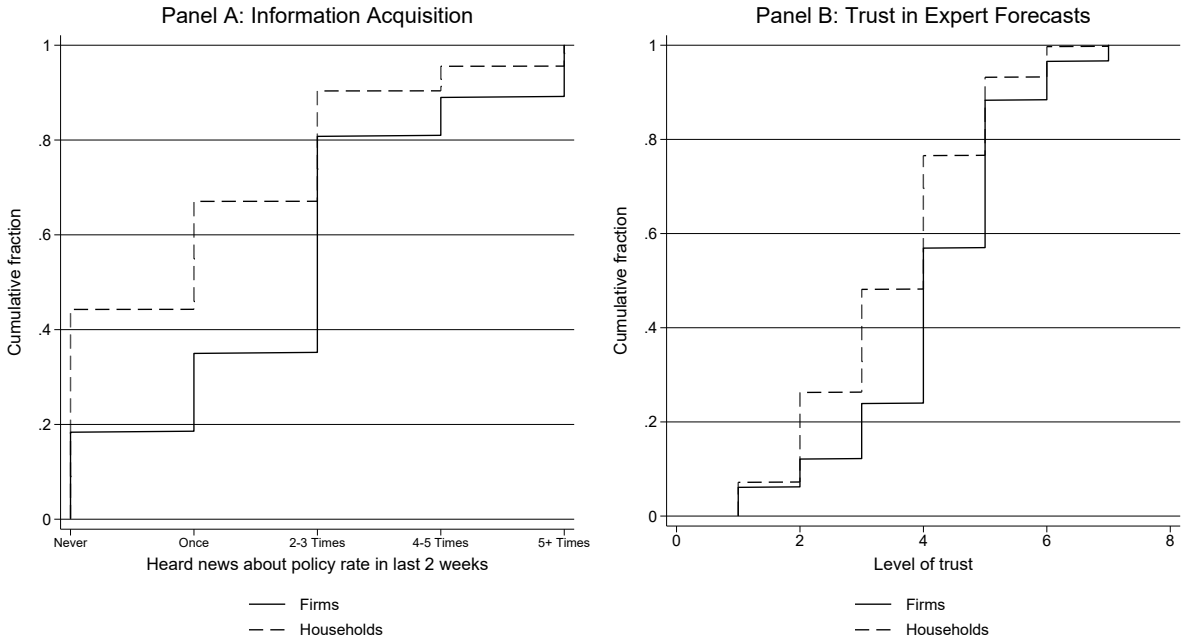
Figure 4: Heterogeneity in Learning from Experts among Firms: 2019 Survey



Notes: This Figure presents the estimated response of firms' expectations regarding the year of policy rate increase (Panel A), the policy rate in 2022 (Panels B), and the policy rate in 2025 (Panel C) to randomized information from an expert forecast predicting a policy rate increase in 2020 relative to respondents that received an expert forecast predicting an increase in 2025 at the earliest. All estimations are based on the German firm survey from December 2019. The effects are estimated separately for different prior news consumption about the ECB policy rate. The regressions control for firms' perceptions of access to and rates faced on loans, location in East Germany, and firms' total investment, number of employees, and revenues (all in logs) stated in the regular ifo Investment Survey. Confidence bounds are depicted at the 90% level.

Mechanisms In sticky information models, information frictions arise from infrequent updating of information sets by economic agents. To study directly the frequency of updating, we ask respondents how often they have heard news about the ECB policy rate over the two weeks before the survey. As shown in Panel A of Figure 5, more than 80% of firms heard news about the policy rate at least once, and more than 60% at least twice. Among households, the numbers are smaller at 56% and 33%. Moreover, households' learning rates about the year of a rate hike and policy rates in 2022 and 2025 decrease in the level of prior news consumption (Panels B, D, and F of Figure 3). The patterns are similar but more noisily measured in the smaller firm sample (Figure 4). Taken together, these results i) provide direct evidence on stronger information frictions among households than among firms, and ii) suggest that differences in learning rates across groups reflect differences in how much information was acquired prior to the survey.

Figure 5: Information Acquisition about Policy Rate and Trust in Expert Forecasts



Notes: Panel A shows the cumulative distribution function of information acquisition about the ECB policy rate from the German survey of December 2019 in the firm and household samples. The figure shows the responses to the question: "How often have news about the policy rate of the European Central Bank (ECB) come to your attention in the last two weeks?". Respondents answered on the following scale: Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times. Panel B shows the cumulative distribution function of trust in economic forecasts of experts as measured in the German survey of September 2020 in the firm and household samples. The figure shows responses to the question: "How much trust do you have in the economic forecasts of experts?" Respondents answered on a scale ranging from [1] "no trust at all" to [7] "very high trust". The Figure displays these distributions separately for households and firms.

Another potential driver of differences in learning rates between firms and households could be differential trust in expert forecasts. Using data from our September 2020 survey, Panel B of Figure 5 shows that firms have somewhat lower levels of trust in the economics forecasts of experts than households. Thus, it is conceivable that differences in trust explain some of the differences in learning rates between firms and households.

3.4 Effects on Expectations about Own Interest Rates

Do firms and households extrapolate from expert forecasts about policy rates to expectations about own rates and credit access? Columns 4 through 6 of Table 6 Panel A show that respondents in the household sample who receive the "Increase 2020" treatment expect a 0.18 p.p. higher mortgage rate in 2022 ($p < 0.01$), a 0.15 p.p. higher rate on consumer loans ($p < 0.01$) and a 0.13 p.p. higher rate on savings accounts ($p < 0.01$) compared to individuals in the "Increase 2025" arm. Respondents who receive the "Increase 2020" treatment also report a 0.043 standard deviation more difficult expected access to mortgages (Column 7, $p < 0.05$) and a 0.046 standard deviation more difficult expected access to consumer loans (Column 8, $p < 0.05$). In Online Appendix B.1 we demonstrate that changes in expected own credit access and rates persist in the follow-up survey and that households significantly adjust their expectations about real own interest rates, and examine heterogeneity in updating of own credit access and rates across groups.

In contrast to the household results, Columns 4 and 5 of Table 6 Panel B show that the information treatment has no significant effects on firms' expected rates and credit access. Due to the weak updating about policy rates among firms, our estimates are not informative about firms' perceived elasticity of own credit market outcomes to changes in policy rates. However, overall the lack of an effect on firms' expectations is again in line with firms holding stronger priors than households about policy rates and potentially own credit market outcomes. Taken together, our fifth main finding is the following:

Result 5. *Households significantly extrapolate from information about the timing of a policy rate hike to expectations about own rates and credit access, while firms do not adjust their expectations*

about own credit market outcomes.

In Online Appendix B.2, we show that our information provision has no systematic effects on firms' or households' expectations about own future outcomes or other macroeconomic variables, such as inflation and the unemployment rate.

4 Conclusion and Implications

Leveraging survey data from Germany, we document five stylized facts about the extent of information frictions among firms and households. First, firms' expectations about the central bank policy rate, inflation, and aggregate unemployment are more aligned with expert forecasts and less dispersed than households'. Second, the extent of belief dispersion differs substantially less across different groups of firms than across different groups of households. Third, differences in information about current realizations of macroeconomic variables are driving a large part of the differences in expectations between firms and households. Fourth, firms update their policy rate expectations significantly less than households when provided with an expert forecast about future rates, consistent with higher levels of news consumption before the survey and stronger prior beliefs. Fifth, while households significantly change their expectations about their personal saving and borrowing rates and their access to credit in response to expert forecasts, firms do not adjust their expectations about own borrowing rates or credit access.

An explanation for these patterns is that information frictions are more pronounced among households than among firms, and these information frictions vary more across different types of households than across different types of firms. This in turn has important implications for modeling. First, while accounting for information frictions is

important both among firms and among households, abstracting from these frictions is even more likely to lead to erroneous conclusions when focusing on households. Second, a fruitful direction for future work is to better explore the origins and consequences of heterogeneous information frictions across different groups of households.

Finally, our results also have implications for understanding macroeconomic dynamics and for policy making, such as differential stickiness of beliefs and decisions between households and firms, and differential effectiveness of policies in changing agents' beliefs. Future work could explore these issues in more detail once longer panel data with comparable questions on macroeconomic expectations of households and firms are available, as for instance from the Survey of Firms' Inflation Expectations for the US (Candia et al., 2021).

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Online Appendix (Supplementary Material for Online Publication Only): Information Frictions among Firms and Households

Sebastian Link Andreas Peichl Christopher Roth Johannes Wohlfart

A Additional Descriptive Evidence

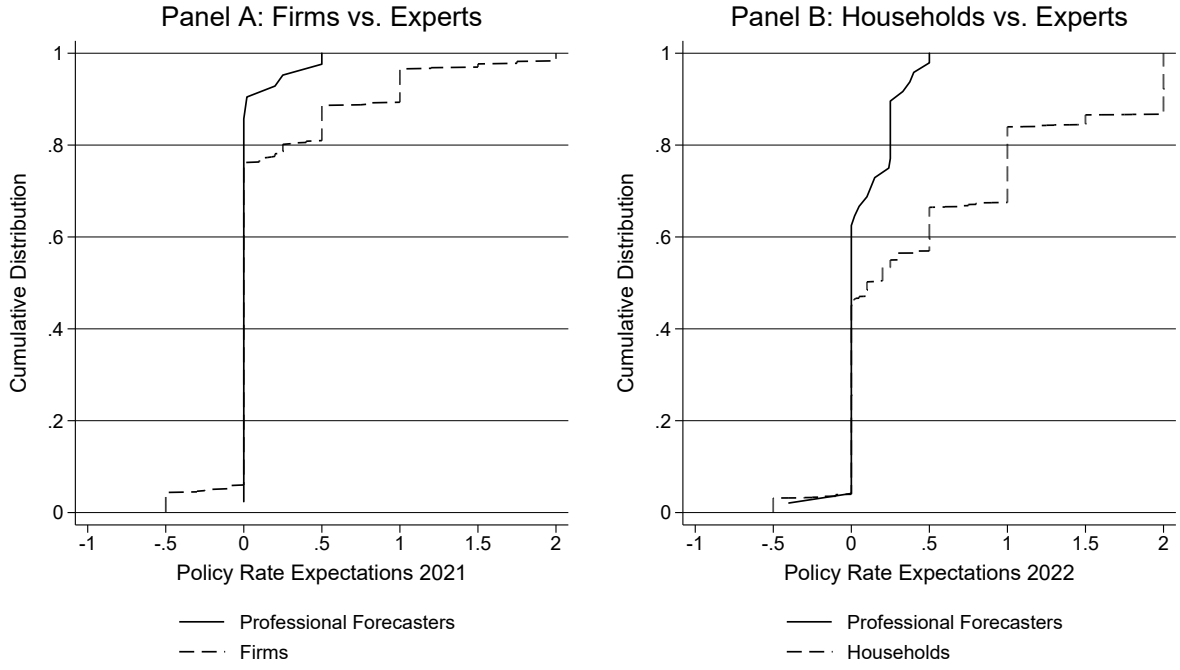
A.1 Robustness to Pandemic Environment

A.1.1 Expectations about Policy Rates from Pre-Corona Period

We provide additional evidence on dispersion and deviation from professional forecasts of households' and firms' expectations using our surveys conducted in 2019, i.e., prior to the coronavirus pandemic, on the ifo Investment Survey and on a representative household sample. We compare households' and firms' forecasts to those of experts participating in the ECB Survey of Professional Forecasters (SPF). Firms and households had been anchored on the policy rate of zero percent that prevailed at the time of the surveys before reporting their expectations. We winsorize predictions at -0.5% and 2% across all datasets for expositional purposes, but our findings are not sensitive to this choice.

Comparison of Households' and Firms' Expectations with Professional Forecasts Panel A of Figure A.1 displays the cumulative density function of firms' and experts' beliefs about the ECB policy rate 2021. Since our main firm survey in December 2019 did not allow us to elicit prior beliefs due to the paper and pencil format, we rely on a question we included in the previous regular round of the ifo Investment Survey conducted in September and October 2019, which was answered by 731 firms. We compare firms' re-

Figure A.1: Prior Policy Rate Expectations from before the Coronavirus Pandemic



Notes: Panel A shows the cumulative distribution functions of firms' and experts' expectations about the policy rate in 2021 based on a supplementary survey question in the regular ifo Investment Survey conducted in September and October 2019 and the October 2019 round of the ECB SPF, respectively. Panel B shows the cumulative distribution functions of households' and experts' expectations about the policy rate in 2022 based on a representative household survey conducted in December 2019 and the January 2020 wave of the ECB SPF, respectively. Households observations are weighted using data from the 2019 wave of the GSOEP. Predictions are winsorized at -0.5% and 2% across all datasets for expositional purposes.

sponses to expert forecasts from the October 2019 round of the SPF. As can be seen, firms' expectations are quite closely aligned with those of professional forecasters. Firms predict a policy rate of 0.16% on average for the year 2021 with a standard deviation of 0.44 p.p., while experts predict a policy rate of 0.04% on average (standard deviation: 0.16 p.p.). Moreover, 83% of firms in our sample expect a policy rate between 0% and 0.5%, within the range of forecasts given by the professionals.

Panel B of Figure A.1 shows the cumulative density function of household expectations about the ECB policy rate in 2022 as well as expert predictions taken from the

January 2020 round of the SPF. Households on average expect a policy rate of 0.53% for the year 2022 with a standard deviation of 0.72 p.p., higher than the average rate predicted by experts of 0.09% (standard deviation: 0.16 p.p.). Moreover, 64% of households in our sample expect a policy rate between -0.4% and 0.5%, within the range of the expert forecasts.

In line with our main evidence, households' expectations about policy rates are more dispersed and less aligned with those of experts compared to firms' expectations. There are some caveats one should keep in mind in the interpretation of these results from our 2019 surveys. First, given that we provided both firms and households with information about the current policy rate, the differences in expectations we detect in this survey can be seen as a lower bound (see our evidence on the effect of the anchor in Section 2.6). Second, firms' and households' expectations concern different reference years, 2021 and 2022, which is due to availability of expert forecasts only for 2021 at the time of the October 2019 round of the ifo Investment Survey.

Correlates of Beliefs Table A.1 Columns 1 through 3 show evidence on correlates of prior interest rate expectations from our household survey from December 2019. Similar to our evidence from the September 2020 survey presented in Section 2.4, more numerate respondents and those holding more financial assets predict lower policy rates and are therefore more aligned with professional forecasts ($p < 0.01$). In contrast to our September 2020 evidence, there are no clear patterns according to age. The table also shows higher confidence in expectations among respondents with more financial assets ($p < 0.01$) but lower confidence among those with higher numeracy ($p < 0.01$, Column

Table A.1: Correlates of Households' Prior Beliefs about Policy Rates: 2019 Survey

	Prior beliefs				Information acquisition	
	(1)	(2)	(3)	(4)	(5)	(6)
	Year policy rate increase	Policy rate 2022	Policy rate 2025	Confidence policy rates (z)	Follow news interest rates (z)	Follow news ECB (z)
Female	0.154	0.054	0.041	-0.413***	-0.285***	-0.324***
	(0.114)	(0.034)	(0.044)	(0.035)	(0.034)	(0.033)
Age at least 45	0.107	-0.030	0.032	-0.023	0.075**	0.094***
	(0.108)	(0.032)	(0.041)	(0.032)	(0.031)	(0.032)
Highschool	0.166	-0.095**	-0.096*	0.047	0.043	0.036
	(0.127)	(0.038)	(0.050)	(0.039)	(0.038)	(0.038)
University	0.106	-0.067*	-0.071	0.034	0.108***	0.089**
	(0.127)	(0.036)	(0.048)	(0.038)	(0.038)	(0.038)
Part-time employed (paid)	-0.077	0.021	0.042	-0.142***	-0.021	-0.022
	(0.137)	(0.046)	(0.057)	(0.041)	(0.040)	(0.040)
Self-employed	0.275	-0.053	0.010	0.068	0.144**	0.201***
	(0.191)	(0.051)	(0.072)	(0.058)	(0.059)	(0.062)
Income > €2,500	-0.152	-0.044	-0.031	0.016	-0.027	-0.022
	(0.117)	(0.032)	(0.043)	(0.035)	(0.035)	(0.035)
Financial assets > €11,000	0.300**	-0.174***	-0.170***	0.081**	0.116***	0.115***
	(0.120)	(0.034)	(0.045)	(0.036)	(0.036)	(0.035)
Stockowner	0.064	-0.069**	-0.106**	0.222***	0.404***	0.381***
	(0.119)	(0.032)	(0.044)	(0.037)	(0.038)	(0.037)
Homeowner	0.071	-0.047	-0.047	0.110***	0.037	0.065**
	(0.108)	(0.031)	(0.041)	(0.032)	(0.032)	(0.032)
Debtor	-0.108	0.073**	0.101**	0.057*	0.074**	-0.002
	(0.104)	(0.031)	(0.041)	(0.032)	(0.031)	(0.031)
High numeracy	0.646***	-0.319***	-0.265***	-0.207***	0.096***	0.037
	(0.109)	(0.030)	(0.041)	(0.033)	(0.033)	(0.033)
Main earner	-0.108	0.057**	0.033	-0.037*	0.015	0.014
	(0.068)	(0.022)	(0.028)	(0.021)	(0.020)	(0.020)
High recession exposure	0.184*	-0.051*	-0.053	0.092***	0.149***	0.180***
	(0.101)	(0.030)	(0.040)	(0.031)	(0.030)	(0.030)
Observations	3686	3880	3796	3992	3992	3992
R^2	0.02	0.08	0.04	0.10	0.12	0.12
Mean dep. variable	2023.41	0.57	1.14	-0.00	0.00	-0.00
SD dep. variable	3.07	0.95	1.22	1.00	1.00	1.00

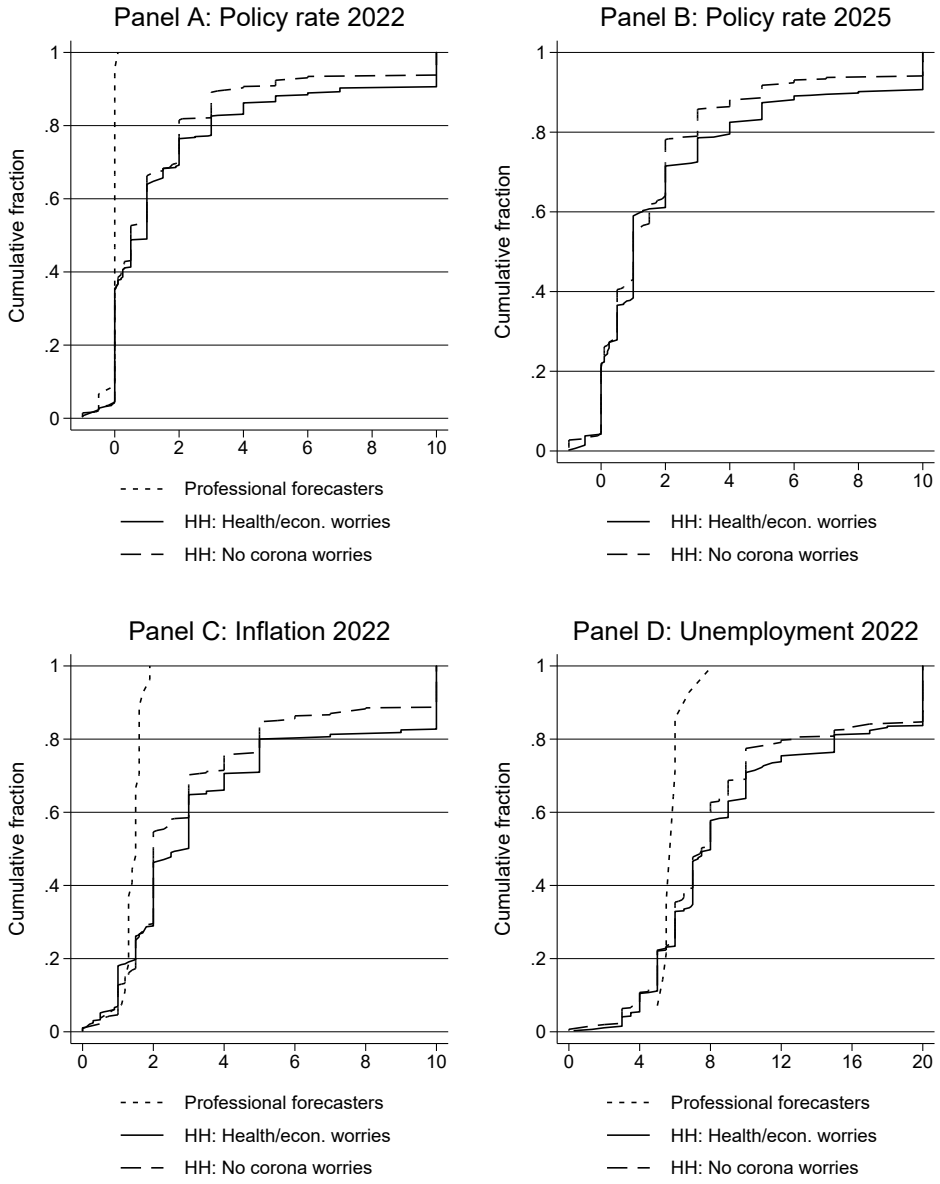
Notes: This Table examines correlates of households' prior beliefs and measures on information acquisition based on the German household survey from December 2019. The dependent variables are the prior beliefs on the expected year of a policy rate increase and the policy rate in 2022 and 2025, households' confidence in their priors about policy rates, and the frequency of news received on interest rates and the ECB in the two weeks prior to the survey, respectively. The outcomes in Columns 4 through 6 are z-scored using the mean and the standard deviation in the corresponding sample. All covariates are coded as dummies. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

4). Those holding more financial assets ($p < 0.01$) and older respondents ($p < 0.05$) report more consumption of interest rate-related or ECB-related news (Columns 5 through 6).

A.1.2 Heterogeneity in 2020 Surveys by Exposure to Coronavirus

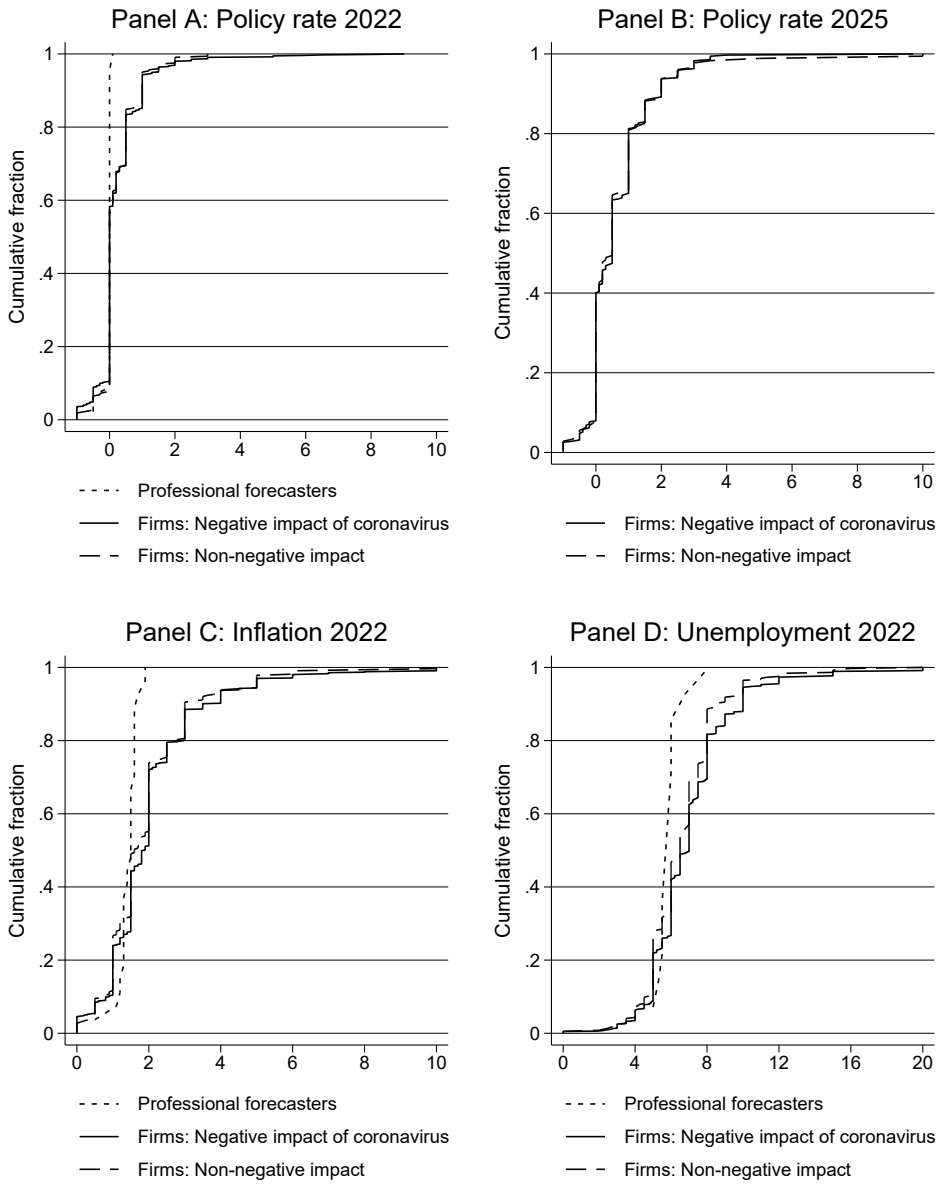
We compare the expectations of households in the September 2020 wave that worry about personal health or economic consequences of the coronavirus to the expectations of those who do not (see Figure A.2). Similarly, we display separately the distribution of expectations for firms that report that their business activity was negatively affected by the pandemic and for those reporting a non-negative impact (see Figure A.3). The figures suggest that more exposure to the pandemic is associated with only slightly more dispersed expectations, and somewhat higher deviations from expert benchmarks. The mean absolute deviation from the median belief of professional forecasters is not statistically different between both groups of exposure in the cases of the expected policy rate in 2022 and inflation in 2022 (neither for firms nor for households) and only statistically different in case of expected unemployment in 2022 (for both firms and households). Non-exposed households still exhibit substantially higher dispersion and bias than exposed firms. Thus, our finding of differences in information frictions between households and firms does not seem to be driven by the special circumstances of the coronavirus pandemic.

Figure A.2: Heterogeneity in Household Expectations by Coronavirus Worries: 2020 Survey



Notes: This Figure shows the cumulative distribution function of expectations from the household survey of September 2020 using only respondents in the "no anchor" condition. The figures show expectations about the average 2022 ECB policy rate, the average 2025 ECB policy rate, the inflation rate over the year 2022, and the average unemployment rate in 2022. The Figure shows the distributions separately for respondents who worry about personal health or economic consequences of the coronavirus crisis and for those who do not. For the sake of readability, we winsorize expectations at -1% and 10%, 0% and 10%, and 20% for policy rates, inflation, and unemployment, respectively. Household observations are weighted based on data from the 2019 wave of the GSOEP. The dotted lines indicate the distributions of forecasts of the 2022 policy rate from the October 2020 round of the ECB SPF and of inflation and unemployment in 2022 of the professional forecasters in FocusEconomics' November 2020 survey, respectively.

Figure A.3: Heterogeneity in Firm Expectations by Coronavirus Impact: 2020 Survey

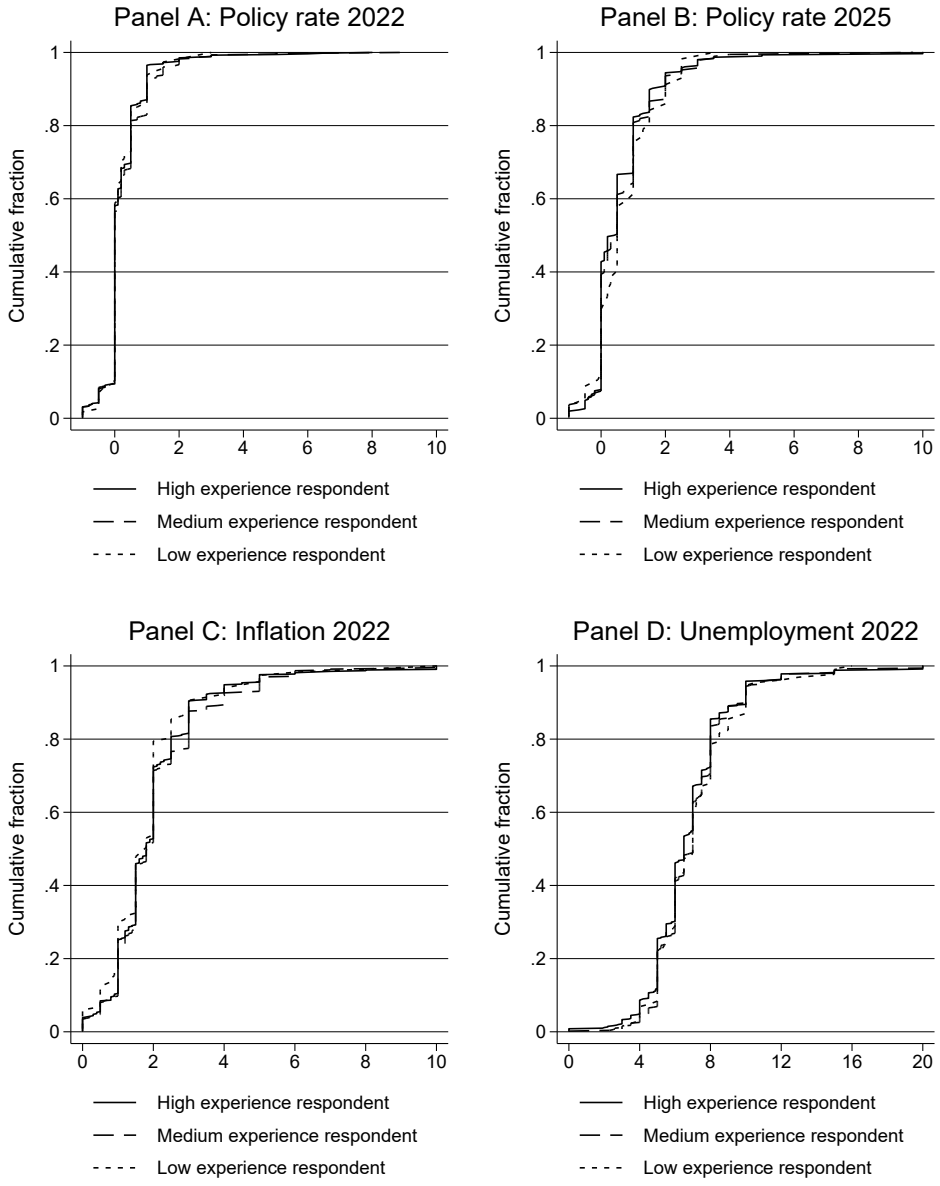


Notes: This Figure shows the cumulative distribution function of expectations from the firm survey of September 2020 survey using only respondents in the "no anchor" condition. The figures show expectations about the average 2022 ECB policy rate, the average 2025 ECB policy rate, the inflation rate over the year 2022, and the average unemployment rate in 2022. The Figure shows the distributions separately for respondents that reported a negative vs a non-negative impact of the coronavirus crisis on their business activity. For the sake of readability, we winsorize expectations at -1% and 10%, 0% and 10%, and 20% for policy rates, inflation, and unemployment, respectively. The dotted lines indicate the distributions of forecasts of the 2022 policy rate from the October 2020 round of the ECB SPF and of inflation and unemployment in 2022 of the professional forecasters in FocusEconomics' November 2020 survey, respectively.

A.2 Robustness to Experience in Survey Participation

One potential concern is that firms in our 2020 survey might be more experienced in answering survey questions regarding their macroeconomic expectations than households given that the IBS is a long-standing survey. However, there are at least two reasons why this difference is very unlikely to drive our results: first, the regular IBS only includes qualitative questions regarding firms' own business activities and expectations about firm-specific variables. Hence, participating firms are not used to answering questions about macroeconomic expectations on a quantitative scale. Second, Figure A.4 shows that the distributions of macroeconomic expectations are virtually the same for respondents with high (above median number of responses to IBS prior to September 2020), medium (between median and 10th percentile), and low (below 10th percentile) experience in answering the regular IBS.

Figure A.4: Heterogeneity in Firm Expectations: Role of Experience in Survey Participation: 2020 Survey



Notes: This Figure shows the cumulative distribution function of firm expectations about the average 2022 ECB policy rate, the average 2025 ECB policy rate, the inflation rate over the year 2022, and the average unemployment rate in 2022 from the German survey of September 2020 using only respondents in the "no anchor" condition. The figure shows the distributions separately for respondents with high, medium, and low experience in answering the regular IBS, which usually elicits qualitative firm-specific variables at monthly frequency. We measure survey experience as a firms' number of responses to the regular IBS prior to the September 2020 wave and split the sample at the median and 10th percentile of the distribution. For readability, we winsorize expectations at -1% and 10%, 0% and 10%, and 0% and 20% for policy rates, inflation, and unemployment, respectively.

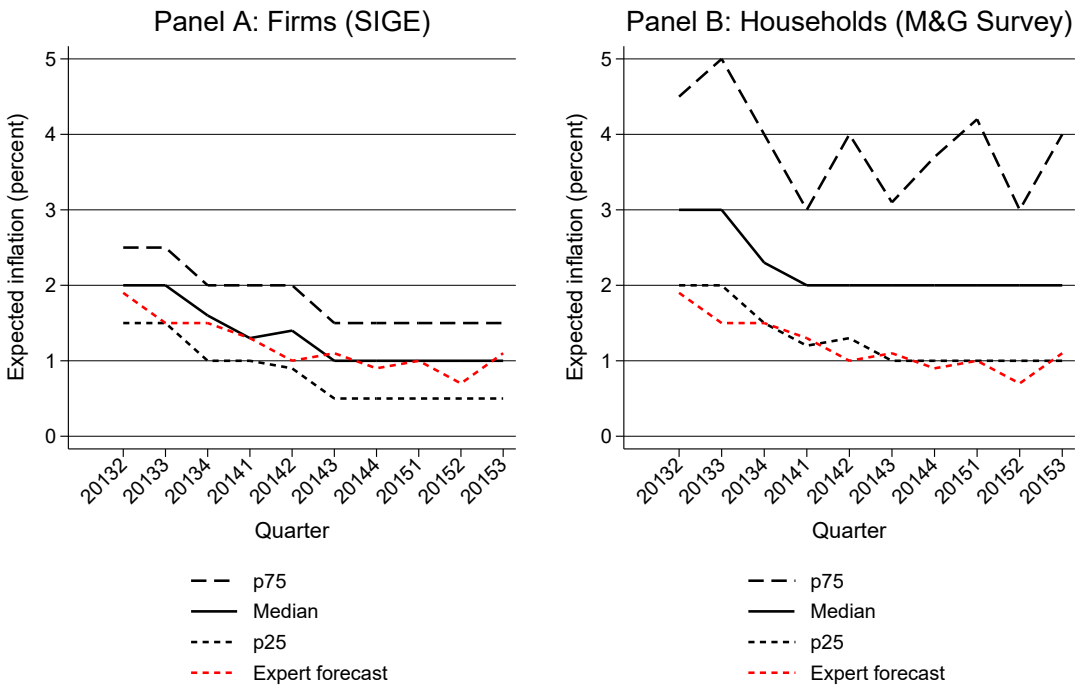
A.3 Evidence from Italy

We also study how expectation dispersion and deviations from professional forecasts differ between firms and households from another large European country – Italy – using micro data on inflation expectations from representative surveys of firms and households.

We leverage quarterly data on 12-month ahead inflation expectations from firms participating in the Bank of Italy's Survey on Inflation and Growth Expectations (SIGE), and compare them to households' expectations measured in a special survey conducted by YouGov for the investment firm M&G during the years 2013-2015. In the firm survey, a random subset of firms received information about the current realization of inflation, which is exploited by Coibion et al. (2020c) to study the causal effect of inflation expectations on firm decisions. We focus on the subsample of firms that did not receive the anchor about the current inflation rate to make the evidence comparable to the household sample.

Figure A.5 and Table A.2 highlight that the inflation expectations of Italian firms are much less dispersed (interquartile range of 1.3 p.p. vs. 2.8 p.p.) and closer to expert forecasts from Consensus Economics compared to households' (mean absolute bias of 0.7 p.p. vs. 3.3 p.p.). The figure highlights that the patterns of large differences in expectations between firms and households are very stable over the whole time period between 2013 and 2015. Together with our main evidence and concurrent evidence from France (Savignac et al., 2021) and the US (Candia et al., 2021), these patterns suggest that expectation dispersion and information frictions are larger among firms than among households.

Figure A.5: Inflation Expectations among Households and Firms: Italy



Notes: This Figure shows inflation expectations (12-month aheasd) from Italian firms participating in the Bank of Italy's Survey on Inflation and Growth Expectations (SIGE, Panel A), and households' inflation expectations (12-month ahead) measured in a special survey conducted by YouGov for the investment firm M&G during the years 2013-2015 (Panel B). The figure shows median inflation expectations as well as the 25th and the 75th percentile of the distribution in the respective sample and wave. The dashed red lines indicate the median professional forecasts from the relevant wave of Consensus Economics. Statistics for household and firm surveys are computed using population weights. The statistics from the firm sample are based on firms in the control group of the experiment used in Coibion et al. (2020c), i.e., they are based on firms that were never provided with inflation-related information.

Table A.2: Dispersion of Inflation Expectations among Households and Firms: Italy

		Firms (Bank of Italy SIGE)							Households (M&G YouGov Survey)							p-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	Bench-mark	Mean	Median	SD	p75-p25	p90-p10	Mean abs. bias	N	Mean	Median	SD	p75-p25	p90-p10	Mean abs. bias	N	(7)=(14)
2013 Q2:																
Inflation next 12 months	1.9	2.10	2.00	1.05	1.00	2.50	0.76	340	4.98	3.00	6.17	2.50	8.70	3.31	649	0.000
2013 Q3:																
Inflation next 12 months	1.5	2.00	2.00	1.07	1.00	2.00	0.82	348	4.82	3.00	5.79	3.00	9.50	3.42	627	0.000
2013 Q4:																
Inflation next 12 months	1.5	1.80	1.60	1.40	1.00	2.50	0.86	323	4.46	2.30	6.08	2.50	9.10	3.18	692	0.000
2014 Q1:																
Inflation next 12 months	1.3	1.50	1.30	1.07	1.00	1.50	0.72	352	3.98	2.00	5.75	1.80	9.00	2.89	616	0.000
2014 Q2:																
Inflation next 12 months	1.0	1.47	1.40	0.98	1.10	2.10	0.75	339	4.24	2.00	5.85	2.70	9.00	3.30	652	0.000
2014 Q3:																
Inflation next 12 months	1.1	1.14	1.00	1.11	1.00	2.09	0.73	324	4.03	2.00	5.95	2.10	9.50	3.15	602	0.000
2014 Q4:																
Inflation next 12 months	0.9	1.03	1.00	0.81	1.00	1.90	0.60	315	4.15	2.00	6.12	2.70	11.50	3.41	625	0.000
2015 Q1:																
Inflation next 12 months	1.0	1.09	1.00	0.96	1.00	1.80	0.55	320	4.26	2.00	6.40	3.20	11.50	3.47	632	0.000
2015 Q2:																
Inflation next 12 months	0.7	1.25	1.00	1.49	1.00	1.80	0.78	311	3.99	2.00	6.14	2.00	9.50	3.39	589	0.000
2015 Q3:																
Inflation next 12 months	1.1	1.10	1.00	1.03	1.00	1.80	0.63	323	4.25	2.00	6.50	3.00	11.50	3.40	627	0.000
Pooled:																
Inflation next 12 months		1.46	1.30	1.18	1.30	2.40	0.72	3295	4.32	2.00	6.08	2.80	9.90	3.29	6311	0.000

Notes: This Table presents summary statistics of expected inflation rates over the next 12 months from firms participating in the Bank of Italy's Survey on Inflation and Growth Expectations (SIGE) and households participating in a special survey conducted by YouGov for the investment firm M&G during the years 2013-2015. Statistics are presented separately for the ten quarters in which the M&G YouGov survey was conducted, as well as pooling across these ten quarters. Statistics for both surveys are computed using population weights. The statistics from the firm sample are based on firms in the control group of the experiment used in Coibion et al. (2020c), i.e., they are based on firms that were never provided with inflation-related information. Columns 2 through 6 depict the mean, median, standard deviation, interquartile range, and the difference between the 90th and 10th percentile for expected inflation in the firm survey, respectively. Column 7 displays the mean absolute deviation of firms' expectations from professional forecasts from Consensus Economics. Column 8 presents the number of observations. Columns 9 through 15 present the same statistics for the household sample. The p-values in Column 16 reject the null hypothesis that the mean absolute bias of households and firms from the expert benchmark depicted in Columns 7 and 14 are equal.

B Additional Evidence on Learning from Expert Forecasts

B.1 Additional Evidence on Effects on Credit Market Expectations

Persistence in Follow-up Survey The treatment effects measured in our December 2019 household survey (described in Sections 3.3 and 3.4) persist in a follow-up survey conducted four weeks later. Table B.1 shows treatment effects estimated in the main survey for the full sample (Panel A), effects estimated in the main survey for the smaller sample of respondents that subsequently participated in the follow-up (Panel B), and effects measured in the follow-up survey (Panel C). Most of the estimates remain statistically significant in the follow-up. The effect sizes for policy rate expectations in the follow-up correspond to about one third of the initial effect sizes, in line with typical estimates of persistence in the literature (Haaland et al., 2021). Effect sizes for personal interest rates and credit access even increase somewhat in size in the follow-up. These findings suggest that at least part of our effects operate through genuine changes in beliefs and that concerns related to numerical anchoring or experimenter demand effects are mitigated (de Quidt et al., 2018). It was not possible to conduct a follow-up survey with the firm sample due to constraints related to space and the timing of the regular rounds of the ifo Investment Survey.

Effects on Other Credit Market Expectations Table B.2 highlights that our December 2019 information intervention also significantly changes households' expected real policy rates and expected real mortgage, consumer loan, and savings account rates, which are adjusted for respondents' inflation expectations (Panel A Columns 1 through 4). By contrast, firms' expected real policy and loan rates do not respond to the treatment (Panel

B Columns 1 and 2). The treatment also significantly increases the probability households assign to a rate hike in 2022 (Panel A Column 5), while it does not affect the perceived probability of a rate decrease (Panel A Column 6). These effects on other credit market expectations confirm our main findings reported in Sections 3.3 and 3.4 that households significantly update their expectations in response to expert forecasts about policy rates, while firms do not change their views.

Heterogeneity Across Groups Table B.3 Columns 1 through 3 show that there are no systematic differences in updating of beliefs about policy rates in response to our 2019 information treatment across groups of households with different levels of financial assets, income, debt, or numeracy. However, updating of expectations about personal consumer loan rates is significantly higher for individuals with higher numeracy, and zero for those with low numeracy (Column 5). Moreover, effects on expected personal mortgage rates are driven by those with higher numeracy, even though differences to those with lower numeracy are statistically insignificant (Column 4). These patterns highlight that individuals with lower numeracy do not believe that changes in monetary policy are transmitted to their own borrowing rates, in line with recent evidence (d'Acunto et al., 2021). There are no systematic patterns of heterogeneity according to levels of household financial assets, income, or debt. Moreover, there are no heterogeneous effects on expected savings account rates or expected access to mortgages or consumer loans (Columns 6 through 8). We are not powered to conduct a thorough analysis of heterogeneous treatment effects using the smaller firm sample.

Robustness Table B.4 demonstrates that the main results from our 2019 information treatment (described in Sections 3.3 and 3.4) are robust to winsorizing expectations instead of trimming them (using the same cutoffs as used for the trimming in the main results). Moreover, Table B.5 shows that the results are robust to excluding control variables.

Table B.1: Persistence in Households' Learning from Expert Forecasts: 2019 and Follow-up Survey

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Mortgage rate 2022	Consumer loan rate 2022	Savings account rate 2022	Mortgage access 2022	Consumer loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Main								
Increase 2020	-1.612***	0.287***	0.266***	0.180***	0.145***	0.127***	-0.043**	-0.046**
	(0.072)	(0.023)	(0.029)	(0.040)	(0.044)	(0.020)	(0.017)	(0.019)
Observations	3758	3896	3828	3859	3864	3818	3992	3992
R^2	0.46	0.40	0.46	0.83	0.80	0.65	0.70	0.63
Panel B: Main follow-up sample								
Increase 2020	-1.493***	0.264***	0.234***	0.180***	0.127**	0.152***	-0.037*	-0.041*
	(0.086)	(0.027)	(0.035)	(0.048)	(0.053)	(0.023)	(0.020)	(0.023)
Observations	2397	2522	2475	2451	2446	2394	2568	2568
R^2	0.48	0.40	0.47	0.83	0.80	0.65	0.73	0.65
Panel C: Follow-up								
Increase 2020	-0.465***	0.105***	0.042	0.232***	0.209**	0.071**	-0.081**	-0.071**
	(0.100)	(0.029)	(0.038)	(0.088)	(0.100)	(0.034)	(0.031)	(0.032)
Observations	2397	2522	2475	2451	2446	2394	2568	2568
R^2	0.24	0.28	0.25	0.28	0.26	0.25	0.38	0.37

Notes: This Table examines the effect of the randomized information provision on posterior expectations of German households provided in the December 2019 survey. "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. Panel A corresponds to Panel A of Table 6 and displays the immediate effect in the December 2019 survey. Panel C reports the effects of the information treatment in a four-week follow up in January 2020. Panel B presents the results based on the main survey in December 2019 for those households that are also in the sample of Panel C. The outcomes in Columns 7 and 8 are z-scored using the mean and the standard deviation in the corresponding sample. In all regressions we control for the same variables as in Panel A of Table 6. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table B.2: Effect of Provision of Expert Forecasts on Other Credit Market Expectations: 2019 Survey

	Real policy rate 2022	Real mortgage rate 2022	Real consumer loan rate 2022	Real savings account rate 2022	Prob. rate incr. 2022	Prob. rate decr. 2022
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Households						
Increase 2020 (A)	0.251***	0.118***	0.082*	0.090***	13.881***	0.106
	(0.031)	(0.043)	(0.047)	(0.030)	(0.994)	(0.656)
Observations	3838	3794	3797	3769	3992	3992
R^2	0.19	0.80	0.77	0.40	0.19	0.07

	Real policy rate 2022	Real firm loan rate 2022
	(1)	(2)
Panel B: Firms		
Increase 2020 (D)	0.019	-0.022
	(0.078)	(0.094)
Observations	400	419
R^2	0.02	0.76
p-value(A=D)	0.005	

Notes: This Table examines the effect of the randomized information provision on posterior expectations of German households (Panel A) and firms (Panel B) reported in the December 2019 surveys about real policy rates, own real rates, and the probabilities respondents assign to a rate increase or decrease until 2022. "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. Expectations about real rates are obtained by deflating expected nominal rates by the respondents' expected inflation rate for 2022. In all regressions we control for the same variables as in Table 6. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table B.3: Heterogeneity in Learning from Expert Forecasts among Households: 2019 Survey

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Mortgage rate 2022	Consumer loan rate 2022	Savings account rate 2022	Mortgage access 2022	Consumer loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Increase 2020 (a)	-1.735***	0.260***	0.220***	0.081	0.001	0.109***	-0.010	-0.030
	(0.141)	(0.050)	(0.062)	(0.081)	(0.088)	(0.041)	(0.030)	(0.035)
Increase 2020 ×	0.061	-0.025	0.045	0.157*	0.133	0.017	-0.022	-0.018
Fin. assets > €11,000 (b)	(0.153)	(0.050)	(0.063)	(0.088)	(0.096)	(0.043)	(0.038)	(0.044)
Increase 2020 ×	0.265*	0.032	0.043	0.043	0.066	0.050	-0.016	0.034
Debtor (c)	(0.145)	(0.046)	(0.060)	(0.082)	(0.092)	(0.041)	(0.036)	(0.041)
Increase 2020 ×	0.229	-0.001	-0.008	-0.114	-0.152	-0.021	0.012	-0.001
Income > €3,000 (d)	(0.153)	(0.048)	(0.062)	(0.084)	(0.096)	(0.042)	(0.039)	(0.043)
Increase 2020 ×	-0.217	0.056	0.014	0.094	0.218**	-0.004	-0.040	-0.044
High numeracy (e)	(0.146)	(0.046)	(0.058)	(0.084)	(0.091)	(0.042)	(0.037)	(0.041)
p-value(a+b=0)	0.000	0.000	0.000	0.013	0.171	0.006	0.417	0.296
p-value(a+c=0)	0.000	0.000	0.000	0.189	0.513	0.000	0.493	0.913
p-value(a+d=0)	0.000	0.000	0.009	0.749	0.211	0.098	0.974	0.541
p-value(a+e=0)	0.000	0.000	0.000	0.053	0.026	0.020	0.189	0.084
Observations	3758	3896	3828	3859	3864	3818	3992	3992
R^2	0.46	0.41	0.46	0.83	0.80	0.65	0.70	0.63

Notes: This Table extends the analysis of Panel A of Table 6 for different groups of German households in the December 2019 survey. "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. "Increase 2020" is interacted with dummies that take value one for high levels of financial assets, debt, income, or numeracy. The outcomes in Columns 7 and 8 are z-scored using the mean and the standard deviation in the corresponding sample. The p-values testing whether treatment effects for different groups are different from zero are displayed at the bottom of the Table. In all regressions we control for the same variables as in Table 6. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table B.4: Learning from Experts' Policy Rate Forecasts: Robustness to Trimming Choices: 2019 Survey

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Inflation 2022	Unempl. rate 2022	Mortgage rate 2022	Consumer loan rate 2022	Savings account rate 2022	Mortgage access 2022	Consumer loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Households trimmed (baseline)										
Increase 2020	-1.612***	0.287***	0.266***	0.043*	0.076	0.180***	0.145***	0.127***	-0.043**	-0.046**
	(0.072)	(0.023)	(0.029)	(0.023)	(0.063)	(0.040)	(0.044)	(0.020)	(0.017)	(0.019)
Observations	3758	3896	3828	3897	3911	3859	3864	3818	3992	3992
R^2	0.46	0.40	0.46	0.12	0.06	0.83	0.80	0.65	0.70	0.63
Panel B: Households winsorized										
Increase 2020	-1.523***	0.261***	0.251***	0.039	0.066	0.185***	0.150***	0.128***	-0.043**	-0.046**
	(0.072)	(0.025)	(0.031)	(0.026)	(0.073)	(0.044)	(0.047)	(0.020)	(0.017)	(0.019)
Observations	3992	3992	3992	3992	3992	3992	3992	3992	3992	3992
R^2	0.52	0.48	0.51	0.19	0.09	0.85	0.83	0.77	0.70	0.63

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Inflation 2022	Unempl. rate 2022	Firm loan rate 2022	Firm loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel C: Firms trimmed (baseline)							
Increase 2020	-0.519**	0.035	0.018	-0.014	-0.115	-0.020	-0.038
	(0.244)	(0.057)	(0.093)	(0.063)	(0.121)	(0.071)	(0.058)
Observations	401	430	428	442	452	436	463
R^2	0.03	0.03	0.04	0.05	0.02	0.85	0.62
Panel D: Firms winsorized							
Increase 2020	-0.437*	-0.011	-0.046	0.024	-0.077	-0.160	-0.038
	(0.264)	(0.120)	(0.127)	(0.087)	(0.180)	(0.143)	(0.058)
Observations	416	466	466	466	466	466	463
R^2	0.03	0.13	0.10	0.09	0.04	0.82	0.62

Notes: This Table provides a robustness check of the results presented in Table 6. Panels A and C correspond to the baseline estimations of Table 6 that trim the data at thresholds of 2030 for the year of a rate hike, of -1% and 5% for policy rates, of 0% and 5% for inflation, of 15% for unemployment, of 0% and 15% for own interest rates, and of -20% and 40% for income growth. Panels B and D present results when winsorizing the data at the same thresholds. Variable descriptions and information on control variables can be found in the note in Table 6. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table B.5: Learning from Experts' Policy Rate Forecasts: Robustness to Omission of Control Variables: 2019 Survey

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Mortgage rate 2022	Consumer loan rate 2022	Savings account rate 2022	Mortgage access 2022	Consumer loan access 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Households								
Increase 2020 (A)	-1.694***	0.303***	0.269***	0.252**	0.073	0.150***	-0.061*	-0.054*
	(0.092)	(0.029)	(0.039)	(0.098)	(0.099)	(0.033)	(0.032)	(0.032)
Observations	3758	3896	3828	3859	3864	3818	3992	3992
R^2	0.08	0.03	0.01	0.00	0.00	0.01	0.00	0.00
Mean dep. variable	2023.32	0.63	1.22	4.05	4.63	0.62	-0.00	0.00
SD dep. variable	2.93	0.92	1.22	3.04	3.08	1.03	1.00	1.00

	Year policy rate increase	Policy rate 2022	Policy rate 2025	Firm loan rate 2022	Firm loan access 2022
	(1)	(2)	(3)	(4)	(5)
Panel B: Firms					
Increase 2020 (B)	-0.513**	0.032	0.018	-0.039	0.036
	(0.241)	(0.057)	(0.092)	(0.180)	(0.093)
Observations	403	432	430	437	463
R^2	0.01	0.00	0.00	0.00	0.00
Mean dep. variable	2023.44	0.26	0.95	2.80	0.00
SD dep. variable	2.43	0.59	0.95	1.87	1.00
p-value(A=B)	0.000	0.000	0.012		

Notes: This Table examines the effect of the randomized information provision on posterior expectations of German households (Panel A) and firms (Panel B). "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. The outcomes in Panel A Columns 7 and 8 and Panel B Column 5 are z-scored using the mean and the standard deviation in the corresponding sample. In contrast to Table 6, the regressions do not control for additional variables. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

B.2 Effects on Other Expectations about the Macroeconomy and Own Circumstances

Our main focus is on the relative strength of information frictions among firms and households. However, our December 2019 surveys also allow us to provide evidence on the role of expectations about future monetary policy in shaping respondents' expectations about the broader economy and their own situation. Forward guidance about the future path of policy rates has become a frequently used tool to change agents' expectations about future inflation in the environment of the zero lower bound.

Macroeconomic Expectations Learning that the central bank is planning to leave interest rates low for longer than previously thought could affect firms' and households' expectations about unemployment and inflation. On the one hand, agents could perceive more accommodating monetary policy to lead to higher demand, resulting in lower unemployment and higher inflation. On the other hand, the central bank's decision to keep interest rates low for longer could be perceived as a reaction to negative news about future demand, leading agents to expect higher unemployment and lower inflation (Wiederholt, 2015). The question how economic agents interpret forecasts about the timing of policy rate hikes is central for monetary policy communication, and ultimately determines the potential of forward guidance about future interest rates to change economic decisions.

As shown in Table B.6, households exposed to the "Increase 2020" treatment expect somewhat higher inflation in 2022 and somewhat higher unemployment in 2020. Movements of inflation and unemployment expectations into the same direction are inconsistent both with a view that lower interest rates lead to higher demand and with an

interpretation that lower policy rates are a reaction to lower demand. Instead, they are consistent i) with households taking a "supply-side" view of the world, and interpreting the announcement of lower interest rates as the central bank's reaction to a negative supply shock; or ii) with households perceiving a positive effect of interest rate hikes on inflation, consistent with recent evidence (Andre et al., 2022). However, changes in expectations are insignificant for inflation in 2020 and unemployment in 2022, are only of small size, and do not persist in a four-week follow-up.

Expectations about Own Circumstances This is also reflected in households' expectations about labor income growth and personal unemployment risk, and firms' expectations about changes in their product prices, the growth of employee wages, as well as changes in demand or profit margin, which are all unaffected by the information (Table B.6).

Discussion Taken together, the policy rate forecast has no strong effects on expectations about aggregate unemployment or inflation or on households' and firms' expected own income and business situation. These patterns suggest that communication about the duration of the zero lower bound environment may not be successful in changing economic agents' expectations about the broader economy or their own circumstances beyond the effects on interest rate expectations. Our findings are in line with evidence by Coibion et al. (2020a) that information about policy rates has no meaningful effects on households' expectations about aggregate unemployment. However, in contrast to our findings, Coibion et al. (2020a) detect stronger reactions of households' inflation expectations to interest rate projections in an environment outside the zero lower bound.

Table B.6: Effect of Provision of Expert Forecasts on Expectations about Macroeconomy and Own Circumstances: 2019 and Follow-up Survey

	Inflation 2020	Inflation 2022	Unempl. rate 2020	Unempl. rate 2022	Annual labor inc. growth 3 years	Pers. unempl. risk 2020	Pers. unempl. risk 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Households main							
Increase 2020	0.023	0.043*	0.076*	0.076	0.128	-0.280	-0.361
	(0.018)	(0.023)	(0.042)	(0.063)	(0.200)	(0.564)	(0.586)
Observations	3940	3897	3940	3911	3866	3953	3943
R^2	0.09	0.12	0.05	0.06	0.12	0.10	0.13
Panel B: Households main follow-up sample							
Increase 2020	0.032	0.047*	0.113**	0.115	0.117	-0.055	-0.474
	(0.021)	(0.027)	(0.049)	(0.075)	(0.226)	(0.683)	(0.741)
Observations	2405	2305	2358	2308	2450	2533	2528
R^2	0.06	0.09	0.06	0.08	0.12	0.12	0.14
Panel C: Households follow-up							
Increase 2020	0.003	0.060	0.204*	0.157	-0.052	0.563	-0.351
	(0.042)	(0.045)	(0.109)	(0.121)	(0.221)	(0.654)	(0.714)
Observations	2405	2305	2358	2308	2450	2533	2528
R^2	0.05	0.06	0.06	0.05	0.09	0.08	0.10

	Inflation 2020	Inflation 2022	Unempl. rate 2020	Unempl. rate 2022	Product price change 2022	Employee wage growth 2022	Demand change 2022	Profit margin change 2022
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel D: Firms								
Increase 2020	-0.002	-0.014	-0.026	-0.115	0.273	-0.087	-0.054	0.018
	(0.036)	(0.063)	(0.065)	(0.121)	(0.297)	(0.205)	(0.092)	(0.095)
Observations	452	442	458	452	459	459	465	466
R^2	0.02	0.05	0.02	0.02	0.10	0.12	0.06	0.03
p-value(A=D)	0.523	0.396	0.185	0.159				

Notes: This Table examines the effect of the randomized information provision on posterior expectations about the macroeconomy and own circumstances of households (Panels A through C) and firms (Panel D). "Increase 2020" is a dummy taking value one if the respondent received the forecast predicting a policy rate increase in 2020, and zero if the respondent received the forecast predicting an increase in 2025 at the earliest. Panel A displays the immediate effect in the December 2019 household survey. Panel C reports the effects of the information treatment in a four-week follow up in January 2020. Panel B presents the results based on the main survey in December 2019 for those households that are also in the sample of Panel C. Panel D depicts the results for the firm survey from December 2019. In all regressions we control for the same variables as in Table 6. Robust standard errors are displayed in parentheses. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

C Survey Instructions: September 2020 Surveys

C.1 Survey Instructions in English (Firms September 2020)

Due to space constraints, each firm participating in the ifo Business Survey (IBS) only responded to two questions in total (in addition to the regular questions). For this purpose, the sample of firms was randomly divided into six groups. To indicate the ordering and assignment of questions to these groups, we refer to "G1Q1" as the first question firms in the first group received, while "G6Q2" refers to the second question firms in the sixth group were assigned to, and so on.

Expectations about Interest Rates: No Anchor

[G3Q2 and G4Q1:] What do you think will the policy rate be on average in 2022: __%

[G6Q1:] What do you think will the policy rate be on average in 2025: __%

Expectations about Interest Rates: With Anchor

[G1Q2 and G2Q1:] Currently the policy rate of the ECB is 0%. What do you think will the policy rate be on average in 2022: __%

[G5Q1:] Currently the policy rate of the ECB is 0%. What do you think will the policy rate be on average in 2025: __%

Expectations about Inflation and Unemployment

[G3Q1 and G4Q2:] What do you expect the inflation rate to be over the year 2022? __%

[G1Q1 and G2Q2:] What do you expect the unemployment rate to be on average in the year 2022. __%

Trust

[G5Q2 and G6Q2:] How much trust do you have in the economic forecasts of experts? __ (1 = no trust at all, 7 = very high trust).

Additional Questions from IBS

In addition to these supplementary survey questions, we use the following survey questions from other modules and waves of the IBS:

Impact of Coronavirus Crisis [September 2020]: Do you realize an effect of the Corona pandemic on your current business situation? Is this effect negative or positive?
negative ☐ -3 ☐ -2 ☐ -1 ☐ 0 ☐ $+1$ ☐ $+2$ ☐ $+3$ positive

Equity Ratio [September 2020]: How high was your company's equity ratio at the end of 2019? __%

Cash to Total Assets [September 2020]: How high were the "cash and cash equivalents" of your company in % of total assets in June 2020? __%

Any Change in Loan Interest Rate in last 6 Months [September 2020]: Has the interest rate your company pays on loans changed since March 2020? ☐ yes ☐ no

Level of Education of Respondent [February 2020]: What is your highest educational degree? Categories:
☐ Below high school ☐ A-levels (or equivalent) ☐ Completed vocational training ☐ Bachelor or master (vocational) ☐ Diploma or Master (University) ☐ Doctorate ☐ Other

Export Share [September 2018]: What percentage of your sales does your company/firm generate abroad? __%

Founding Year [September 2018]: In which year was your company/firm founded? __

C.2 Survey Instructions in English (Households September 2020)

Attention Check

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter "Very strongly interested" and "Not at all interested" as your answers to the next question. How interested are you in politics?
Very strongly interested - Strongly interested - A little bit interested - Almost not interested - Not at all interested

Explanation

Over the course of this survey we will repeatedly ask you things about your household, for instance about the net income of your household. By household we mean all family members whom you share your primary residence with, excluding housemates and subtenants.

Background Characteristics

What is your current employment relationship? full-time employed - part-time employed - self-employed (full-time) - self-employed (part-time) - job-seeking/unemployed - retired/pensioned - housekeeping - in full-time education/apprenticeship - parental leave - temporary leave from work - permanent leave from work other: __

What is your gender? male - female

What is your age? 18-24 - 25-34 - 35-44 - 45-54 - 55-64 - over 64

What do you think is your household's monthly disposable net income? Disposable net income refers to the amount of income that the household has available after taxes and transfers.

Which federal state do you live in?

What is your highest level of education?
School-leaving certificate from: Special school - Lower secondary school - Polytechnic secondary school (POS), 8th grade (GDR degree) - Secondary school - Polytechnic secondary school (POS), 10th grade (GDR degree) - Advanced technical college - High school - Extended comprehensive school (EOS) (GDR degree) or professional education with Abitur (GDR degree) - Other: __

Expectations about Interest Rates: No Anchor

What do you think will the policy rate be on average in 2022: __%

How certain are you about your estimate about the development of the ECB policy rate?
very certain - certain - uncertain - very uncertain

What do you think will the policy rate be on average in 2025: __%

How certain are you about your estimate about the development of the ECB policy rate?
very certain - certain - uncertain - very uncertain

Expectations about Interest Rates: With Anchor

Currently the policy rate of the ECB is 0%.

What do you think will the policy rate be on average in 2022: __%

How certain are you about your estimate about the development of the ECB policy rate?
very certain - certain - uncertain - very uncertain

What do you think will the policy rate be on average in 2025: __%

How certain are you about your estimate about the development of the ECB policy rate?
very certain - certain - uncertain - very uncertain

Expectations about Inflation and Unemployment

What do you expect the inflation rate to be over the year 2022? __%

How certain are you about your estimate about the development of the inflation rate?
very certain - certain - uncertain - very uncertain

What do you expect the unemployment rate to be on average in the year 2022. __%

How certain are you about your estimate about the development of the unemployment rate?
very certain - certain - uncertain - very uncertain

Trust

How much trust do you have in the economic forecasts of experts? (1 = no trust at all, 7 = very high trust).

How much trust do you have in the ECB? (1 = no trust at all, 7 = very high trust).

Numeracy

Next we would like to ask you five questions to see how people use numbers in everyday life.

In a sale, a shop is selling all items at half price. Before the sale, a sofa costs 300 Euros. How much will it cost in the sale? __

Let's say you have 200 Euro in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?
__

In the BIG BUCKS LOTTERY, the chances of winning a 10,000 Euro prize are 1%. What is your best guess about how many people would win a 10,000 Euro prize if 1,000 people each buy a single ticket from BIG BUCKS? __people

If the chance of getting a disease is 10 percent, how many people out of 1,000 would be expected to get the disease? __people

The chance of getting a viral infection is 0.0005. Out of 10,000 people, about how many of them are expected to get infected? __people

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?
More than today - The same as today - Less than today

Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a share of a stock mutual fund with the same value.
True - False

Additional Demographics I

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks when it comes to financial investment? 1 - Unwilling to take risk; 10 - Fully prepared to take risk.

Are you generally a patient person or an impatient person? 1- Very patient; 10 - Very impatient.

How often have news about the policy rate of the European Central Bank (ECB) come to your attention in the last two weeks? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

How often have news about interest rates in general come to your attention in the last two weeks? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

How often have news about the inflation rate come to your attention in the last two weeks? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

How often have news about the unemployment rate come to your attention in the last two weeks? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

To what degree do you agree with the following statements? fully agree, rather agree, neither agree nor disagree, rather disagree, fully disagree

- I usually follow news about the economy.
- My job security depends on the overall business cycle.
- A recession would impair the financial situation of my household.

Coronavirus Perceptions

What influence does the coronavirus crisis exert on the economic situation of your household?
Very negative influence - Negative influence - No influence - Positive influence- Very positive influence

Do you worry about your health or the health of other household members because of the coronvirus crisis?
No worries at all - Little worries - Moderate worries - Big worries - Very big worries

Assets and Debt

What do you estimate the value of your household's current accounts, savings accounts and demand deposit accounts to be? (Please enter zero if your household does not hold any current accounts, savings accounts or demand deposit accounts)

—

What do you estimate the value of your household's total holdings of stocks and stock mutual funds to be? (Please enter zero if your household does not hold any stocks/stock mutual funds.)

—

What do you estimate the value of your household's total holdings of other financial assets including money market funds, building loan contracts, or government and corporate bonds to be? (Please enter zero if your household does not hold any other financial

assets.)

—

What do you estimate the total value of your household's holdings of real estate, including your primary residence (if it is owned by your household) to be? (Please enter zero if your household does not own any real estate.)

—

What do you estimate your household's total outstanding housing debt (mortgage debt and home equity loans) to be? (Please enter zero if your household does not hold any housing debt.)

—

What is your estimate of your household's total outstanding non-housing debt? This includes installment loans, outstanding balances on credit cards, student loans, and auto loans. (Please enter zero if your household does not hold any non-housing debt.)

—

Additional Demographics II

How many people live in your households?

In which industry do you work? [drop-down]

What is your main occupation? [drop-down]

Who is the main earner in your household? You - Your spouse - You and your spouse earn the same amount - Another person

Who in your household is most knowledgeable regarding the finances of your household? By this we mean the household member who has the best overview of income, financial accounts, pension schemes, and real estate holdings. I am most knowledgeable about the household's finances. - My spouse is most knowledgeable about the household's finances. - My spouse and I are equally knowledgeable about the household's finances - Another person.

Does your household use your main residence . . . as main owner - . . . as partial owner - . . . as renter - . . . for free

Does your household own stocks or stock mutual funds? Yes - No

For which party have you voted in the general election of 2017?
Conservatives - Social Democrats - Greens - Liberals - Alternative for Germany - Left - Other - Have not voted - Prefer not to say

D Survey Instructions: December 2019 Surveys

D.1 Survey Instructions in English (Firms December 2019)

Information Treatment

Arm: Increase 2020

Currently the policy rate of the ECB is 0%. According to an expert who regularly participates in an expert survey of the ECB, the policy rate of the ECB will rise to a higher level in the third quarter of 2020 (next summer).

Arm: Increase 2025

Currently the policy rate of the ECB is 0%. According to an expert from a German Bank, the policy rate of the ECB will rise to a higher level at the earliest in 2025 (in five years).

Macroeconomic Expectations

Over the course of this survey we will repeatedly ask you things about your assessment in percentage terms. If you think that the respective probability/percentage change is X%, then please enter X.

Inflation refers to the percent increase in the general price level measured by the so-called Consumer Price Index. What do you expect the inflation rate to be in the following years?
__% over the year 2020.
__% over the year 2022.

The current unemployment rate in Germany is 5.0%. What do you expect the unemployment rate to be on average in the following years?
__% in the year 2020.
__% in the year 2022.

Credit Market Perceptions

How difficult do you think it is (will be) for German firms with similar characteristics as your firm (sector, number of employees, revenue) to ...
a) ...currently take out a loan to finance investment? very difficult - difficult - neither difficult nor easy - easy - very easy
b) ...take out a loan to finance investment in 2022? very difficult - difficult - neither hard nor easy - easy - very easy

What do you think would be the interest rate that German firms with similar characteristics as your firm (sector, number of employees, revenue) would have to pay on average if they...
a) ... take out a loan to finance investment today? The interest rate would be __%
b) ... take out a loan to finance investment in the year 2022? The interest rate would be __%

Business Expectations

By how many percent will the following quantities change each year on average over the next three years? (If you expect a decrease, please enter negative percent value.)
Average price of your Firm's products __%
Average hourly wage of your firm's employees __%

How will the following quantities change until the end of 2022 compared to today?
. . . the demand for your firm's products? strongly increase - increase - neither increase nor decrease - decrease - strongly decrease
. . . the profit margin of your firm? strongly increase - increase - neither increase nor decrease - decrease - strongly decrease

Interest Rate Expectations

In what year do you think will the policy rate of the ECB rise to a level above 0%?
____ .

What do you think will the policy rate be on average ...
__% in 2022
__% in 2025

How certain are you about your expectations about the policy rate of the ECB?
very certain - certain - uncertain - very uncertain

News Consumption

How often in the last two weeks came news about the policy rate of the European Central Bank (ECB) to your attention? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

Trust in ECB

How much trust do you have in the ECB? Please enter a number between 0 and 10 (0 = no trust at all, 10 = very high trust).

Information about the Respondent

How much influence do you personally have in your firm when it comes to the following decisions:

. . . investment decisions? very much influence - much influence - neither much nor little influence - little influence - very little influence

. . . production decisions? very much influence - much influence - neither much nor little influence - little influence - very little influence

. . . personnel decisions (recruitment and dismissals)? very much influence - much influence - neither much nor little influence - little influence - very little influence

What fraction of the revenue of your company is generated abroad?
__% within the Euro area (excluding Germany)
__% outside the Euro area

D.2 Survey Instructions in English (Households December 2019)

Attention Check

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter "Very strongly interested" and "Not at all interested" as your answers to the next question. How interested are you in politics? Very strongly interested - Strongly interested A little bit interested - Almost not interested - Not at all interested

Explanation

Over the course of this survey we will repeatedly ask you things about your household, for instance about the net income of your household. By household we mean all family members whom you share your primary residence with, excluding housemates and subtenants.

Background Characteristics

What is your current employment relationship? full-time employed - part-time employed - self-employed (full-time) - self-employed (part-time) - job-seeking/unemployed - retired/pensioned - housekeeping - in full-time education/apprenticeship - parental leave - temporary leave from work - permanent leave from work other: __

What is your gender? male - female

What is your age? 18-24 - 25-34 - 35-44 - 45-54 - 55-64 - over 64

What do you think is your household's monthly disposable net income? Disposable net income refers to the amount of income that the household has available after taxes and transfers.

Which federal state do you live in?

Prior Beliefs about Interest Rates

Currently the policy rate of the ECB is 0%.

When do you think will the policy rate of the ECB rise to a level above 0%?
The policy rate will rise to a level above 0% in the year ____ .

What do you think will the policy rate be on average ...
... in 2022: __%
... in 2025: __%

How certain are you about your expectations about the ECB policy rate?
very certain - certain - uncertain - very uncertain

Information Treatment

On the next page you will receive an expert forecast about the future development of the ECB policy rate. Please carefully review the forecast, you will not be able to go back to that page. On the next page you can only proceed after 5 seconds.

Arm: Increase 2020

Currently the policy rate of the ECB is 0%. According to an expert who regularly participates in an expert survey of the ECB on the future economic development, the policy rate of the ECB will rise to a higher level in the third quarter of 2020 (next summer).

Arm: Increase 2025

Currently the policy rate of the ECB is 0%. According to an expert from a German Bank, the policy rate of the ECB will rise to a higher level at the earliest in 2025 (in five years).

Macroeconomic Expectations

In what follows we will ask you some questions about the aggregate economy.

Inflation refers to the percent increase in the general price level measured by the so-called Consumer Price Index. A decrease in the general price level is called deflation (negative inflation). The current rate of inflation in Germany is 1.1%. What do you expect the inflation rate to be in in the following years?
__% over the year 2020.
__% over the year 2022.

The current unemployment rate in Germany is 5%. What do you expect the unemployment rate to be on average in the following years?
__% in the year 2020.
__% in the year 2022.

Perceived Credit Constraints

How easy would it be for your household to take out a loan to finance consumption expenditures?
. . . currently: Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult
. . . in 2022: Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult

How easy would it be for your household to take out a mortgage loan?
. . . currently: Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult
. . . in 2022: Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult

Credit Market Expectations

Imagine your household wants to take out a loan to finance consumption expenditures. What do you think would be the interest rate your household would have to pay on such a loan?
. . . currently: __%
. . . in 2022: __%

Imagine your household wants to take out a fairly large mortgage. What do you think would be the interest rate your household would have to pay on such a loan?
. . . currently: __%
. . . in 2022: __%

What do you think is the interest rate your household could earn by saving on a savings account?
. . . currently: __%
. . . in 2022: __%

Personal Income and Unemployment Expectations

The next question is about the net labor income of your household. By net labor income we mean the amount your household earns through either self-employment or wage earnings after taxes and transfers. What do you think, in percentage terms, how much higher or lower will be your households' total net labor income in 2022 compared to today? If you expect a lower net labor income, please enter a negative number.
What do you think, by how many percent will your households' total net labor income change each year on average over the next 3 years? If you expect a decrease, please enter a negative number. __%

What do you think is the probability that you will be involuntarily unemployed for at least 3 months in the following years?
. . . 2020: __%
. . . 2022: __%

Posterior Expectations about the Interest Rate

We want to ask you again for your assessment regarding the development of the interest rate.
When do you think will the policy rate of the ECB rise to a level above 0%?
The key interest rate will rise to a level above 0% in the year ____ .

What do you think will the key interest rate be on average ...
. . . in 2022: __%
. . . in 2025: __%

How certain are you about your expectations about the ECB interest rate?
very certain - certain - uncertain - very uncertain

In this question we present you three scenarios about the average level of the key interest rate in 2022. For each scenario, please let us know the percent chance you assign to the event that this scenario happens. The probabilities of the three scenarios have to sum up to 100 percent.

The key interest rate in 2022 will on average be…
… higher than today: __%
… as high as today: __%
… lower than today :__%
sum: __%

Trust in ECB

How much trust do you have in the ECB? Please enter a number between 0 and 10 (0 = no trust at all, 10 = very high trust).

Assets and Debt

What do you estimate the value of your household's current accounts, savings accounts and demand deposit accounts to be? (Please enter zero if your household does not hold any current accounts, savings accounts or demand deposit accounts)

—

What do you estimate the value of your household's total holdings of stocks and stock mutual funds to be? (Please enter zero if your household does not hold any stocks/stock mutual funds.)

—

What do you estimate the value of your household's total holdings of other financial assets including money market funds, building loan contracts, or government and corporate bonds to be? (Please enter zero if your household does not hold any other financial assets.)

—

What do you estimate the total value of your household's holdings of real estate, including your primary residence (if it is owned by your household) to be? (Please enter zero if your household does not own any real estate.)

—

What do you estimate your household's total outstanding housing debt (mortgage debt and home equity loans) to be? (Please enter zero if your household does not hold any housing debt.)

—

What is your estimate of your household's total outstanding non-housing debt? This includes installment loans, outstanding balances on credit cards, student loans, and auto

loans. (Please enter zero if your household does not hold any non-housing debt.)
__

Additional Demographics I

How many people live in your households?

What is your highest level of education?
School-leaving certificate from: Special school - Lower secondary school - Polytechnic secondary school (POS), 8th grade (GDR degree) - Secondary school - Polytechnic secondary school (POS), 10th grade (GDR degree) - Advanced technical college - High school - Extended comprehensive school (EOS) (GDR degree) or professional education with Abitur (GDR degree) - Other: __

Did you complete vocational training, for example an apprenticeship? Or do you have a qualification from a university, university of applied sciences, or university of cooperative education? Company apprenticeship - Semi-skilled training - Training at a school of public health - Training at a vocational school - Master certification, engineering diploma or comparable - Certification from a university of cooperative education - Certification from a university of applied sciences or from a teacher training college - Certification from a university - Other: __

In which industry do you work? [drop-down]

What is your main occupation? [drop-down]

Numeracy

Let's say you have 200 euro in a savings account. The account earns ten per cent interest per year. Interest accrues at each anniversary of the account. If you never withdraw money or interest payments, how much will you have in the account at the end of two years?
__

Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After one year, how much would you be able to buy with the money in this account?
More than today - The same as today - Less than today

Please tell me whether this statement is true or false: Buying a single company's stock usually provides a safer return than a share of a stock mutual fund with the same value.
True - False

Additional Demographics II

Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks when it comes to financial investment? 1 - Unwilling to take risk; 10 - Fully

prepared to take risk.

Are you generally a patient person or an impatient person? 1- Very patient; 10 - Very impatient.

How often in the last two weeks have come news about the policy rate of the European Central Bank (ECB) to your attention? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

How often in the last two weeks have come news about interest rates in general to your attention? Never - Once - Between 2 and 3 times - Between 4 and 5 times - More than 5 times

To what degree do you agree with the following statements? fully agree, rather agree, neither agree nor disagree, rather disagree, fully disagree

- I usually follow news about the economy.
- Firms are usually better informed about the interest rate policy of the ECB than I am.
- My job security depends on the overall business cycle.
- A recession would impair the financial situation of my household.

Who is the main earner in your household?
You - Your spouse - You and your spouse earn the same amount - Another person

Who in your household is most knowledgeable regarding the finances of your household? By this we mean the household member who has the best overview of income, financial accounts, pension schemes, and real estate holdings.
I am most knowledgeable about the household's finances. - My spouse is most knowledgeable about the household's finances. - My spouse and I are equally knowledgeable about the household's finances - Another person.

Does your household use your main residence . . . as main owner - . . . as partial owner - . . . as renter - . . . for free

Does your household own stocks or stock mutual funds?
Yes - No

For which party have you voted in the general election of 2017?
Conservatives - Social Democrats - Greens - Liberals - Alternative for Germany - Left - Other - Have not voted - Prefer not to say

D.3 Survey Instructions in English (Follow-up Households January 2020)

Attention Check

The next question is about the following problem. In questionnaires like ours, sometimes there are participants who do not carefully read the questions and just quickly click through the survey. This means that there are a lot of random answers which compromise the results of research studies. To show that you read our questions carefully, please enter turquoise as your answer to the next question. What is your favorite color?

Explanation

Over the course of this survey we will repeatedly ask you things about your household, for instance about the net income of your household. By household we mean all family members whom you share your primary residence with, excluding housemates and subtenants.

Posterior Expectations about the Interest Rate

In what follows we will ask you some questions on your expectations about the aggregate economy and your own economic circumstances in the next years.

When do you think will the policy rate of the ECB rise to a level above 0%?
The key interest rate will rise to a level above 0% in the year ____ .

What do you think will the key interest rate be on average ...
... in 2022: __%
... in 2025: __%

How certain are you about your expectations about the ECB interest rate?
very certain - certain - uncertain - very uncertain

Macroeconomic Expectations

Inflation refers to the percent increase in the general price level measured by the so-called Consumer Price Index. A decrease in the general price level is called deflation (negative inflation). What do you expect the inflation rate in Germany to be in the following years?
__% over the year 2020.
__% over the year 2022.

What do you expect the unemployment rate in Germany to be on average in the following years?
__% in the year 2020.
__% in the year 2022.

Perceived Credit Constraints

What do you think, how easy will it be for your household in 2022 to take out a loan to finance consumption expenditures?
Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult

What do you think, how easy will it be for your household in 2022 to take out a mortgage?
Very easy - Somewhat easy - Neither easy nor difficult - Somewhat difficult - Very difficult

Credit Market Expectations

Imagine that in the year 2022 your household wants to take out a mortgage. What do you think would be the annual interest rate your household would have to pay on such a loan?
. . . in 2022: __%

Imagine that in the year 2022 your household wants to take out a loan to finance consumption expenditures. What do you think would be the annual interest rate your household would have to pay on such a loan?
. . . in 2022: __%

What do you think will be the annual interest rate your household can earn by saving on a savings account in the year 2022?
. . . in 2022: __%

Additional Demographics

In what year were you born?
—

What do you think is your household's monthly disposable net income (in Euro)?
Disposable net income refers to the amount of income that the household has available after taxes and transfers.

What is your gender? male - female

What is your age? 18-24 - 25-34 - 35-44 - 45-54 - 55-64 - over 64

Which federal state do you live in?

Did you answer the question in this survey truthfully? Yes - No

What do you think is the purpose of this study?