Inflation Expectations and Economic Preferences

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Abstract

We provide evidence for an expectation gap, where risk-averse as well as impatient households and experts provide significantly higher prior inflation forecasts. Using a survey randomized control trial (RCT), we can show that information about inflation forecasts closes this expectations gap. The group, whose prior expectations was farthest from the treatment information, tends to adjust posterior expectations more strongly. However, we find no such effect with respect to forecasts for energy prices, which are less informative. Our results suggest that the expectation gap seems to be partially due to differences in information seeking between different types of individuals.

Keywords: Inflation expectations, patience, risk preference, households, experts, survey experiment, randomized control trial (RCT).

JEL classification: E52, E31, D84, D90.

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1 Introduction

Inflation expectations as well as economic preferences can influence economic choices like consumption, investment and product pricing (Bradford et al., 2017; Dräger and Nghiem, 2021; Coibion et al., 2020). Consequently, policymakers monitor the formation process of inflation expectations and increasingly use central bank communication to guide expectations in the general public. A growing literature using survey experiments with randomized control trials (RCT) shows that information treatments including information frequently communicated by central banks can steer households' and expert' expectations at least in the short run (Coibion et al., 2020, 2023; Weber et al., 2023; Dräger et al., 2024). At the same time, there are some indications for systematic differences in inflation forecasts depending on risk (Armantier et al., 2015; Goldfayn-Frank and Wohlfahrt, 2020; Dräger et al., 2023; Vinogradov et al., 2024), and time preferences (Bruine de Bruin et al., 2010; Krupka and Stephens, 2013), although more investigation is needed into the potential mechanisms underlying these differences. Both risk and time preferences have been linked to information-seeking behavior, where risk-averse and impatient individuals are less likely to seek information with respect to future risky outcomes (see Golman et al. (2017) for a review of the literature).[1] Within two parallel surveys, we provide evidence for systematic differences in inflation expectations depending on risk and time preferences for both a sample representative of the general population and a sample of experts. Using an RCT approach, we explore variation in information as a possible mechanism underlying the observed differences in inflation expectations.

The RCT study was conducted for German online samples in January 2023, when actual inflation was high due to the energy crisis. Since households tend to give less informed and more dispersed inflation expectations compared to experts (D'Acunto et al., 2023; Dräger et al., 2022), we ran two surveys in parallel: the first household survey is representative of the German population, comprising 3,266 households. The second expert survey was run among employees working at seven German banks and insurance companies, comprising 663 experts. This allows us to compare whether households and experts process information differently and whether risk and time preferences are equally relevant for both groups.

The survey randomly assigned respondents to one of three treatment groups or the control group. In all treatments, we show a graphical illustration and a short text representing forecasts provided by the German Bundesbank. In the *Forecast* treatment, respondents are provided with forecasts for overall inflation. In the *Forecast Risk* treatment, we additionally provide information regarding macroeconomic uncertainty by presenting two inflation forecasts – a baseline scenario (which corresponds to the forecast provided in the *Forecast* treatment) and a risk scenario that highlights the uncertainty in the projection

[1] In a similar vein, theories of rational inattention in macroeconomics posit that agents may rationally choose not to use their limited capacity for information processing for informing themselves about macroeconomic fundamentals like inflation (Maćkowiak and Wiederholt, 2009).

arising due to recent political events. In the *Energy Risk* treatment, we again provide two forecasts, but these forecasts are less informative with respect to inflation as they relate to energy price forecasts. Meanwhile, respondents in the *Control* treatment did not receive any information. Before and after the treatment, respondents were asked about their inflation expectations for the next 12 months and 5 years, using different questions for prior and posterior forecasts. Additionally, respondents were surveyed about their patience and risk preferences. To measure the level of patience, the staircase method of Falk et al. (2018) was used. Risk tolerance is assessed with a survey question on willingness to take financial risks in return for higher expected financial pay-offs (Dohmen et al., 2011). We predict that our treatments will reduce differences in information available to respondents when forming inflation expectations. Thus, if heterogeneity in inflation expectations across preferences is caused by differences in information, we should observe that the treatments reduces this heterogeneity.

The study presents two main contributions: First, we measure the heterogeneity of prior inflation expectations across levels of risk tolerance and patience. Our survey results indicate that risk-averse as well as impatient individuals on average expect significantly higher inflation *a priori*. This finding is robust for both the general population and the expert sample and when controlling for correlations of prior inflation expectations with further socio-demographic characteristics.

The second main contribution concerns the heterogeneity of information treatment effects in the RCT on posterior inflation expectations across risk and time preferences. We can show that information about inflation forecasts closes the gap between inflation forecasts by risk-tolerant and risk-averse or patient and impatient individuals as well as the gap between households and experts in general. Our results suggest that the group, whose prior expectations are farthest from the forecasts shown in the treatment, adjusts more strongly towards the information in the *Forecast* and *Forecast Risk* treatments. The *Energy Risk* treatment, which is not directly applicable to forecasts of overall inflation, does not contribute to closing the gap in observed inflation forecasts.

This paper contributes to a limited body of literature examining the relationship between inflation expectations and economic preferences. The evidence so far suggests that the correlation between risk preferences and inflation expectations is somewhat ambiguous. Goldfayn-Frank and Wohlfahrt (2020) investigate whether risk aversion can explain the observed difference in inflation expectations between East and West German households, but find no significant correlation. Armantier et al. (2015) analyze how risk preferences and inflation expectations of households jointly affect their economic behavior. In an incentivized experiment, the authors demonstrate that risk-averse respondents switch from an inflation-indexed to a safe investment when they perceive higher uncertainty about future inflation. Dräger et al. (2023) analyze consumers' preferences on expected inflation and interest rates and show that a higher degree of risk-aversion correlates with a higher likelihood to prefer lower inflation at a given level of inflation expectations.

Finally, Vinogradov et al. (2024) examine the correlation between ambiguity-aversion as well as risk attitudes and inflation expectations by US households. Their findings indicate that risk-aversion and ambiguity aversion correlate negatively with the reported level of expected inflation.

We further relate to the literature evaluating the link between intertemporal choice and inflation expectations, where the findings generally point in the same direction. Bruine de Bruin et al. (2010) show that US consumers with a short financial planning horizon are more likely to expect inflation rates exceeding 5%. Similarly, Krupka and Stephens (2013) demonstrate that during a phase of rising inflation US consumers exhibit higher hypothetical discount rates.

Our study also adds to a growing body of literature that studies the impact of information treatments about forecasts or forecast uncertainty on the formation of inflation expectations using survey RCT interventions (Armantier et al., 2016; Cavallo et al., 2017; Coibion et al., 2020, 2023; Weber et al., 2023; Dräger et al., 2024; Nghiem et al., 2024). The impact of inflation forecasts on the inflation expectations of households results in a shift of these expectations in the direction of the provided signal (Armantier et al., 2016; Coibion et al., 2023). Cavallo et al. (2017) show that changes in the price of individual food products also result in a corresponding adjustment in households' expectations of overall inflation. Kostyshyna and Petersen (2023) investigate the influence of an inflation forecast with confidence intervals. Kumar et al. (2023) as well as Coibion et al. (2024) examine the effect of uncertainty about different GDP growth forecasts on economic decisions by firms and households. Similarly, Grebe and Tillmann (2022) analyze the influence of dissent in the ECB's Governing Council on household uncertainty.

Finally, our analysis contributes to the literature analyzing differences in inflation forecasts by households and experts. Döpke et al. (2008) analyze how frequently households and experts update their inflation expectations in a sticky information environment. Andre et al. (2022) show that experts and households tend to have different subjective models in mind when forecasting inflation and therefore utilize the same information differently.

The remainder of the paper is organized as follows. Section 2 presents the survey experiment and data, Section 3 presents empirical results analyzing the impacts of macroeconomic uncertainty in information on inflation expectations and on uncertainty about inflation projection, Section 4 presents the results of the re-examination of the previously analyzed results using split samples for time and risk preferences, and Section 5 concludes.

2 Survey Experiment and Data

2.1 Survey Experiment

In January 2023, we conducted two online surveys on a household and an expert sample in parallel and implemented a randomized control trial (RCT) in both. This was during

a time when inflation in Germany was peaking at over 8%. The sample of households is a representative sample of the German population with respect to gender, age, net income and education. The expert sample consists of employees at German banks and insurance companies.[2]

We surveyed both households and experts because the previous literature finds substantial differences in the formation of inflation expectations between these groups: experts typically have more accurate inflation expectations and they have a more fundamental understanding of economic relationships (D'Acunto et al., 2023). The comparison between experts and households thus allows to evaluate heterogeneities in the effect of information on two groups that differ in the initial information level.

The surveys were conducted between 16th January and 3rd February 2023. Household data was collected by the survey company *Bilendi & respondi* and the expert data was collected online via LimeSurvey in collaboration with a sample of German banks and insurance companies. For each questionnaire completed by the experts, we donated 10€ to an NGO; the households were paid a fixed amount by the survey company.

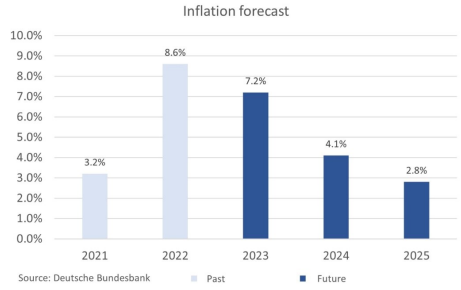
Both groups completed the same questionnaire, except for three questions focusing on households' financial literacy, which were considered too simple for the experts. The questionnaire starts with a series of questions to assess respondents' knowledge of financial markets and monetary policy and their level of optimism. Next, a brief explanation of inflation in general was presented, followed by questions concerning the perceived rate of inflation over the past 12 months, along with respondents' point predictions for the inflation rate over the next 12 months and 5 years. This question measures respondents' prior inflation expectations $\pi^{e,h}_{prior}$ at horizon $h \in [12m, 5y]$ and is phrased as follows:

> What do you expect the inflation or deflation rate in Germany will be over the next 12 months / 5 years?

After answering these questions, respondents were randomly assigned to one of three treatment groups or to the control group. Figure 1 provides an overview of the information provided in each of the treatments.

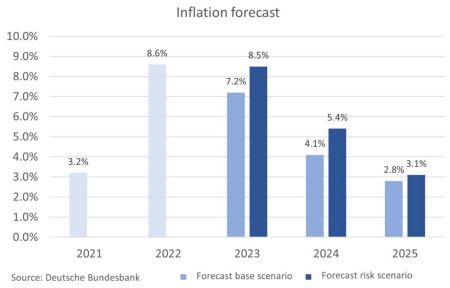
[2] As we aim for a wider degree of variation in beliefs and forecasts also among the expert sample, it excludes professional forecasters.

Figure 1: Treatments



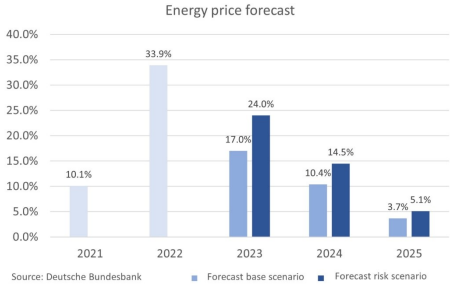
In 2021, the inflation rate in Germany averaged 3.2% and in 2022 8.6%. The Deutsche Bundesbank expects average inflation rates in Germany of 7.2%, 4.1% and 2.8% for 2023, 2024 and 2025 respectively.

(a) Treatment 1: *Forecast*



In 2021, the inflation rate in Germany averaged 3.2% and in 2022 8.6%. The Deutsche Bundesbank expects average inflation rates in Germany of 7.2%, 4.1% and 2.8% for 2023, 2024 and 2025 respectively.
The Bundesbank emphasizes the high level of uncertainty in forecasting inflation rates due to the war in Ukraine. In a risk scenario in which a sharper conflict with Russia and stronger geopolitical tensions are assumed, the expected average inflation for Germany for 2023, 2024 and 2025 rises to 8.5%, 5.4% and 3.1%.

(b) Treatment 2: *Forecast Risk*



In 2021, energy prices in Germany increased by an average of 10.1% and by 33.9% in 2022. The Bundesbank expects energy prices in Germany to rise by an average of 17%, 10.4% and 3.7% in 2023, 2024 and 2025 respectively.
The Bundesbank emphasizes the high level of uncertainty in forecasting energy prices due to the war in Ukraine. In a risk scenario in which a sharper conflict with Russia and stronger geopolitical tensions are assumed, the expected average energy prices for Germany for 2023, 2024 and 2025 rise to 24%, 14.5% and 5.1%, respectively.

(c) Treatment 3: *Energy Risk*

The *Forecast* treatment shows inflation forecasts from the Bundesbank. The *Forecast Risk* treatment extends the *Forecast* treatment by adding a higher risk scenario for future inflation, allowing us to evaluate the marginal impact of the risk scenario. In contrast to the previous two treatments, the *Energy Risk* treatment shows energy price forecasts, which are not directly informative for inflation forecasts and experienced above-average price increases at the time of the survey experiment. By design, respondents would see this information for at least 10 seconds. Respondents in the control group did not receive any information, and proceeded directly to the next set of questions.

It was revealed in all treatments that the Bundesbank was the source of the forecasts and all forecasts covered the three-year time period from 2023-2025. In addition, all treatments showed past actual inflation or energy price growth rates for 2021 and 2022. When the forecast contains a risk scenario, the colors of the scenarios in the graph were randomly assigned with a 50% probability to prevent color bias.

After the RCT, we asked respondents about their short- and long-term expected inflation rates again (Haaland et al., 2023). To prevent duplicate questioning and survey fatigue, we elicit posterior inflation expectations using a probability question instead of the point forecasts used to measure prior expectations. In particular, we ask about respondents' minimum and maximum expected inflation rates, as well as their confidence level regarding these expectations. The two questions are as follows:

> We are interested in your opinion on the development of the inflation rate in the next 12 months / 5 years. In your opinion, what will be the minimum and maximum inflation or deflation rate in the next 12 months / 5 years?
>
> How confident are you that the average inflation rate over the next 12 months / 5 years will exceed the mean value of the minimum and maximum expectations?

Respondents were asked to rate their level of confidence on a scale from 0 to 10, where 0 represents complete lack of confidence and 10 represents complete confidence. We compute the first and second moments of the expected inflation rates by taking into account their minimum and maximum expectations, their reported level of confidence, and assuming a simple triangular distribution.

Subsequently, we elicit respondents' time preference using the staircase method following Falk et al. (2018) over different time horizons. In this task, respondents had to make five intertemporal choices for each time horizon in a hypothetical scenario, choosing between receiving 100€ today or a larger payment in 12 months or 5 years, respectively. For each time horizon, we separately asked the respondents the following question:[3]

> Suppose you were given the choice between receiving a payment today or a payment in 12 months / 5 years. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months / 5 years is different in every situation. For each of these situations, we would like to know which one you would choose. Please consider the following: Would you rather receive amount 100€ today or X€ in 12 months / 5 years?

The appendix displays the staircase method with the exact later payment amounts for each time horizon in Figures A5 and A6. This intertemporal choice task allows us to assign a patience level to each respondent and time horizon, ranging from 0 (completely impatient) to 32 (completely patient). When splitting the samples into patient and impatient individuals, we categorize respondents in the upper third of the distribution of the continuous patience measure as patient and those in the lower third as impatient.

Finally, we elicit respondents' financial risk preference following the validated procedure of Dohmen et al. (2011):

[3]Note that respondents were explicitly asked to ignore any effects from inflation when answering the questions about intertemporal choices.

> In the following question, we ask you to assess your willingness to take financial risk. A value of 0 means that you are willing to take a low financial risk, typically associated with a lower return, and a value of 10 means that you are willing to take a high financial risk, typically associated with a high return. Where would you place yourself on the following scale?

Respondents can express their financial risk-tolerance on a 11-point Likert scale. We use the same approach as before and categorize respondents in the upper third of the distribution of the continuous measure as risk-tolerant, and those in the lower third as risk-averse.

The questionnaire ends with some demographic questions. The complete questionnaire is provided in Appendix B.

2.2 Summary Statistics

Our data set includes 3,266 households and 663 experts. The average time taken to complete the survey was 13 minutes for households and 17 minutes for experts. Similarly, there are differences in the average time spent on the treatment page between the samples. Respondents in the *Forecast* treatment from both samples spent the same average time on the page. However, experts spent around 20 seconds longer on the page compared to households if they were in the *Forecast Risk* or *Energy Risk* treatments. On average, households had a dropout rate of 25% and experts had a dropout rate of 23%.

In order to avoid bias because of speeding, we exclude respondents from both samples who completed the questionnaire within 5 minutes. In line with the literature, we further account for outliers in both prior and posterior inflation expectations by truncating in the range $-5\% \leq \pi \leq 25\%$ and by estimating weights from Huber (1964) robust regressions to endogenously identify further outliers.

Throughout the regression analysis, we control for socio-demographic characteristics, such as age, gender, net income and education. Table A1 in the appendix details how the control variables are constructed. Table A2 in the appendix provides summary statistics of the control variables in the two samples and indicates differences and similarities between the household and expert samples. Tables A3-A4 show balance tests for the means of socio-demographic control variables across treatment groups for the household and the expert sample, respectively. While the age and gender distributions are comparable between the household and the expert sample, not surprisingly, experts report significantly higher income and education than households in the representative sample. Within survey samples, the randomization across treatment groups works well with respect to socio-demographic characteristics. For both samples, we achieved a relatively balanced sample with similar sample sizes in all treatments. Moreover, the treatment groups in the household sample do not differ significantly with the control group according to any of the socio-demographic characteristics. This is also true to a large extent

in the expert sample, where we only find some variation according to age between the *Energy Risk* treatment and the control group and according to the share in the lowest education group between the *Forecast* as well as the *Energy Risk* treatment and the control group, respectively. The lowest education group contains workers at banks and insurance companies that are still in training, but is relatively small and our results are robust to controlling for the fraction of individuals in this group.

Finally, Table A5 in the appendix shows summary statistics for prior inflation expectations, risk-tolerance as well as measures of patience across a 12-months and 5-years horizon in both samples. In line with the literature (Armantier et al., 2013; D'Acunto et al., 2024), households expect significantly higher inflation than experts both for the next 12 months, and the next 5 years. At the same time, the standard deviation of inflation forecasts is much lower in the expert sample, suggesting less disagreement on future inflation among experts. Households' stated risk and time preferences do not differ significantly between the treatment groups and the control group. This is largely also true in the expert sample, with the exception of short-run patience in the *Forecast* treatment and long-run patience in the *Energy Risk* treatment. Comparing the two samples shows that experts express a significantly higher financial risk tolerance as well as significantly higher levels of patience than households.

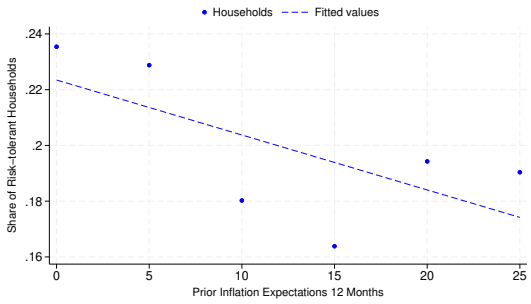
How do prior inflation expectations co-vary with economic preferences across household and experts? Figures 2 and 3 depict the shares of risk-tolerant and patient households and experts across grouped means of prior short- and long-run inflation expectations. Both correlations are negative, implying that households and experts systematically expect higher inflation *a priori* if they classify themselves as relatively risk-averse or impatient. In order to test this more formally, Table A6 in the appendix shows results for Huber (1964) robust regressions on prior inflation expectations:

$$\pi^{e,h}_{j,prior} = \alpha + \beta preference_j + \zeta X_j + \epsilon_j, \tag{1}$$

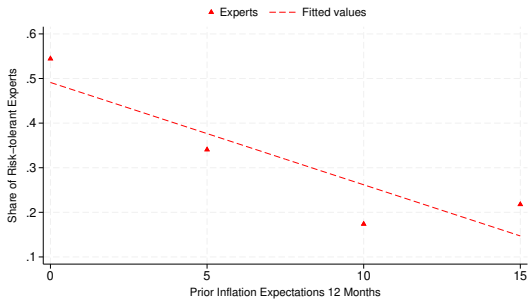
where $\pi^{e,h}_{j,prior}$ denotes prior inflation expectations at horizon $h \in [12m, 5y]$ of individual j, $preference_j$ is a continuous measure of either risk-tolerance or patience and X_j is a vector of socio-demographic control variables including age, gender, net income and education. The systematic differences in prior expectations across risk and time preferences are statistically significant for both households and experts even when controlling for variation in inflation expectations across socio-demographic variables.[4] This is our first main result.

[4]Note that the negative correlation between long-run inflation expectations by experts and the measure of patience marginally misses significance at the 10% level.

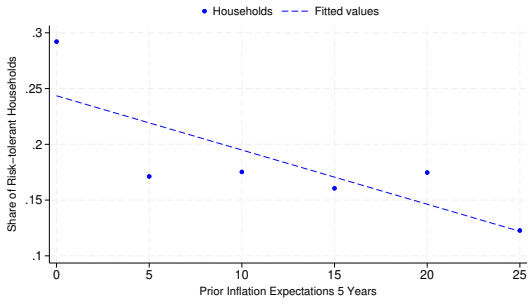
Figure 2: Shares of Risk-Tolerant Households and Experts Across Prior Inflation Expectations



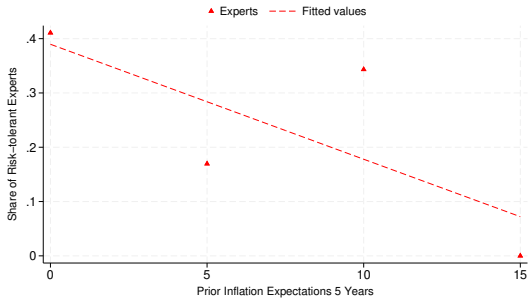
(a) Households' Short-Run Expectations



(b) Experts' Short-Run Expectations



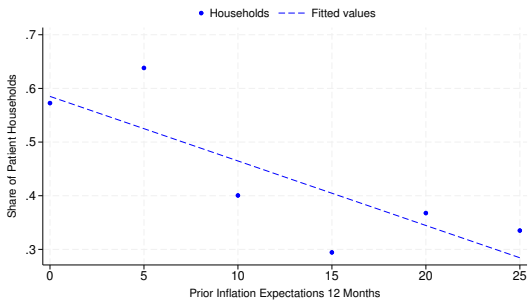
(c) Households' Long-Run Expectations



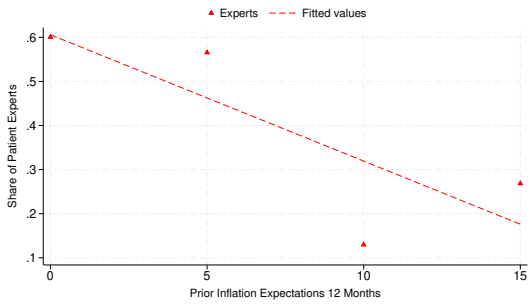
(d) Experts' Long-Run Expectations

Note: Prior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$ and classified in intervals of 5 for a better visualization. Households are classified as risk-tolerant with risk preferences > 5 and experts with risk preferences > 6. The x-axis represents mean grouped values of inflation expectations over intervals of 5 percentage points, while the y-axis depicts the share of risk-tolerant households and experts. We use Huber weights from the regressions in Table A7.

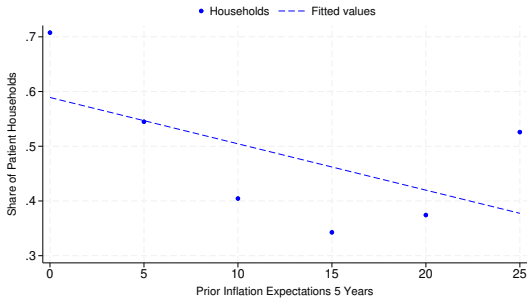
Figure 3: Shares of Patient Households and Experts Across Prior Inflation Expectations



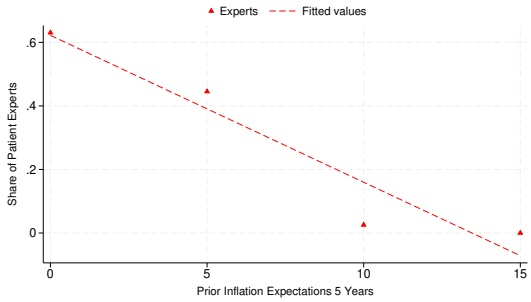
(a) Households' Short-Run Expectations



(b) Experts' Short-Run Expectations



(c) Households' Long-Run Expectations



(d) Experts' Long-Run Expectations

Note: Prior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$ and classified in intervals of 5 for a better visualization. Households are classified as patient with time preference > 27 in the 12-month time horizon and with time preference of > 26 in the 5-year time horizon. Experts are classified as patient with time preference of > 29 in the 12-month time horizon and with time preference of > 29 in the 5-year time horizon. The x-axis represents mean grouped values of inflation expectations over intervals of 5 percentage points, while the y-axis depicts the share of patient households and experts. We use Huber weights from the regressions in Table A7.

3 Causal Effects of Information Treatments on Inflation Expectations

This section evaluates the overall effects of the provided information treatments on households' and experts' posterior short- and long-run inflation expectations. Since posterior expectations were measured using probabilistic questions, we further analyze treatment effects on individual posterior forecast uncertainty, measured as the standard deviation of the triangular distribution over posterior minimum and maximum expected inflation. All regressions use weights from Huber (1964) robust regressions to endogenously account for outliers in inflation expectations.

We start by evaluating summary statistics for prior and posterior inflation expectations of experts and households across the treatment groups, shown in Table 1. Reassuringly, prior short- and long-run inflation expectations do not differ significantly between treatment groups and the control group in either sample. As expected, posterior expectations do not change much in the control groups, which did not receive any information.[5] In the household sample, posterior short- and long-run expectations differ significantly from the control group, with the exception of posterior long-run expectations in the *Energy Risk* treatment. With respect to prior expectations, households give lower posterior forecasts for both horizons in the *Forecast* and the *Forecast Risk* treatments, while they give higher forecasts in the *Energy Risk* treatment. These adjustments are plausible, since prior expectations by households are, on average, above the inflation forecasts shown in the first two treatments, but below the energy price forecasts shown in the third treatment.

Posterior inflation expectations by experts in the treatment groups are largely not significantly different from those in the control group, implying that treatment effects are often insignificant. It seems that the information was not new for experts and does thus not have an impact on their forecasts. This interpretation seems plausible given that experts' prior expectations were relatively close to the Bundesbank forecasts, particularly in the 12-months horizon (see Table A5). Comparing the means in posterior short- and long-run expectations between the samples suggests that the information treatments caused households' forecasts to align more closely with experts' forecasts in the *Forecast* treatment and, to a lesser extent, the *Forecast Risk* treatment, while this is not the case in the *Energy Risk* treatment. Regressions on a joint sample with an expert dummy variable show that, controlling for differences in treatment effects between households and experts, updates in posterior long-run expectations as well as short- and long-run forecast uncertainty are not significantly different (see Tables A8 and A10 in the appendix).

[5] We might still see significant changes in posterior expectations also in the control group, as posterior expectations were measured using a different question type.

Table 1: Prior and Posterior Inflation Expectations of Households and Experts

		Households					T-Test	Experts					T-Test
		Mean	SD	Min	Max	N	P-Value	Mean	SD	Min	Max	N	P-Value
$\pi^{e,12m}_{prior}$	Forecast	8.34	3.97	1	25	677	0.20	6.82	1.77	3.5	13	157	0.43
	Forecast Risk	8.14	3.50	1	25	678	0.74	6.97	2.06	3.5	15	142	0.17
	Energy Risk	8.09	3.48	0.1	24	662	0.96	6.81	1.81	4	15	137	0.49
	Control	8.08	3.55	1	25	665	-	6.66	1.80	4	15	153	-
$\pi^{e,12m}_{post}$	Forecast	7.05	2.18	0.99	18.5	677	0.00	7.02	1.68	3	14	157	0.87
	Forecast Risk	7.19	2.05	0.1	18	678	0.00	7.37	1.85	3.2	14.2	142	0.17
	Energy Risk	8.56	3.39	0.7	25	662	0.01	7.62	2.20	3.2	17	137	0.03
	Control	8.06	3.39	0.6	23.5	665	-	7.06	2.07	3	17.6	153	-
$\pi^{e,5y}_{prior}$	Forecast	6.32	3.92	0.6	25	649	0.42	4.60	1.96	2.5	15	147	0.63
	Forecast Risk	6.84	4.27	0.5	25	661	0.16	4.54	2.10	2.4	17	136	0.83
	Energy Risk	6.63	4.33	1	25	655	0.62	4.25	1.79	2.3	13	128	0.32
	Control	6.51	4.31	1	25	643	-	4.48	2.10	2.4	18	144	-
$\pi^{e,5y}_{post}$	Forecast	5.27	2.27	-0.5	16.7	649	0.00	4.88	1.71	1	11.7	147	0.58
	Forecast Risk	5.44	2.24	-0.2	18	661	0.00	4.78	1.90	1.31	14	136	0.36
	Energy Risk	7.12	3.95	-0.4	25	655	0.12	5.04	2.04	1	13.3	128	0.91
	Control	6.78	3.87	0	24.5	643	-	5.01	2.37	1	18	144	-

Note: Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We use Huber weights from the regressions in Table A7. We run t-tests between each treatment group and the control group. * p<.10, ** p<.05, *** p<.01

Next, we estimate average treatment effects on updates in posterior inflation expectations, accounting for socio-demographic control variables:[6]

$$\pi^{e,h}_{j,post} - \pi^{e,h}_{j,prior} = \alpha + \sum_{i=1}^{3} \eta_i treatment_{j,i} + \zeta X_j + \epsilon_j, \tag{2}$$

where $\pi^{e,h}_{j,post} - \pi^{e,h}_{j,prior}$ denotes updates in posterior expectations at horizon $h \in [12m, 5y]$ of individual j, the coefficients η_i measure the average treatment effects and X_j is again a vector of socio-demographic control variables including age, gender, net income and education. The results are presented in Table 2. We find that households lower their posterior short- and long-run expectations significantly more compared to the control group when subjected to information containing inflation forecasts. This adjustment is economically large by about 1-2 percentage points. Interestingly, the treatment effects do not differ significantly between the *Forecast* and the *Forecast Risk* treatments. However, the *Forecast Risk* treatment has a significantly larger impact on long-run expectations compared to expectations in the short run. In contrast to the two inflation forecast treatments, households significantly increase their short- and long-run expectations by about 20-50 basis points when subjected to information about high energy price forecasts in the *Energy Risk* treatment. Even though the effect is not as large, it suggests that households extrapolate from energy prices to overall inflation to some extent.

In line with the results from Table 1 and from the Bayesian updating model shown in Table A7 and Figure A1 in the appendix, experts adjust their posterior expectations much less to the treatments compared to households. While the increase in expectations in response to the *Energy Risk* treatment is comparable across the two samples, the reduction in posterior expectations due to the inflation forecast treatments is only significant for experts' long-run expectations and much smaller at around 27 basis points. Lower treatment effects on experts' posterior expectations seem plausible given that their prior forecasts were much closer to the Bundesbank forecasts.

Finally, we estimate treatment effects on the uncertainty in individuals' posterior inflation forecasts, estimating the following regression:

$$\sigma^{\pi^e,h}_{j,post} = \alpha + \sum_{i=1}^{3} \eta_i treatment_{j,i} + \gamma_0 \pi^{e,h}_{j,prior} + \zeta X_j + \epsilon_j, \tag{3}$$

where $\sigma^{\pi^e,h}_{j,post}$ denotes the individual posterior inflation forecast uncertainty at horizon $h \in [12m, 5y]$. As in equation (2), we control for prior expectations and socio-demographic controls.

[6] We further estimate Bayesian updating models that account for updates towards the signals in the information treatment relative to the level of prior expectations. The results are shown and discussed in Appendix A.2. Relative to individuals' priors, we observe stronger updates in the household sample, particularly towards information in the *Forecast* and *Forecast Risk* treatments.

Table 2: Treatment Effects on Updates in Inflation Expectations

	Households		Experts	
	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Forecast	-1.279***	-1.325***	-0.162	-0.265*
	[-1.568,-0.989]	[-1.597,-1.053]	[-0.428,0.104]	[-0.542,0.013]
Forecast Risk	-0.933***	-1.660***	0.047	-0.275*
	[-1.193,-0.673]	[-1.955,-1.365]	[-0.240,0.333]	[-0.563,0.013]
Energy Risk	0.474***	0.202*	0.439***	0.243*
	[0.266,0.682]	[-0.012,0.417]	[0.154,0.724]	[-0.044,0.529]
Constant	-0.255	-0.209	0.499	0.042
	[-0.766,0.256]	[-0.787,0.369]	[-0.215,1.214]	[-0.811,0.895]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	589	555
Adj. R^2	0.083	0.120	0.031	0.039

Note: Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A9 in the appendix presents the estimation results for equation (3). The *Forecast* treatment is particularly effective for reducing posterior forecast uncertainty across all horizons for both households and experts. While the reduction in forecast uncertainty is similar in the *Forecast Risk* treatment in the household sample, this is not the case for experts' short-run expectations. This suggests, in line with the previous evidence, that households disregarded the risk scenario for future inflation. In the expert sample, forecast uncertainty in the long run, when the risk scenario converges to the baseline scenario, is similarly reduced as in the *Forecast* treatment, while there is no significant effect in the short run. Finally, the *Energy Risk* treatment increases short-run forecast uncertainty for households, but not for experts.

4 Inflation Expectations Heterogeneity by Economic Preferences

After evaluating information treatment effects in the overall samples, we next investigate the heterogeneity in treatment effects with respect to economic preferences. In particular, we split the samples according to financial risk-tolerance and to levels of patience to test whether these preferences influence the information processing of different types of forecasts for the formation of inflation expectations and the underlying forecast uncertainty.

4.1 Heterogeneity by Risk Preferences

First, we evaluate heterogeneity in treatment effects with respect to agents' financial risk tolerance. Table 3 shows summary statistics of prior and posterior inflation expecta-

tions across treatments between the risk-tolerant and risk-averse parts of both samples. Comparing posterior forecasts between risk-tolerant and risk-averse households across treatments demonstrates that information about inflation forecasts is able to close the expectations gap. Risk-averse households tend to adjust their posterior expectations more strongly across all information treatment groups. This is plausible, since the risk-averse households' prior forecasts were further above the forecasts shown in the inflation treatments.[7]

In the expert sample, the summary statistics suggest that the gap between short-run expectations by risk-tolerant and risk-averse experts is closed in the *Forecast Risk* and the *Energy Risk* treatment groups. Interestingly and in contrast to the result for households, here we find a stronger adjustment in the forecasts by risk-tolerant experts. This is plausible, however, because unlike households, risk-tolerant experts' prior short-run expectations were lower than either the baseline or the risk forecast shown in the *Forecast Risk* treatment, whereas forecasts by the risk-averse group were relatively close to the baseline scenario. Finally, the information treatments cannot close the gap between expectations of risk-tolerant and risk-averse experts when it comes to long-run expectations. This seems plausible, since the information given did not cover the five-year horizon. Overall, the summary statistics in Table 3 imply that information about price forecasts can close the gap between forecasts by risk-tolerant and risk-averse individuals.

To test this formally, Table 4 presents estimation results for equation (2) estimated separately for the risk-tolerant and risk-averse sub-samples. These regressions control for potential effects of question type on forecasts across risk preferences, as all coefficients are estimated relative to the control group. Risk-averse households are estimated to lower both short- and long-run expectations more strongly in the *Forecast* and *Forecast Risk* treatments. Risk-tolerant experts increase their short-run expectations significantly in the *Forecast Risk* treatment, whereas the treatment effect on risk-averse experts is insignificant. Moreover, risk-averse households increase their short-run expectations significantly in the *Energy Risk* treatment, whereas the effect is insignificant for the risk-tolerant households. Overall, these results reinforce those in Table 3 and suggest that information about inflation forecasts can lead to different adjustments in posterior inflation forecasts across risk preferences relative to a control group without information. Nonetheless, the results need to be taken with a grain of salt, since the treatment effects' confidence bands can overlap between the risk-tolerant and the risk-averse samples. As shown in Table A11 in the appendix, the difference in adjustments of posterior expectations across risk preferences, using a continuous measure for willingness to take risk, is significant in the case of the *Energy Risk* treatment for households' short-run expectations, the *Forecast* treatment for households' long-run expectations and the *Forecast Risk* treatment for experts'

[7]Note that posterior expectations by risk-tolerant and risk-averse households align also in the control group, potentially due to the different question type for posterior expectations. However, we account for this in the regression analysis presented below in Table 4, which estimates diff-in-diff treatment effects relative to the control group.

short-run expectations. Moreover, Table A12 in the appendix presents triple interaction effects with risk-tolerance as well as a dummy for the expert sample. None of the triple interactions are significant, except in the *Forecast* treatment on long-run expectations. This suggests that differences in treatment effects across risk preferences did not vary much between households and experts.

Tables A13-A16 in the appendix re-estimate the Bayesian updating model and the forecast uncertainty model across risk preferences and forecast horizons. In line with the results discussed above, risk-averse households adjust somewhat more strongly towards the inflation forecast information treatments regarding their short-run expectations. Tables A15-A16 in the appendix also show some variation in forecast uncertainty across risk preferences: The *Forecast* treatment reduces short-run forecast uncertainty significantly only for risk-averse households and risk-tolerant experts, i.e. the groups whose prior forecasts were further from the Bundesbank forecast. Moreover, the *Energy Risk* treatment increases posterior forecast uncertainty significantly more strongly for both risk-averse households and experts. This implies that the high energy price forecasts and the included risk scenario resonated more strongly with the risk-averse parts of the samples.

Table 3: Prior and Posterior Inflation Expectations of Risk-Tolerant and Risk-Averse Households and Experts

		Households							Experts						
		Risk-tolerant			Risk-averse			T-Test	Risk-tolerant			Risk-averse			T-Test
		Mean	SD	N	Mean	SD	N	P-Value	Mean	SD	N	Mean	SD	N	P-Value
$\pi^{e,12m}_{prior}$	Forecast	7.94	3.78	148	9.26	4.34	175	0.00	6.41	1.59	49	7.41	1.92	62	0.00
	Forecast Risk	7.75	3.23	144	8.64	3.50	166	0.02	6.32	1.73	51	7.68	2.32	46	0.00
	Energy Risk	7.56	3.36	144	8.69	3.54	170	0.00	6.52	1.84	48	7.53	2.51	29	0.05
	Control	7.74	3.88	135	8.64	3.63	161	0.04	6.27	1.36	48	7.10	2.20	43	0.03
$\pi^{e,12m}_{post}$	Forecast	7.19	2.12	148	7.07	2.38	175	0.62	6.74	1.52	49	7.40	1.73	62	0.04
	Forecast Risk	7.24	1.94	144	7.22	2.35	166	0.91	7.20	1.69	51	7.59	2.21	46	0.34
	Energy Risk	8.31	3.35	144	8.76	3.63	170	0.26	7.40	2.10	48	8.29	2.85	29	0.12
	Control	8.21	3.77	135	8.20	3.69	161	0.98	6.72	1.70	48	7.44	2.34	43	0.09
$\pi^{e,5y}_{prior}$	Forecast	5.61	3.63	135	7.07	4.28	163	0.00	3.95	1.18	42	5.35	2.48	60	0.00
	Forecast Risk	6.34	4.04	139	7.42	4.17	160	0.02	4.03	1.58	47	5.03	2.24	42	0.02
	Energy Risk	5.63	3.66	136	7.55	4.56	170	0.00	3.81	1.68	44	5.19	2.67	28	0.01
	Control	5.88	4.49	131	6.92	4.20	152	0.05	3.94	1.22	43	5.14	2.88	39	0.01
$\pi^{e,5y}_{post}$	Forecast	5.44	2.12	135	5.22	2.50	163	0.42	4.15	1.33	42	5.59	1.89	60	0.00
	Forecast Risk	5.43	2.15	139	5.50	2.52	160	0.81	4.26	1.52	47	5.14	2.05	42	0.02
	Energy Risk	6.37	3.83	136	7.71	4.10	170	0.00	4.61	1.84	44	5.78	2.54	28	0.03
	Control	6.53	4.11	131	6.77	3.94	152	0.61	4.42	1.70	43	5.56	3.09	39	0.04

Note: Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We use Huber weights from the regressions in Table A7. Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. We run t-tests between the prior and posterior inflation expectations of risk-tolerant and risk-averse households and experts for each treatment and control group. * p<.10, ** p<.05, *** p<.01

Table 4: Treatment Effects on Updates in Inflation Expectations Across Risk Preferences

	Households				Experts			
	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Forecast	-1.256***	-1.702***	-0.869***	-1.706***	-0.085	-0.427	-0.333	-0.201
	[-1.856,-0.656]	[-2.346,-1.058]	[-1.496,-0.243]	[-2.346,-1.066]	[-0.611,0.440]	[-0.987,0.132]	[-0.882,0.217]	[-0.792,0.391]
Forecast Risk	-0.929***	-0.888***	-1.439***	-1.699***	0.476*	-0.447	-0.282	-0.243
	[-1.532,-0.325]	[-1.541,-0.236]	[-2.064,-0.814]	[-2.346,-1.052]	[-0.045,0.996]	[-1.057,0.164]	[-0.806,0.243]	[-0.888,0.402]
Energy Risk	0.254	0.649*	0.065	0.388	0.419	0.312	0.257	0.043
	[-0.356,0.864]	[-0.004,1.301]	[-0.571,0.700]	[-0.254,1.030]	[-0.113,0.952]	[-0.364,0.988]	[-0.281,0.795]	[-0.664,0.749]
Constant	-0.979	0.040	-0.888	-0.397	0.393	1.388	0.349	-1.096
	[-2.181,0.223]	[-0.958,1.038]	[-2.194,0.418]	[-1.388,0.595]	[-0.729,1.515]	[-0.346,3.122]	[-0.856,1.553]	[-2.958,0.765]
Split Sample	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse
Demographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	571	672	541	645	196	180	176	169
Adj. R^2	0.072	0.097	0.089	0.134	0.035	0.062	0.016	0.028

Note: Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

4.2 Heterogeneity by Time Preferences

Next, we evaluate the heterogeneity in treatment effects across levels of patience measured using the staircase method by Falk et al. (2018) for the 12-months and 5-years horizon. Table 5 presents the summary statistics of prior and posterior expectations across treatment groups for patient and impatient respondents. Posterior expectations by patient and impatient households become more aligned in the two inflation forecast treatments via stronger updates in impatient households' expectations, but the difference becomes insignificant only in the case of short-run expectations in the *Forecast* treatment group. In the expert sample, we find that patient experts in the *Forecast Risk* treatment, who give prior short-run expectations below the Bundesbank forecast, adjust more strongly to this information, thus closing the gap between the patient and impatient group. This is in line with our results regarding risk preferences, suggesting that the positive correlation between risk and time preferences observed in other studies might extend to the way these characteristics co-vary with inflation expectations.[8]

Table 6 presents estimates of average treatment effects on updates in posterior inflation expectations with sample splits according to the level of patience. In line with our results for heterogeneity with respect to risk preferences, impatient households lower their short- and long-run expectations more in the *Forecast* and *Forecast Risk* treatments. The difference in treatment effects is significant, using a continuous measure for patience, for short-run expectations in both treatments and long-run expectations in the *Forecast Risk* treatment, see Table A17 in the appendix. In addition, impatient households increase their long-run forecasts significantly compared to the control group, while this treatment effect is not significant for patient households. In the case of experts, we find that treatment effects tend to be significant either for patient or impatient experts. Patient experts, whose prior was below either Bundesbank forecast scenario, increase their posterior short-run expectations significantly in the *Forecast Risk* treatment, whereas we observe a negative treatment effect on impatient experts' long-run posterior expectations. Similar to our results for households, the increase in short-run forecasts in the *Energy Risk* treatment is significant only for impatient experts. This difference is also significant in Table A17. Table A18 in the appendix presents results with triple interaction effects between treatment dummies, patience and a dummy for the expert sample. None of the triple interactions are significant for updates in long-run expectations, but for short-run expectations we find that patient experts adjust differently to the *Forecast* and *Energy Risk* treatments.

Finally, Tables A19-A22 in the appendix re-estimate the Bayesian updating model and the forecast uncertainty model across levels of patience and forecast horizons. In line with the results in Table 6, impatient households update somewhat more strongly, albeit

[8] The correlation coefficients between the measure of financial risk willingness and time preferences over 12 months and 5 years are 0.19 and 0.17 for experts, while these correlation coefficients are significantly lower for households, both at 0.09. All correlations are significant at the 1% level.

with insignificant differences, towards the information in the *Forecast* and *Forecast Risk* treatments, while patient experts update more strongly towards the *Forecast* treatment in their short-run expectations. Finally, differences in treatment effects between the patient and impatient samples on forecast uncertainty are generally not significant.

Overall, the results in this section show that heterogeneity with respect to both risk-tolerance and patience matters for the incorporation of information into inflation expectations, where this is true for both households and experts. The information shown in the treatments may close the gap between prior inflation expectations across risk and time preference groups, particularly if it directly relates to forecasts of overall inflation like in the *Forecast* and *Forecast Risk* treatments. For these treatments, information effects are particularly strong for the groups, whose prior expectations are farthest from the inflation forecasts shown. The information in the *Energy Risk* treatment seems to resonate more strongly with risk-averse or impatient groups. Since this information is not directly applicable to forecasting overall inflation and could emphasize risk and uncertainty regarding future inflation, it seems to affect more strongly the expectation formation by the more cautious groups with higher prior inflation expectations. This is our second main result.

Table 5: Prior and Posterior Inflation Expectations of Patient and Impatient Households and Experts

		Households							Experts						
		Patient			Impatient			T-Test	Patient			Impatient			T-Test
		Mean	SD	N	Mean	SD	N	P-Value	Mean	SD	N	Mean	SD	N	P-Value
$\pi^{e,12m}_{prior}$	Forecast	7.74	3.43	249	9.42	4.61	178	0.00	6.49	1.45	66	6.89	2.07	38	0.25
	Forecast Risk	7.34	2.91	238	8.89	3.94	190	0.00	6.28	1.37	42	7.50	2.08	40	0.00
	Energy Risk	7.33	2.96	224	9.11	3.91	201	0.00	6.40	1.24	49	7.47	2.48	39	0.01
	Control	7.31	2.72	236	8.67	3.88	207	0.00	6.56	1.82	33	6.67	2.03	57	0.78
$\pi^{e,12m}_{post}$	Forecast	6.90	2.07	249	7.18	2.39	178	0.19	6.76	1.51	66	6.99	1.68	38	0.48
	Forecast Risk	6.82	1.79	238	7.48	2.38	190	0.00	7.06	1.62	42	7.56	1.88	40	0.20
	Energy Risk	7.84	2.84	224	9.41	3.77	201	0.00	6.99	1.70	49	8.46	2.70	39	0.00
	Control	7.30	2.69	236	8.57	3.71	207	0.00	6.91	2.15	33	6.96	2.15	57	0.92
$\pi^{e,5y}_{prior}$	Forecast	5.71	3.45	210	7.01	3.86	162	0.00	4.29	1.34	55	4.53	1.65	39	0.45
	Forecast Risk	5.76	2.93	216	7.91	4.64	173	0.00	3.93	1.33	46	5.06	2.29	38	0.01
	Energy Risk	5.99	4.19	213	7.18	4.19	183	0.01	3.79	0.99	47	5.18	2.84	29	0.00
	Control	5.68	3.68	220	7.49	4.75	178	0.00	4.01	1.26	34	5.10	2.87	50	0.04
$\pi^{e,5y}_{post}$	Forecast	5.05	2.05	210	5.51	2.39	162	0.05	4.48	1.39	55	5.04	1.66	39	0.07
	Forecast Risk	5.03	2.00	216	5.94	2.43	173	0.00	4.24	1.53	46	5.15	2.11	38	0.02
	Energy Risk	6.59	3.87	213	7.68	3.95	183	0.01	4.34	1.57	47	5.97	2.47	29	0.00
	Control	6.01	3.45	220	7.61	4.16	178	0.00	4.33	1.45	34	5.74	2.97	50	0.01

Note: Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. Patient households have a time preference of > 27 in the 12-month time horizon and impatient households have a time preference of < 15 in 12 months. Patient experts have a time preference of > 29 in the 12-month time horizon and impatient experts have a time preference of < 25 in 12 months. Patient households have a time preference of > 26 in the 5-year time horizon and impatient households have a time preference of < 20 in 5 years. Patient experts have a time preference of > 29 in the 5-year time horizon and impatient experts have a time preference of < 24 in 5 years. We use Huber weights from the regressions in Table A7. We run t-tests between the prior and posterior inflation expectations of risk-tolerant and risk-averse households and experts for each treatment and control group. * p<.10, ** p<.05, *** p<.01

Table 6: Treatment Effects on Updates in Inflation Expectations Across Levels of Patience

	Households				Experts			
	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Forecast	-0.964***	-2.056***	-1.021***	-1.578***	-0.023	-0.111	-0.118	-0.165
	[-1.372,-0.557]	[-2.706,-1.407]	[-1.440,-0.602]	[-2.179,-0.976]	[-0.481,0.436]	[-0.692,0.469]	[-0.512,0.275]	[-0.736,0.405]
Forecast Risk	-0.576***	-1.275***	-1.054***	-2.082***	0.417*	-0.056	0.002	-0.592**
	[-0.947,-0.205]	[-1.828,-0.722]	[-1.441,-0.666]	[-2.730,-1.434]	[-0.074,0.908]	[-0.565,0.454]	[-0.430,0.435]	[-1.168,-0.016]
Energy Risk	0.452***	0.430**	0.210	0.363*	0.268	0.752***	0.277	0.118
	[0.131,0.772]	[0.024,0.836]	[-0.131,0.550]	[-0.068,0.794]	[-0.237,0.773]	[0.214,1.291]	[-0.180,0.733]	[-0.579,0.816]
Constant	-0.660	-0.103	-0.233	-0.512	-0.965	0.037	1.019	0.328
	[-1.524,0.203]	[-1.066,0.859]	[-1.110,0.645]	[-1.633,0.609]	[-2.615,0.684]	[-0.902,0.976]	[-1.174,3.213]	[-0.837,1.493]
Split Sample	Patient	Impatient	Patient	Impatient	Patient	Impatient	Patient	Impatient
Demographic Controls	✓	✓	✓	✓	✓	✓	✓	✓
Observations	947	776	859	696	190	174	182	156
Adj. R^2	0.094	0.095	0.113	0.125	0.016	0.062	0.031	-0.008

Note: Patient households have a time preference of > 27 in the 12-month time horizon and impatient households have a time preference of < 15 in 12 months. Patient experts have a time preference of > 29 in the 12-month time horizon and impatient experts have a time preference of < 25 in 12 months. Patient households have a time preference of > 26 in the 5-year time horizon and impatient households have a time preference of < 20 in 5 years. Patient experts have a time preference of > 29 in the 5-year time horizon and impatient experts have a time preference of < 24 in 5 years. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

5 Conclusion

This study contributes to the analysis of heterogeneity in inflation expectations, focusing on the role of risk and time preferences. We analyze this research question in two German samples: A representative household sample and a sample of experts working at banks and insurance companies, which were subjected to the same online survey in January 2023. Within the survey, we include a randomized control trial (RCT), where respondents were randomly allocated into three treatment groups and one control group. All treatments show past price changes for 2021-2022 as well as Bundesbank forecasts for 2023, 2024 and 2025. The *Forecast* treatment shows forecasts for overall inflation, the *Forecast Risk* treatment extends the baseline forecasts with a risk scenario related to higher energy price increases. Finally, the *Energy Risk* treatment shows both the baseline and the risk scenario for projected energy price changes.

Our results can be summarized into two main findings: First, prior inflation expectations of both risk-averse and impatient respondents are significantly higher than those of the risk-tolerant and patient parts of the sample even when controlling for further socio-demographic characteristics. This is true for both households and experts, even though experts' inflation predictions are more accurate and less dispersed on average. This finding implies that the positive correlation between risk-tolerance and patience might extend to the interaction of these preferences with levels of expected inflation.

Second, information treatments on inflation forecasts may close the expectations gap between risk-tolerant and risk-averse or patient and impatient respondents. This is true particularly in the *Forecast* and the *Forecast Risk* treatments, where the information shown is directly applicable to forecasting overall inflation. The treatment effects are strongest on the groups, whose prior expectations were farthest from the forecasts shown. Here, we do find differences between the household and the expert sample: Risk-averse or impatient households overestimate inflation more strongly and, thus, adjust more strongly to the treatments than their risk-tolerant or patient counterparts. By contrast, patient or risk-tolerant experts underestimate inflation on average, whereas the impatient or risk-averse experts are closer to the Bundesbank forecasts. Finally, the *Energy Risk* treatment shows particularly high and volatile forecasts, but is not directly applicable to forecasting overall inflation. Here, we find that risk-averse and impatient households and experts tend to react more strongly to the treatment and tend to increase their inflation forecasts. Thus, if anything, the *Energy Risk* treatment leads to a widening of the expectations gap.

Overall, our study shows that heterogeneity in inflation expectations with respect to risk and time preferences matters, as even for experts this can result in expectations gaps of up to one percentage point. The good news is that information about inflation forecasts can reconcile the groups, thereby stressing another important aspect of this type of central bank communication.

References

Andre, P., C. Pizzinelli, C. Roth, and J. Wohlfart (2022). Subjective models of the macroeconomy: Evidence from experts and representative samples. The Review of Economic Studies 89(6), 2958–2991.

Armantier, O., W. Bruine de Bruin, S. Potter, G. Topa, W. van der Klaauw, and B. Zafar (2013). Measuring inflation expectations. Annual Review of Economics 5, 273–301.

Armantier, O., W. Bruine de Bruin, G. Topa, W. van der Klaauw, and B. Zafar (2015). Inflation expectations and behavior: Do survey respondents act on their beliefs? International Economic Review 56(2), 505–536.

Armantier, O., S. Nelson, G. Topa, W. van der Klaauw, and B. Zafar (2016). The price is right: Updating inflation expectations in a randomized price information experiment. Review of Economics and Statistics 98(3), 503–523.

Bradford, D., C. Courtemanche, G. Heutel, P. McAlvanah, and C. Ruhm (2017). Time preferences and consumer behavior. Journal of Risk and Uncertainty 55, 119–145.

Bruine de Bruin, W., W. van der Klaauw, J. S. Down, B. Fischhoff, G. Topa, and O. Armantier (2010). Expectations of inflation: The role of demographic variables, expectation formation, and financial literacy. The Journal of Consumer Affairs 44(2), 381–402.

Cavallo, A., G. Cruces, and R. Perez-Truglia (2017). Inflation expectations, learning and supermarket prices: Evidence from field experiments. American Economic Journal: Macroeconomics 9(3), 1–35.

Coibion, O., D. Georgarakos, Y. Gorodnichenko, G. Kenny, and M. Weber (2024, March). The effect of macroeconomic uncertainty on household spending. American Economic Review 114(3), 645–77.

Coibion, O., D. Georgarakos, Y. Gorodnichenko, and M. van Rooij (2023, July). How does consumption respond to news about inflation? Field evidence from a randomized control trial. American Economic Journal: Macroeconomics 15(3), 109–52.

Coibion, O., D. Georgarakos, Y. Gorodnichenko, and M. Weber (2023). Forward guidance and household expectations. Journal of the European Economic Association 21, 2131–2171.

Coibion, O., Y. Gorodnichenko, and S. Kumar (2018). How do firms form their expectations? New survey evidence. American Economic Review 108(9), 2671–2713.

Coibion, O., Y. Gorodnichenko, and T. Ropele (2020). Inflation expectations and firm decisions: New causal evidence. The Quarterly Journal of Economics 135(1), 165–219.

Coibion, O., Y. Gorodnichenko, and M. Weber (2022). Monetary policy communications and their effects on household inflation expectations. Journal of Political Economy 130(6), 1537–1584.

Dohmen, T., A. Falk, D. Huffman, U. Sunde, J. Schupp, and G. G. Wagner (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. Journal of the European Economic Association 9(3), 522–550.

Döpke, J., J. Dovern, U. Fritsche, and J. Slacalek (2008). The dynamics of European inflation expectations. The B.E. Journal of Macroeconomics 8(1), 1–23.

Dräger, L., K. Gründler, and N. Potrafke (2022). Political shocks and inflation expectations: Evidence from the 2022 Russian invasion of Ukraine. CESifo Working Paper 9649.

Dräger, L., M. J. Lamla, and D. Pfajfar (2023). The hidden heterogeneity of inflation and interest rate expectations: The role of preferences. CESifo Working Paper 9637.

Dräger, L., M. J. Lamla, and D. Pfajfar (2024). How to limit the spillover from the 2021 inflation surge to inflation expectations? Journal of Monetary Economics 144, 103546.

Dräger, L. and G. Nghiem (2021). Are consumers' spending decisions in line with an Euler equation? The Review of Economics and Statistics 103(3), 580–596.

D'Acunto, F., E. Charalambakis, D. Georgarakos, G. Kenny, J. Meyer, and M. Weber (2024). Household inflation expectations: An overview of recent insights for monetary policy. NBER Working Paper 32488.

D'Acunto, F., U. Malmendier, and M. Weber (2023). What do the data tell us about inflation expectations? In R. Bachmann, G. Topa, and W. van der Klaauw (Eds.), Handbook of Economic Expectations, pp. 133–161. Academic Press.

Falk, A., A. Becker, T. Dohmen, B. Enke, D. Huffman, and U. Sunde (2018). Global evidence on economic preferences. The Quarterly Journal of Economics 133(4), 1645–1692.

Goldfayn-Frank, O. and J. Wohlfahrt (2020). Expectations formation in a new environment: Evidence from the German reunification. Journal of Monetary Economics 115, 301–320.

Golman, R., D. Hagmann, and G. Loewenstein (2017). Information avoidance. Journal of economic literature 55(1), 96–135.

Grebe, M. and P. Tillmann (2022). Household expectations and dissent among policymakers. MAGKS - Joint Discussion Paper Series in Economics 26-2022.

Haaland, I., C. Roth, and J. Wohlfart (2023). Designing information provision experiments. Journal of Economic Literature 61(1), 3–40.

Huber, P. J. (1964). Robust estimation of a location parameter. Annals of Mathematical Statistics 35, 73–101.

Kostyshyna, O. and L. Petersen (2023). Communicating inflation uncertainty and household expectations. Staff Working Papers/ Bank of Canada 2023-63.

Krupka, E. L. and M. Stephens (2013). The stability of measured time preferences. Journal of Economic Behavior and Organization 85(11-19).

Kumar, S., Y. Gorodnichenko, and O. Coibion (2023). The effect of macroeconomic uncertainty on firm decisions. Econometrica 91(4), 1297–1332.

Maćkowiak, B. and M. Wiederholt (2009). Optimal sticky prices under rational inattention. American Economic Review 99(3), 769–803.

Nghiem, G., L. Dräger, and A. Dalloul (2024). Anchoring households' inflation expectations when inflation is high. CESifo Working Paper 11042.

Vinogradov, D. V., M. J. Lamla, and Y. Makhlouf (2024). Survey-based expectations and uncertainty attitudes. Working Paper Series / University of Glasgow, Adam Smith Business School 2024-02.

Weber, M., B. Candia, T. Ropele, R. Lluberas, S. Frache, B. H. Meyer, S. Kumar, Y. Gorodnichenko, D. Georgarakos, O. Coibion, G. Kenny, and J. Ponce (2023). Tell me something I don't already know: Learning in low and high-inflation settings. NBER Working Paper 31485.

A Online Appendix

A.1 Summary Statistics

Table A1: Description of Socio-Demographic Control Variables

Variable	Description
Age	Age is subdivided in four dummies for young ($\leq$ 29 years), middle young (30 years $\leq$ x $<$40 years), middle old (40 years $\leq$ x $<$60 years) and old ($\geq$ 60 years) ages. The reference category is middle old age.
Female	Dummy for women. The reference category are men/diverse respondents.
Net Income	Net income is subdivided in three dummies for low ($<$1000 €), medium (1000€ $\leq$ x $<$4000 €) and high ($\geq$ 4000€) net income of a household. The reference category is medium net income.
Education	Education is subdivided in four dummies: in school, completed an apprenticeship, university degree or no high school education. The reference category are those with a completed apprenticeship.

Table A2: Summary Statistics of Socio-Demographic Control Variables

	Households			Experts			T-Test
	Mean	SD	N	Mean	SD	N	P-Value
Female	0.46	0.50	2682	0.44	0.50	589	0.31
Age	48.75	15.08	2682	47.47	11.69	589	0.02**
Net Income ($<$ 1000€)	0.07	0.26	2682	0.00	0.07	589	0.00***
Net Income (1000€ $\leq x <$ 4000€)	0.63	0.48	2682	0.32	0.47	589	0.00***
Net Income ($\geq$ 4000€)	0.29	0.45	2682	0.67	0.47	589	0.00***
No degree	0.03	0.17	2682	0.01	0.07	589	0.00***
In School	0.05	0.23	2682	0.02	0.15	589	0.00***
Apprenticeship	0.58	0.49	2682	0.47	0.50	589	0.00***
University degree	0.33	0.47	2682	0.50	0.50	589	0.00***

Note: Summary statistics for control variables in the full sample. We use Huber weights from the regressions in Table A7. T-tests compare the means of each variable between the household and the expert sample. * p$<$.10, ** p$<$.05, *** p$<$.01

Table A3: Summary Statistics of Socio-Demographic Control Variables Across Treatment Groups: Household Sample

	Households				Balance T-Tests		
	Forecast n=677 Mean / SD	Forecast Risk n=678 Mean / SD	Energy Risk n=662 Mean / SD	Control n=665 Mean / SD	Forecast P-Value	Forecast Risk P-Value	Energy Risk P-Value
Female	0.45	0.47	0.46	0.47	0.45	0.96	0.73
	(0.50)	(0.50)	(0.50)	(0.50)			
Age	49.12	48.43	48.68	48.80	0.70	0.66	0.89
	(15.29)	(15.10)	(14.89)	(15.05)			
Net Income (< 1000€)	0.08	0.08	0.07	0.07	0.38	0.54	0.74
	(0.27)	(0.27)	(0.26)	(0.25)			
Net Income (1000€$\leq x < 4000$€)	0.65	0.63	0.62	0.64	0.80	0.61	0.38
	(0.48)	(0.48)	(0.49)	(0.48)			
Net Income (≥ 4000€)	0.27	0.29	0.31	0.29	0.44	0.85	0.46
	(0.44)	(0.46)	(0.46)	(0.45)			
No degree	0.03	0.03	0.04	0.03	0.87	0.66	0.14
	(0.16)	(0.17)	(0.20)	(0.16)			
In School	0.07	0.06	0.04	0.05	0.20	0.60	0.64
	(0.25)	(0.23)	(0.21)	(0.22)			
Apprenticeship	0.60	0.57	0.57	0.58	0.46	0.71	0.59
	(0.49)	(0.49)	(0.50)	(0.49)			
University degree	0.30	0.34	0.35	0.34	0.14	0.99	0.84
	(0.46)	(0.47)	(0.48)	(0.47)			

Note: Summary statistics for control variables in the household sample. We use Huber weights from the regressions in Table A7. Balance t-tests compare the means in each treatment group with the mean in the control group. * p<.10, ** p<.05, *** p<.01

Table A4: Summary Statistics of Socio-Demographic Control Variables Across Treatment Groups: Expert Sample

	Experts				Balance T-Tests		
	Forecast n=157 Mean / SD	Forecast Risk n=142 Mean / SD	Energy Risk n=137 Mean / SD	Control n=153 Mean / SD	Forecast P-Value	Forecast Risk P-Value	Energy Risk P-Value
Female	0.44	0.49	0.40	0.42	0.65	0.22	0.78
	(0.50)	(0.50)	(0.49)	(0.49)			
Age	48.12	47.14	48.80	45.92	0.10	0.40	0.04**
	(11.18)	(12.08)	(10.94)	(12.39)			
Net Income (< 1000€)	0	0.01	0	0.01	0.19	0.76	0.22
	(0.00)	(0.09)	(0.00)	(0.10)			
Net Income (1000€$\leq x < 4000$€)	0.30	0.32	0.33	0.35	0.31	0.61	0.66
	(0.46)	(0.47)	(0.47)	(0.48)			
Net Income (≥ 4000€)	0.70	0.67	0.67	0.64	0.22	0.57	0.53
	(0.46)	(0.47)	(0.47)	(0.48)			
No degree	0	0.02	0	0.01	0.29	0.51	0.32
	(0.00)	(0.12)	(0.00)	(0.09)			
In School	0.01	0.02	0.01	0.05	0.04**	0.14	0.03**
	(0.11)	(0.14)	(0.09)	(0.23)			
Apprenticeship	0.45	0.46	0.52	0.47	0.81	0.85	0.35
	(0.50)	(0.50)	(0.50)	(0.50)			
University degree	0.53	0.51	0.47	0.47	0.28	0.54	0.96
	(0.50)	(0.50)	(0.50)	(0.50)			

Note: Summary statistics for control variables in the experts sample. We use Huber weights from the regressions in Table A7. Balance t-tests compare the means in each treatment group with the mean in the control group. * p<.10, ** p<.05, *** p<.01

Table A5: Summary Statistics of Prior Inflation Expectations, Risk and Time Preferences for Households and Experts

		Households			T-Test	Experts			T-Test
		Mean	SD	N	P-Value	Mean	SD	N	P-Value
Prior expected inflation 12 months $\pi^{e,12m}_{prior}$		8.16	3.63	2,682		6.81	1.86	589	0.00***
Prior expected inflation 5 years $\pi^{e,5y}_{prior}$		6.58	4.21	2,608		4.47	1.99	555	0.00***
Risk-tolerance	Overall	3.47	2.43	2,682		5.14	2.26	589	0.00***
	Forecast	3.54	2.52	677	0.26	4.87	2.21	157	0.15
	Forecast Risk	3.49	2.40	678	0.43	5.06	2.46	142	0.52
	Energy Risk	3.47	2.42	662	0.49	5.45	2.09	137	0.39
	Control	3.38	2.38	665	-	5.23	2.23	153	-
Patience 12 Months	Overall	21.68	8.94	2,682		24.54	8.47	589	0.00***
	Forecast	22.19	8.75	677	0.11	25.30	8.64	157	0.06*
	Forecast Risk	21.56	8.96	678	0.77	24.75	7.95	142	0.19
	Energy Risk	21.54	9.04	662	0.80	24.60	8.76	137	0.26
	Control	21.42	9.01	665	-	23.47	8.48	153	-
Patience 5 Years	Overall	22.48	7.75	2,608		24.99	6.99	555	0.00***
	Forecast	22.55	7.63	649	0.34	24.93	7.74	147	0.21
	Forecast Risk	22.59	7.62	661	0.29	25.19	6.66	136	0.10
	Energy Risk	22.64	7.59	655	0.24	26.01	6.25	128	0.01**
	Control	22.13	8.16	643	-	23.84	6.99	144	-

Note: Summary statistics for prior short and long-term inflation expectations as well as risk-tolerance and level of patience in both samples. Risk-tolerance expresses individuals' willingness to take financial risks in return for higher profits on a 11-point Likert scale. Patience expresses individuals' willingness to wait for a higher hypothetical amount of money in the future. We use Huber weights from the regressions in Table A7. T-tests compare the means between households and experts in the overall sample and in each treatment group with the mean in the control group. * p<.10, ** p<.05, *** p<.01

Table A6: Effects of Economic Preferences on Prior Inflation Expectations

	Households			
	$\pi^{e,12m}_{prior}$	$\pi^{e,5y}_{prior}$	$\pi^{e,12m}_{prior}$	$\pi^{e,5y}_{prior}$
Risk-tolerance	-0.072**	-0.096***		
	[-0.133,-0.010]	[-0.164,-0.028]		
Patience			-0.053***	-0.072***
			[-0.069,-0.038]	[-0.093,-0.051]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	2682	2608
Adj. R^2	0.040	0.057	0.055	0.071
	Experts			
	$\pi^{e,12m}_{prior}$	$\pi^{e,5y}_{prior}$	$\pi^{e,12m}_{prior}$	$\pi^{e,5y}_{prior}$
Risk-tolerance	-0.171***	-0.152***		
	[-0.248,-0.094]	[-0.230,-0.074]		
Patience			-0.016*	-0.019
			[-0.036,0.003]	[-0.043,0.004]
Demographic Controls	✓	✓	✓	✓
Observations	589	555	589	555
Adj. R^2	0.104	0.158	0.072	0.137

Note: Demographic controls include age, gender, net income and level of education. Risk-tolerance expresses individuals' willingness to take financial risks in return for higher profits. Patience expresses individuals' willingness to wait for a higher hypothetical amount of money in the future. Prior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, ***

A.2 Bayesian Updating of Posterior Inflation Expectations by Households and Experts

We measure the extent to which survey respondents adjust their posterior forecast towards the signal provided in the treatments, conditional on the level of their prior forecast. Following, e.g., Coibion et al. (2018, 2022, 2023) and Dräger et al. (2024), this type of estimation can be linked to a Bayesian learning model of expectation formation, estimating the strength of adjustment in posterior expectations towards the information signal provided in the treatments.[9] We thus estimate the following regression:

$$\pi^{e,h}_{j,post} = \alpha + \sum_{i=1}^{3} \eta_i treatment_{j,i} + \gamma_0 \pi^{e,h}_{j,prior} + \sum_{i=1}^{3} \gamma_i treatment_{j,i} \times \pi^{e,h}_{j,prior} + \zeta X_j + \epsilon_j, \tag{4}$$

where $\pi^{e,h}_{j,post}$ denotes individual posterior inflation expectations at horizon $h \in [12m, 5y]$ and $\pi^{e,h}_{j,prior}$ are the prior inflation expectations at the same horizon. Each treatment i is included as a dummy variable $treatment_{j,i}$ with the control group as reference category, and X_j is a vector of socio-demographic control variables including age, gender, net income and education. The coefficients γ_i in (4) measure the strength of adjustment towards the signal conditional on prior expectations. Under Bayesian learning, we expect γ_i to be negative, where more negative coefficients correspond to more informative treatments, since they assign less weight to prior beliefs $(\gamma_0 + \gamma_1, \gamma_0 + \gamma_2, \gamma_0 + \gamma_3)$ compared to the control group (γ_0) and a higher weight on the signal.

The results from the estimation of equation (4) are presented in Table A7. For better readability, we display the interaction between prior expectations and treatment effects in Figure A1 in the form of binscatter plots for prior and posterior expectations across treatment groups, accounting for the Huber weights from Table A7. The slope of the binscatter plots shows the relation between prior and posterior forecasts. For respondents in the control group, we would expect a slope of one, since they did not receive any signal. As can be seen in Figure A1 and Table A7, the reliance on priors is high at around 0.8 in all models, but still estimated to be below one. This is a typical finding in the literature (Coibion et al., 2018, 2022, 2023), which may result from the fact that different questions are used to measure prior and posterior expectations.

[9] As discussed in Coibion et al. (2018), the regression in (4) can be translated into the expectation formation model under Bayesian learning. If expectations are formed according to Bayesian learning, they are a weighted average of prior expectations and the signal: $belief^{post} = G \times information + (1 - G) \times belief^{prior}$, where the weight on the information signal G is equal to the gain of the Kalman filter. In our estimation in (4), the coefficients on the interaction between treatment and prior correspond to the negative Kalman gain. Under Bayesian learning, coefficients γ_i should thus be negative. More negative γ_i coefficients mean that the signal is more informative since respondents put less weight on their prior.

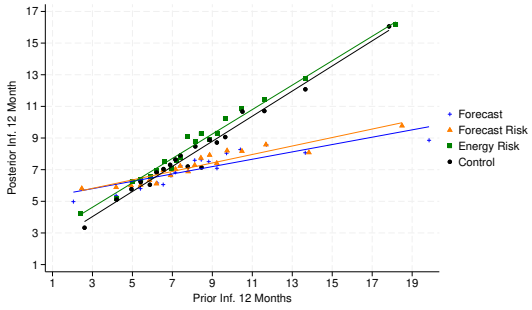
Table A7: Treatment Effects on Posterior Inflation Expectations: Bayesian Updating Model

	Households		Experts	
	$\pi^{e,12m}_{post}$	$\pi^{e,5y}_{post}$	$\pi^{e,12m}_{post}$	$\pi^{e,5y}_{post}$
π^{e}_{prior}	0.796***	0.786***	0.883***	0.866***
	[0.754,0.837]	[0.747,0.825]	[0.749,1.018]	[0.719,1.014]
Forecast	3.484***	1.584***	1.117*	0.648*
	[2.990,3.978]	[1.213,1.954]	[-0.070,2.303]	[-0.112,1.408]
Forecast Risk	3.421***	1.792***	1.614***	0.612
	[2.912,3.930]	[1.435,2.149]	[0.464,2.764]	[-0.149,1.373]
Energy Risk	0.551**	0.180	0.083	0.287
	[0.048,1.053]	[-0.171,0.531]	[-1.189,1.355]	[-0.620,1.195]
Forecast x π^{e}_{prior}	-0.565***	-0.467***	-0.184**	-0.191**
	[-0.627,-0.503]	[-0.527,-0.407]	[-0.362,-0.006]	[-0.359,-0.023]
Forecast Risk x π^{e}_{prior}	-0.533***	-0.496***	-0.220**	-0.194**
	[-0.597,-0.469]	[-0.550,-0.441]	[-0.389,-0.051]	[-0.366,-0.022]
Energy Risk x π^{e}_{prior}	-0.008	0.009	0.056	-0.012
	[-0.070,0.054]	[-0.043,0.062]	[-0.134,0.246]	[-0.228,0.205]
Constant	1.595***	1.615***	1.155**	0.962**
	[1.150,2.041]	[1.215,2.015]	[0.055,2.254]	[0.013,1.910]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	589	555
Adj. R^2	0.548	0.656	0.593	0.642

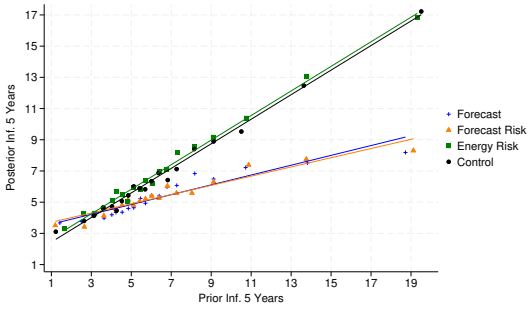
Note: Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^{e} \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Figure A1(a) & (b) shows binscatter plots for households' short- and long-run inflation expectations, respectively. Both models show that households strongly adjust their inflation forecasts to the signal provided by the inflation forecasts shown in the *Forecast* and *Forecast Risk* treatments. In fact, the estimated weight on prior beliefs becomes almost zero in these treatment groups. By contrast, the *energy risk* treatment only receives a small weight for updates of households' short-run expectations, and is not significantly different from the control group in the case of long-run expectations. Figure A1(c) & (d) show that experts update much less towards the information signals compared to households. This is not surprising, given that experts' prior forecasts were closer to the Bundesbank forecasts. As for households, the *Energy Risk* treatments is not informative for experts' forecasts, either.

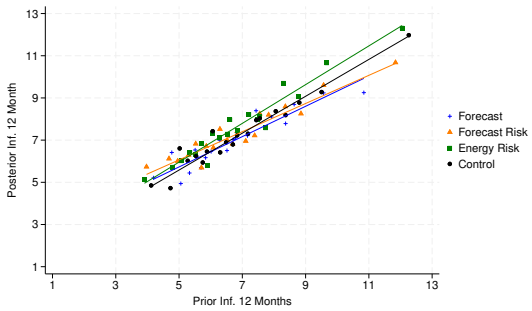
Figure A1: Binscatter Plots: Treatment effects on posterior inflation expectations



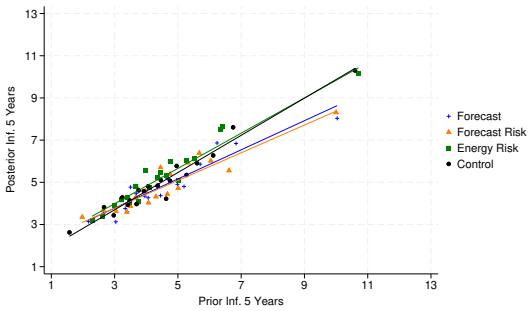
(a) Households' inflation expectations 12m



(b) Households' inflation expectations 5y



(c) Experts' inflation expectations 12m



(d) Experts' inflation expectations 5y

Note: Binscatter plots of prior and posterior inflation expectations with Huber robust weights from the regressions in Table A7. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$.

A.3 Further Results for Overall Treatment Effects

Table A8: Treatment Effects on Updates in Inflation Expectations: Interaction with Experts

	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Experts	0.316**	0.105
	[0.060,0.573]	[-0.170,0.380]
Forecast	-1.279***	-1.324***
	[-1.568,-0.990]	[-1.596,-1.052]
Forecast Risk	-0.932***	-1.661***
	[-1.192,-0.672]	[-1.957,-1.366]
Energy Risk	0.477***	0.207*
	[0.271,0.684]	[-0.006,0.419]
Forecast x Experts	1.045***	1.023***
	[0.645,1.446]	[0.622,1.424]
Forecast Risk x Experts	0.945***	1.382***
	[0.548,1.343]	[0.957,1.808]
Energy Risk x Experts	-0.120	-0.024
	[-0.489,0.250]	[-0.407,0.359]
Constant	-0.302	-0.252
	[-0.775,0.171]	[-0.787,0.284]
Demographic Controls	✓	✓
Observations	3271	3163
Adj. R^2	0.090	0.123

Note: Demographic controls include age, gender, net income and level of education. Experts is a dummy variable for the expert sample. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A9: Treatment Effects on Inflation Forecast Uncertainty

	Households		Experts	
	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,5y}_{post}$
Forecast	-0.367***	-0.563***	-0.333***	-0.276**
	[-0.554,-0.180]	[-0.760,-0.366]	[-0.567,-0.099]	[-0.514,-0.037]
Forecast Risk	-0.430***	-0.526***	-0.155	-0.219*
	[-0.576,-0.283]	[-0.783,-0.270]	[-0.383,0.073]	[-0.474,0.036]
Energy Risk	0.263***	-0.099	0.239	0.158
	[0.073,0.454]	[-0.330,0.131]	[-0.052,0.530]	[-0.125,0.441]
π^e_{prior}	0.089***	0.104***	0.097***	0.153***
	[0.064,0.114]	[0.079,0.129]	[0.038,0.156]	[0.093,0.212]
Constant	1.285***	1.552***	1.308***	0.899**
	[0.866,1.703]	[1.170,1.935]	[0.532,2.085]	[0.201,1.596]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	589	555
Adj. R^2	0.089	0.061	0.080	0.086

Note: Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We use Huber weights from the regressions in Table A7 and estimate robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A10: Treatment Effects on Inflation Forecast Uncertainty: Interaction with Experts

	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,5y}_{post}$
Experts	0.036	0.003
	[-0.180,0.252]	[-0.237,0.242]
Forecast	-0.366***	-0.563***
	[-0.552,-0.179]	[-0.761,-0.365]
Forecast Risk	-0.429***	-0.527***
	[-0.575,-0.282]	[-0.784,-0.270]
Energy Risk	0.264***	-0.099
	[0.074,0.455]	[-0.330,0.132]
Forecast x Experts	0.042	0.296*
	[-0.251,0.336]	[-0.010,0.603]
Forecast Risk x Experts	0.307**	0.317*
	[0.035,0.578]	[-0.042,0.675]
Energy Risk x Experts	-0.015	0.237
	[-0.366,0.336]	[-0.127,0.600]
π^e_{prior}	0.089***	0.106***
	[0.066,0.113]	[0.083,0.130]
Constant	1.266***	1.500***
	[0.877,1.654]	[1.142,1.858]
Demographic Controls	✓	✓
Observations	3271	3163
Adj. R^2	0.088	0.061

Note: Demographic controls include age, gender, net income and level of education. Experts is a dummy variable for the expert sample. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We use Huber weights from the regressions in Table A7 and estimate robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

A.4 Further Results for Heterogeneity in Treatment Effects Across Risk Preferences

Table A11: Treatment Effects on Updates in Inflation Expectations: Interaction with Risk-Tolerance

	Households		Experts	
	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Risk-tolerance	0.101***	0.060*	0.004	0.060
	[0.040,0.163]	[-0.004,0.124]	[-0.080,0.088]	[-0.031,0.151]
Forecast	-1.416***	-1.782***	-0.490	0.060
	[-1.942,-0.889]	[-2.263,-1.300]	[-1.193,0.212]	[-0.657,0.777]
Forecast Risk	-0.903***	-1.823***	-0.652*	-0.162
	[-1.371,-0.435]	[-2.321,-1.326]	[-1.350,0.045]	[-0.930,0.607]
Energy Risk	0.746***	0.318	0.231	0.319
	[0.375,1.116]	[-0.063,0.699]	[-0.533,0.995]	[-0.459,1.097]
Forecast x Risk-tolerance	0.034	0.129**	0.066	-0.063
	[-0.085,0.153]	[0.019,0.240]	[-0.057,0.190]	[-0.192,0.065]
Forecast Risk x Risk-tolerance	-0.011	0.046	0.136**	-0.021
	[-0.121,0.098]	[-0.071,0.163]	[0.011,0.261]	[-0.154,0.111]
Energy Risk x Risk-tolerance	-0.080*	-0.034	0.037	-0.016
	[-0.168,0.007]	[-0.122,0.055]	[-0.096,0.171]	[-0.148,0.115]
Constant	-0.579**	-0.399	0.497	-0.337
	[-1.123,-0.035]	[-0.996,0.198]	[-0.365,1.359]	[-1.390,0.716]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	589	555
Adj. R^2	0.087	0.126	0.043	0.036

Note: Demographic controls include age, gender, net income and level of education. Risk-tolerance expresses individuals' willingness to take financial risks in return for higher profits. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A12: Treatment Effects on Updates in Inflation Expectations: Interaction with Experts and Risk-Tolerance

	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Experts	0.747***	0.376
	[0.215,1.280]	[-0.239,0.991]
Forecast	-1.424***	-1.788***
	[-1.951,-0.896]	[-2.271,-1.304]
Forecast Risk	-0.902***	-1.819***
	[-1.371,-0.433]	[-2.318,-1.320]
Energy Risk	0.734***	0.311
	[0.365,1.103]	[-0.068,0.691]
Forecast x Experts	0.948**	1.787***
	[0.066,1.830]	[0.902,2.672]
Forecast Risk x Experts	0.304	1.680***
	[-0.543,1.152]	[0.753,2.607]
Energy Risk x Experts	-0.626	-0.110
	[-1.514,0.262]	[-1.049,0.828]
Risk-tolerance	0.106***	0.071**
	[0.045,0.167]	[0.007,0.135]
Risk-tolerance x Experts	-0.114**	-0.071
	[-0.216,-0.012]	[-0.185,0.044]
Forecast x Risk-tolerance	0.036	0.131**
	[-0.084,0.155]	[0.020,0.242]
Forecast Risk x Risk-tolerance	-0.012	0.044
	[-0.122,0.098]	[-0.073,0.162]
Energy Risk x Risk-tolerance	-0.076*	-0.031
	[-0.164,0.011]	[-0.119,0.057]
Forecast x Experts x Risk-tolerance	0.013	-0.195**
	[-0.161,0.186]	[-0.371,-0.020]
Forecast Risk x Experts x Risk-tolerance	0.130	-0.073
	[-0.037,0.298]	[-0.252,0.105]
Energy Risk x Experts x Risk-tolerance	0.122	0.027
	[-0.044,0.287]	[-0.142,0.196]
Constant	-0.643**	-0.478*
	[-1.152,-0.133]	[-1.037,0.082]
Demographic Controls	✓	✓
Observations	3271	3163
Adj. R^2	0.095	0.130

Note: Demographic controls include age, gender, net income and level of education. Experts is a dummy variable for the expert sample. Risk-tolerance expresses individuals' willingness to take financial risks in return for higher profits. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A13: Treatment Effects on Posterior Short-Run Inflation Expectations: Bayesian Updating Model Across Risk Preferences

	Households		Experts	
	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$
π^{e}_{prior}	0.836***	0.855***	0.791***	0.972***
	[0.733,0.939]	[0.778,0.932]	[0.437,1.146]	[0.784,1.160]
Forecast	3.112***	4.358***	0.407	2.103**
	[1.985,4.238]	[3.366,5.349]	[-2.135,2.949]	[0.308,3.897]
Forecast Risk	2.993***	3.979***	1.541	1.115
	[1.787,4.198]	[2.878,5.081]	[-1.050,4.131]	[-0.798,3.028]
Energy Risk	0.568	0.938*	0.287	0.236
	[-0.576,1.713]	[-0.105,1.981]	[-2.244,2.818]	[-1.701,2.174]
Forecast x π^{e}_{prior}	-0.541***	-0.654***	-0.077	-0.337***
	[-0.689,-0.393]	[-0.764,-0.543]	[-0.472,0.319]	[-0.592,-0.082]
Forecast Risk x π^{e}_{prior}	-0.514***	-0.567***	-0.167	-0.199
	[-0.671,-0.357]	[-0.697,-0.438]	[-0.571,0.237]	[-0.471,0.073]
Energy Risk x π^{e}_{prior}	-0.039	-0.041	0.024	0.015
	[-0.191,0.113]	[-0.163,0.081]	[-0.362,0.409]	[-0.257,0.288]
Constant	1.344**	1.323***	1.531	1.419
	[0.182,2.506]	[0.412,2.233]	[-0.903,3.966]	[-0.346,3.184]
Split Sample	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse
Demographic Controls	✓	✓	✓	✓
Observations	571	672	196	180
Adj. R^2	0.604	0.545	0.523	0.648

Note: Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^{e} \leq 25$ We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A14: Treatment Effects on Posterior Long-Run Inflation Expectations: Bayesian Updating Model Across Risk Preferences

	Households		Experts	
	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$
π^{e}_{prior}	0.826***	0.824***	0.741***	0.966***
	[0.744,0.907]	[0.743,0.906]	[0.424,1.057]	[0.672,1.260]
Forecast	1.759***	1.829***	0.268	1.504*
	[1.012,2.507]	[1.061,2.598]	[-1.579,2.115]	[-0.054,3.062]
Forecast Risk	1.983***	2.033***	0.159	1.091
	[1.282,2.684]	[1.222,2.844]	[-1.396,1.714]	[-0.665,2.847]
Energy Risk	-0.363	0.832**	0.063	0.833
	[-1.032,0.305]	[0.042,1.622]	[-1.691,1.818]	[-0.936,2.602]
Forecast x π^{e}_{prior}	-0.472***	-0.499***	-0.155	-0.317*
	[-0.605,-0.338]	[-0.609,-0.389]	[-0.621,0.312]	[-0.636,0.003]
Forecast Risk x π^{e}_{prior}	-0.546***	-0.491***	-0.106	-0.277
	[-0.660,-0.432]	[-0.606,-0.376]	[-0.494,0.282]	[-0.644,0.091]
Energy Risk x π^{e}_{prior}	0.074	-0.047	0.034	-0.144
	[-0.041,0.190]	[-0.154,0.061]	[-0.428,0.495]	[-0.508,0.220]
Constant	1.622***	1.353***	1.426*	0.171
	[0.646,2.598]	[0.488,2.217]	[-0.137,2.989]	[-1.777,2.119]
Split Sample	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse
Demographic Controls	✓	✓	✓	✓
Observations	541	645	176	169
Adj. R^2	0.681	0.646	0.473	0.711

Note: Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^{e} \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A15: Treatment Effects on Short-Run Inflation Forecast Uncertainty Across Risk Preferences

	Households		Experts	
	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$
Forecast	-0.262	-0.382**	-0.522***	-0.098
	[-0.618,0.095]	[-0.687,-0.077]	[-0.893,-0.151]	[-0.536,0.340]
Forecast Risk	-0.371***	-0.379**	-0.183	-0.142
	[-0.653,-0.090]	[-0.678,-0.079]	[-0.535,0.170]	[-0.598,0.315]
Energy Risk	0.408**	0.563**	0.096	0.639*
	[0.019,0.797]	[0.097,1.030]	[-0.317,0.508]	[-0.012,1.289]
π^e_{prior}	0.078***	0.086***	0.130**	0.022
	[0.029,0.127]	[0.041,0.130]	[0.029,0.231]	[-0.066,0.110]
Constant	0.982*	1.304***	1.272**	2.127**
	[-0.037,2.000]	[0.622,1.987]	[0.275,2.269]	[0.023,4.230]
Split Sample	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse
Demographic Controls	✓	✓	✓	✓
Observations	571	672	196	180
Adj. R^2	0.076	0.086	0.167	0.025

Note: Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A16: Treatment Effects on Long-Run Inflation Forecast Uncertainty Across Risk Preferences

	Households		Experts	
	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$
Forecast	-0.435***	-0.543***	-0.210	-0.233
	[-0.735,-0.135]	[-0.901,-0.184]	[-0.641,0.220]	[-0.746,0.279]
Forecast Risk	-0.420***	-0.281	-0.192	-0.451*
	[-0.734,-0.106]	[-0.984,0.423]	[-0.641,0.257]	[-0.986,0.084]
Energy Risk	-0.099	0.114	0.150	0.229
	[-0.457,0.258]	[-0.344,0.573]	[-0.308,0.608]	[-0.512,0.970]
π^e_{prior}	0.064***	0.111***	0.231***	0.119***
	[0.021,0.107]	[0.058,0.165]	[0.057,0.405]	[0.032,0.207]
Constant	2.149***	1.211***	0.619	1.438*
	[1.452,2.845]	[0.298,2.125]	[-0.725,1.962]	[-0.095,2.970]
Split Sample	Risk-tolerant	Risk-averse	Risk-tolerant	Risk-averse
Demographic Controls	✓	✓	✓	✓
Observations	541	645	176	169
Adj. R^2	0.066	0.016	0.083	0.045

Note: Risk-tolerant households categorize their financial risk appetite with values > 5, risk-averse households with values < 2. Risk-tolerant experts categorize their financial risk appetite with values > 6, risk-averse experts with values < 4. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

A.5 Further Results for Heterogeneity in Treatment Effects Across Time Preferences

Table A17: Treatment Effects on Updates in Inflation Expectations: Interaction with Patience

	Households		Experts	
	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Patience	-0.004	0.007	0.016	-0.015
	[-0.019,0.012]	[-0.012,0.025]	[-0.008,0.040]	[-0.048,0.019]
Forecast	-2.258***	-2.025***	0.029	0.037
	[-3.089,-1.428]	[-2.950,-1.101]	[-0.800,0.857]	[-0.977,1.051]
Forecast Risk	-1.835***	-2.781***	-0.327	-0.813
	[-2.555,-1.115]	[-3.756,-1.805]	[-1.251,0.597]	[-2.045,0.419]
Energy Risk	0.227	0.443	1.221***	-0.106
	[-0.329,0.783]	[-0.226,1.112]	[0.305,2.136]	[-1.525,1.312]
Forecast x Patience	0.044***	0.031	-0.008	-0.012
	[0.011,0.077]	[-0.007,0.068]	[-0.040,0.023]	[-0.050,0.026]
Forecast Risk x Patience	0.042***	0.049**	0.014	0.022
	[0.013,0.071]	[0.011,0.088]	[-0.021,0.050]	[-0.024,0.069]
Energy Risk x Patience	0.012	-0.011	-0.032*	0.015
	[-0.011,0.034]	[-0.038,0.017]	[-0.067,0.003]	[-0.038,0.067]
Constant	-0.156	-0.344	0.110	0.428
	[-0.776,0.464]	[-1.067,0.378]	[-0.811,1.030]	[-0.763,1.619]
Demographic Controls	✓	✓	✓	✓
Observations	2682	2608	589	555
Adj. R^2	0.089	0.126	0.038	0.040

Note: Demographic controls include age, gender, net income and level of education. Patience expresses individuals' willingness to wait for a higher hypothetical amount of money in the future. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A18: Treatment Effects on Updates in Inflation Expectations: Interaction with Experts and Patience

	$\pi^{e,12m}_{post} - \pi^{e,12m}_{prior}$	$\pi^{e,5y}_{post} - \pi^{e,5y}_{prior}$
Experts	0.321	1.176**
	[-0.434,1.076]	[0.115,2.238]
Forecast	-2.284***	-2.044***
	[-3.115,-1.453]	[-2.965,-1.122]
Forecast Risk	-1.840***	-2.779***
	[-2.560,-1.120]	[-3.758,-1.801]
Energy Risk	0.222	0.444
	[-0.331,0.776]	[-0.223,1.111]
Forecast x Experts	2.059***	1.870**
	[0.863,3.254]	[0.398,3.342]
Forecast Risk x Experts	1.369**	1.870**
	[0.196,2.542]	[0.202,3.537]
Energy Risk x Experts	0.843	-0.537
	[-0.270,1.956]	[-2.243,1.169]
Patience	-0.003	0.008
	[-0.018,0.013]	[-0.011,0.026]
Patience x Experts	0.001	-0.045**
	[-0.029,0.030]	[-0.086,-0.003]
Forecast x Patience	0.045***	0.032*
	[0.012,0.078]	[-0.006,0.069]
Forecast Risk x Patience	0.042***	0.049**
	[0.013,0.071]	[0.011,0.088]
Energy Risk x Patience	0.012	-0.011
	[-0.011,0.035]	[-0.038,0.017]
Forecast x Experts x Patience	-0.045*	-0.035
	[-0.092,0.001]	[-0.093,0.022]
Forecast Risk x Experts x Patience	-0.022	-0.022
	[-0.068,0.023]	[-0.087,0.042]
Energy Risk x Experts x Patience	-0.040*	0.025
	[-0.084,0.003]	[-0.040,0.089]
Constant	-0.217	-0.395
	[-0.804,0.371]	[-1.084,0.293]
Demographic Controls	✓	✓
Observations	3271	3163
Adj. R^2	0.096	0.129

Note: Demographic controls include age, gender, net income and level of education. Experts is a dummy variable for the expert sample. Patience expresses individuals' willingness to wait for a higher hypothetical amount of money in the future. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A19: Treatment Effects on Posterior Short-Run Inflation Expectations: Bayesian Updating Model Across Levels of Patience

	Households		Experts	
	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$	$\pi^{e,12m}_{post}$
π^{e}_{prior}	0.772***	0.812***	0.999***	0.784***
	[0.688,0.856]	[0.747,0.877]	[0.784,1.214]	[0.583,0.984]
Forecast	2.911***	3.642***	1.749*	1.372
	[1.988,3.835]	[2.747,4.537]	[-0.152,3.650]	[-0.559,3.303]
Forecast Risk	3.040***	3.707***	1.530	0.562
	[2.116,3.963]	[2.752,4.661]	[-0.853,3.912]	[-1.149,2.274]
Energy Risk	0.685	0.789*	0.867	-0.085
	[-0.185,1.554]	[-0.096,1.675]	[-1.645,3.380]	[-2.132,1.962]
Forecast x π^{e}_{prior}	-0.478***	-0.597***	-0.274**	-0.209
	[-0.603,-0.353]	[-0.696,-0.498]	[-0.541,-0.007]	[-0.490,0.073]
Forecast Risk x π^{e}_{prior}	-0.485***	-0.558***	-0.179	-0.064
	[-0.612,-0.359]	[-0.667,-0.450]	[-0.541,0.182]	[-0.308,0.180]
Energy Risk x π^{e}_{prior}	-0.025	-0.031	-0.096	0.135
	[-0.142,0.093]	[-0.129,0.066]	[-0.479,0.287]	[-0.156,0.427]
Constant	1.377***	1.679***	-0.951	1.480*
	[0.587,2.167]	[0.899,2.460]	[-2.961,1.059]	[-0.218,3.178]
Split Sample	Patient	Impatient	Patient	Impatient
Demographic Controls	✓	✓	✓	✓
Observations	947	776	190	174
Adj. R^2	0.477	0.579	0.533	0.652

Note: Patient households have a time preference of > 27 in the 12-month time horizon and impatient households have a time preference of < 15 in 12 months. Patient experts have a time preference of > 29 in the 12-month time horizon and impatient experts have a time preference of < 25 in 12 months. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^{e} \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A20: Treatment Effects on Posterior Long-Run Inflation Expectations: Bayesian Updating Model Across Levels of Patience

	Households		Experts	
	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$	$\pi^{e,5y}_{post}$
π^{e}_{prior}	0.804***	0.780***	0.838***	0.767***
	[0.729,0.879]	[0.715,0.844]	[0.574,1.102]	[0.514,1.020]
Forecast	1.617***	1.834***	0.094	0.250
	[0.978,2.255]	[1.029,2.638]	[-1.320,1.508]	[-1.368,1.868]
Forecast Risk	1.469***	2.136***	0.322	0.065
	[0.817,2.122]	[1.373,2.899]	[-1.228,1.872]	[-1.507,1.638]
Energy Risk	0.281	0.150	-0.094	0.516
	[-0.317,0.879]	[-0.592,0.892]	[-1.912,1.725]	[-1.058,2.090]
Forecast x π^{e}_{prior}	-0.459***	-0.508***	-0.043	-0.114
	[-0.576,-0.342]	[-0.621,-0.396]	[-0.362,0.276]	[-0.461,0.234]
Forecast Risk x π^{e}_{prior}	-0.437***	-0.525***	-0.087	-0.125
	[-0.553,-0.322]	[-0.623,-0.428]	[-0.457,0.283]	[-0.447,0.196]
Energy Risk x π^{e}_{prior}	0.003	0.019	0.080	-0.071
	[-0.099,0.105]	[-0.078,0.116]	[-0.377,0.537]	[-0.388,0.246]
Constant	1.020***	1.899***	1.787	1.784**
	[0.329,1.711]	[1.095,2.702]	[-0.816,4.390]	[0.223,3.346]
Split Sample	Patient	Impatient	Patient	Impatient
Demographic Controls	✓	✓	✓	✓
Observations	859	696	182	156
Adj. R^2	0.654	0.632	0.528	0.687

Note: Patient households have a time preference of > 26 in the 5-year time horizon and impatient households have a time preference of < 20 in 5 years. Patient experts have a time preference of > 29 in the 5-year time horizon and impatient experts have a time preference of < 24 in 5 years. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^{e} \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A21: Treatment Effects on Short-Run Inflation Forecast Uncertainty Across Levels of Patience

	Households		Experts	
	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$	$\sigma^{\pi^e,12m}_{post}$
Forecast	-0.414***	-0.348	-0.139	-0.659***
	[-0.638,-0.190]	[-0.811,0.115]	[-0.539,0.262]	[-1.113,-0.205]
Forecast Risk	-0.355***	-0.446***	-0.088	-0.163
	[-0.578,-0.132]	[-0.713,-0.179]	[-0.560,0.385]	[-0.619,0.292]
Energy Risk	0.304**	0.364*	0.193	0.304
	[0.020,0.587]	[-0.050,0.779]	[-0.272,0.658]	[-0.360,0.967]
π^e_{prior}	0.072***	0.091***	0.043	0.150**
	[0.018,0.125]	[0.051,0.130]	[-0.075,0.162]	[0.036,0.264]
Constant	1.288***	1.100***	3.318***	0.438
	[0.518,2.059]	[0.357,1.842]	[1.871,4.765]	[-0.981,1.856]
Split Sample	Patient	Impatient	Patient	Impatient
Demographic Controls	✓	✓	✓	✓
Observations	947	776	190	174
Adj. R^2	0.092	0.074	0.044	0.083

Note: Patient households have a time preference of > 27 in the 12-month time horizon and impatient households have a time preference of < 15 in 12 months. Patient experts have a time preference of > 29 in the 12-month time horizon and impatient experts have a time preference of < 25 in 12 months. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

Table A22: Treatment Effects on Long-Run Inflation Forecast Uncertainty Across Levels of Patience

	Households		Experts	
	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$	$\sigma^{\pi^e,5y}_{post}$
Forecast	-0.612***	-0.614**	-0.113	-0.326
	[-0.925,-0.298]	[-1.138,-0.089]	[-0.595,0.368]	[-0.793,0.141]
Forecast Risk	-0.718***	-0.778***	0.017	-0.322
	[-1.027,-0.408]	[-1.301,-0.255]	[-0.505,0.538]	[-0.822,0.178]
Energy Risk	-0.382**	-0.014	0.463*	0.225
	[-0.709,-0.055]	[-0.656,0.628]	[-0.078,1.004]	[-0.381,0.831]
π^e_{prior}	0.106***	0.123***	0.039	0.141***
	[0.048,0.165]	[0.072,0.173]	[-0.103,0.180]	[0.041,0.240]
Constant	1.542***	1.488***	2.713***	0.768*
	[0.851,2.232]	[0.657,2.318]	[1.103,4.323]	[-0.114,1.649]
Split Sample	Patient	Impatient	Patient	Impatient
Demographic Controls	✓	✓	✓	✓
Observations	859	696	182	156
Adj. R^2	0.112	0.073	0.051	0.083

Note: Patient households have a time preference of > 26 in the 5-year time horizon and impatient households have a time preference of < 20 in 5 years. Patient experts have a time preference of > 29 in the 5-year time horizon and impatient experts have a time preference of < 24 in 5 years. Demographic controls include age, gender, net income and level of education. Prior and posterior inflation expectations are truncated in the range $-5 \leq \pi^e \leq 25$. We estimate Huber robust regressions with weights from the regressions in Table A7 and robust standard errors. 95% confidence intervals are in parentheses. * p<.10, ** p<.05, *** p<.01

B Survey Questions

This survey deals with your views and expectations regarding inflation and your economic preferences. It is part of a scientific study at Leibniz University Hannover. Answering this survey takes approximately 15 minutes. All answers are anonymous, which means that we cannot trace any conclusions back to individual respondents.
For most questions there is no right or wrong answer - we are mainly interested in your views and personal opinions.
The quality of our data is crucial. To capture your knowledge and opinions as accurately as possible, it is essential that you answer each question to the best of your ability.

1. Do you commit to answering every question in this survey carefully?

   - Yes
   - No

   We would now like to ask you a few general questions on financial topics. Please answer the questions based on your current level of knowledge.

2. Do you agree with the following statement, "The investment in the stock of a single company is less risky than investing in a fund with stocks in similar companies"? [*Note: This question was only asked in the household survey.*]

   - I don't agree
   - I agree
   - Don't know

3. The primary goal of the European Central Bank (ECB) is to...

   - stabilize prices for goods and services
   - stabilize corporate bond prices
   - keep interest rates low and stable
   - reduce government debt
   - Don't know / No answer

4. Which of the following actions is most likely to reduce inflation?

   - Increase short-term interest rates
   - Decrease short-term interest rates
   - Lower income taxes
   - Increase government spending

- Don't know / No answer

5. Imagine you have 100€ in a bank account. Your money earns 10% interest rate per year . How many euros would you have in your account after two years? [*Note: This question was only asked in the household survey.*]

   - a little more than 120 €
   - exactly 120 €
   - exactly 200 €
   - exactly 110 €
   - Don't know

6. Imagine that your net income (income after taxes and duties) was twice as high in 2023, but that the prices of all goods had also doubled. How much could you then buy with your income in 2023? [*Note: This question was only asked in the household survey.*]

   - just as much as today
   - more than today
   - less than today
   - cannot be determined on the basis of the information given
   - Don't know

7. What inflation rate does the European Central Bank (ECB) aim for in the medium term? [Only integer numbers in the range of 0 to 100 are allowed]

   ___ %

8. On a scale from 0 (strongly disagree) to 4 (totally agree), how much do the following statements apply to you? [*Matrix Question*]

   - I usually expect the best in uncertain times.
   - I find it easy to relax.
   - If something can go wrong for me, it will.
   - I always look on the bright side of my future.
   - I feel comfortable in my circle of friends.
   - It is important for me to always be busy.
   - Things almost never work out the way I want them to.
   - I am not easily upset.

- I rarely count on good things happening to me.
- All in all, I expect more good things to happen to me than bad things.
- No answer

The following questions ask about your assessment of the general price level development in Germany. Inflation is the percentage increase in the general price level, usually measured by the consumer price index. A decline in the price level is commonly referred to as "deflation."

9. What do you think the inflation or deflation rate in Germany was over the past 12 months? [Numeric values with one decimal place in the range of -100 to +100]

   ___ %

10. What do you expect the inflation or deflation rate in Germany will be over the next 12 months? [Numeric values with one decimal place in the range of -100 to +100]

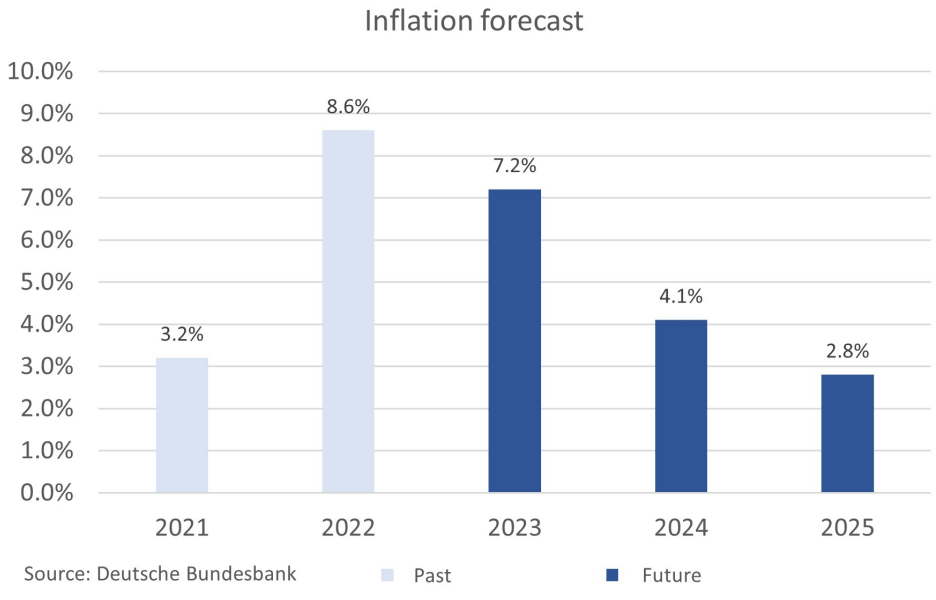
    ___ %

11. What do you expect the inflation or deflation rate in Germany will be over the next 5 years? [Numeric values with one decimal place in the range of -100 to +100]

    ___ %

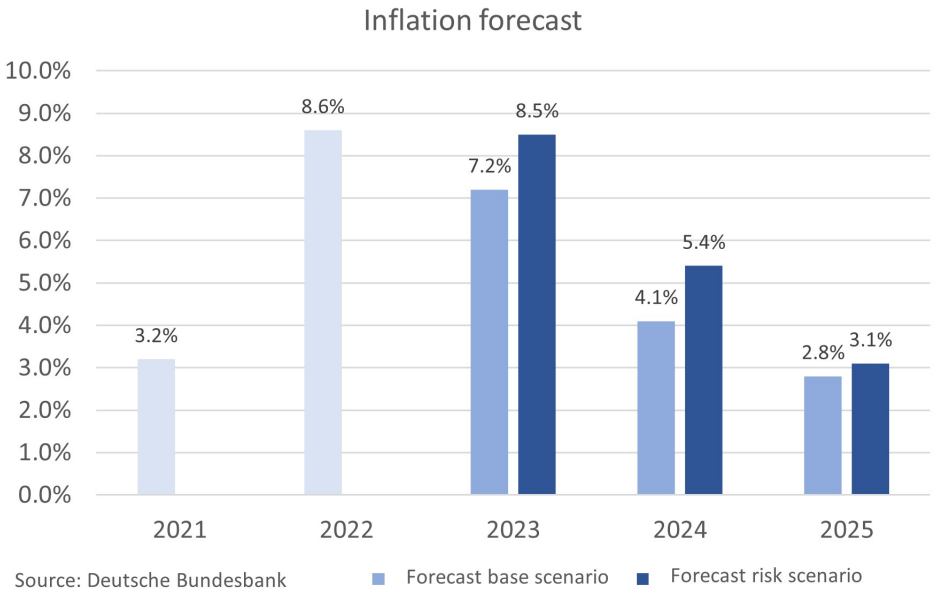
[*Note: Random allocation into 4 groups (equally sized): 1 Control Group and 3 Treatment Groups*]

Figure A2: *Forecast* Treatment



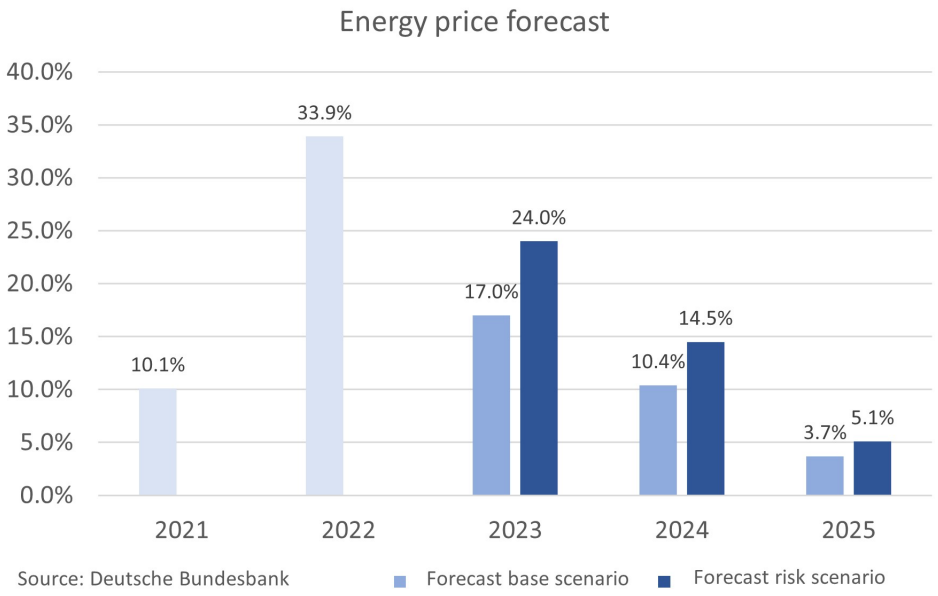
In 2021, the inflation rate in Germany averaged 3.2% and in 2022 8.6%. The Deutsche Bundesbank expects average inflation rates in Germany of 7.2%, 4.1% and 2.8% for 2023, 2024 and 2025 respectively.

Figure A3: *Forecast Risk* Treatment



In 2021, the inflation rate in Germany averaged 3.2% and in 2022 8.6%. The Deutsche Bundesbank expects average inflation rates in Germany of 7.2%, 4.1% and 2.8% for 2023, 2024 and 2025 respectively.
The Bundesbank emphasizes the high level of uncertainty in forecasting inflation rates due to the war in Ukraine. In a risk scenario in which a sharper conflict with Russia and stronger geopolitical tensions are assumed, the expected average inflation for Germany for 2023, 2024 and 2025 rises to 8.5%, 5.4% and 3.1%.

Figure A4: *Energy Risk* Treatment



In 2021, energy prices in Germany increased by an average of 10.1% and by 33.9% in 2022. The Bundesbank expects energy prices in Germany to rise by an average of 17%, 10.4% and 3.7% in 2023, 2024 and 2025 respectively.
The Bundesbank emphasizes the high level of uncertainty in forecasting energy prices due to the war in Ukraine. In a risk scenario in which a sharper conflict with Russia and stronger geopolitical tensions are assumed, the expected average energy prices for Germany for 2023, 2024 and 2025 rise to 24%, 14.5% and 5.1%, respectively.

12. We are interested in your opinion on the development of the inflation rate in the next 12 months. In your opinion, what will be the minimum and maximum inflation or deflation rate in the next 12 months?

    minimum ___ %

    maximum ___ %

13. How confident are you that the average inflation rate over the next 12 months will exceed the mean value of the minimum and maximum expectations?

    - Scale: 0 (Completely uncertain) to 10 (Completely certain)

14. We are interested in your opinion on the development of the inflation rate in the next 5 years. In your opinion, what will be the minimum and maximum inflation or deflation rate in the next 5 years?

    minimum ___ %

    maximum ___ %

15. How confident are you that the average inflation rate over the next 5 years will exceed the mean value of the minimum and maximum expectations?

    - Scale: 0 (Completely uncertain) to 10 (Completely certain)

16. Suppose you were given the choice between receiving a payment today or a payment in 12 months. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 12 months is different in every situation. For each of these situations, we would like to know which one you would choose. Please consider the following: Would you rather receive amount 100€ today or X€ in 12 months? [*Note: Note: The complete decision tree can be seen in Figure A5*]

17. Suppose you were given the choice between receiving a payment today or a payment in 5 years. We will now present to you five situations. The payment today is the same in each of these situations. The payment in 5 years is different in every situation. For each of these situations, we would like to know which one you would choose. Please consider the following: Would you rather receive amount 100€ today or X€ in 5 years? [*Note: Note: The complete decision tree can be seen in Figure A6*]

18. In the following question, we ask you to assess your willingness to take financial risk. A value of 0 means that you are willing to take a low financial risk, typically associated with a lower return, and a value of 10 means that you are willing to take a high financial risk, typically associated with a high return. Where would you place yourself on the following scale?

    - Scale: 0 (Low financial risk) to 10 (High financial risk)

19. Please indicate your gender:

    - Female
    - Male
    - Diverse

20. Please enter your year of birth:

    ___

21. What is your highest educational or vocational qualification?

    - Currently a student
    - Currently in training or studies (no Bachelor's degree yet)
    - Completed vocational training (apprenticeship)
    - Completed vocational school (professional school, higher business school)
    - Completed training at a technical school, technical college, or professional academy
    - Completed a master's school with a long preparation time of more than 880 hours
    - Completed a Bachelor's degree, university of applied sciences degree, engineering school
    - Completed a diploma or Master's degree, teacher training completed
    - Completed a doctorate
    - Other vocational qualification
    - No educational qualification (and currently not in training or studying)
    - Other

22. What is your household's total monthly net income?

    - under 500 Euros
    - 500 to 999 Euros
    - 1000 to 1,499 Euros
    - 1,500 to 1,999 Euros
    - 2,000 to 2,499 Euros
    - 2,500 to 2,999 Euros
    - 3,000 to 3,499 Euros
    - 3,500 to 3,999 Euros
    - 4,000 to 4,999 Euros
    - 5,000 to 5,999 Euros
    - 6,000 to 7,999 Euros
    - 8,000 to 9,999 Euros
    - 10,000 Euros or more
    - No answer

C Additional Figures

Figure A5: Staircase Method Patience for 12 Months

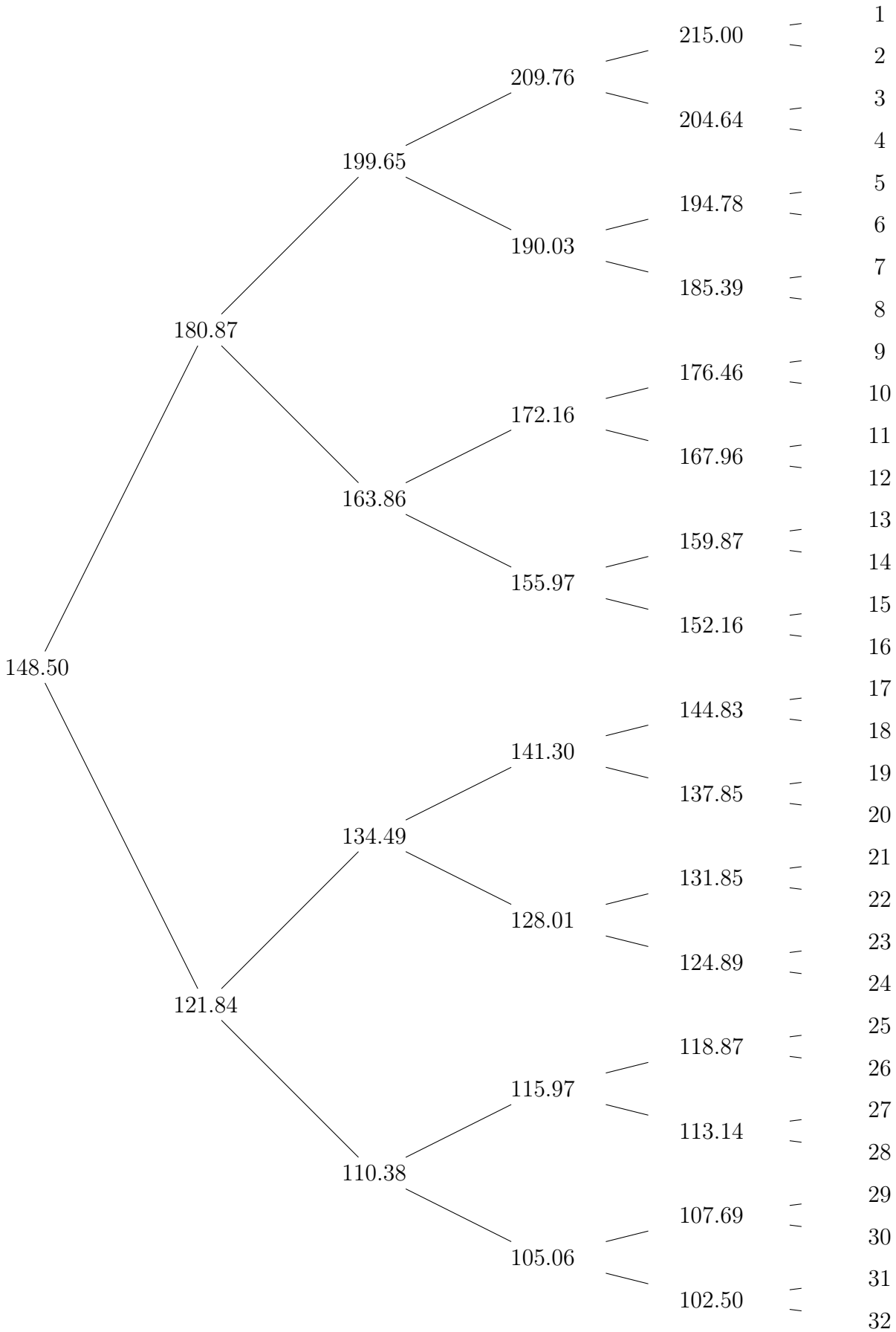


Figure A6: Staircase Method Patience for 5 Years