

Dräger, Lena; Nghiem, Giang

**Conference Paper**

## Inflation Literacy, Inflation Expectations, and Trust in the Central Bank: A Survey Experiment

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2023: Growth and the "sociale Frage"

**Provided in Cooperation with:**

Verein für Socialpolitik / German Economic Association

*Suggested Citation:* Dräger, Lena; Nghiem, Giang (2023) : Inflation Literacy, Inflation Expectations, and Trust in the Central Bank: A Survey Experiment, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2023: Growth and the "sociale Frage", ZBW - Leibniz Information Centre for Economics, Kiel, Hamburg

This Version is available at:

<https://hdl.handle.net/10419/277587>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Inflation Literacy, Inflation Expectations, and Trust in the Central Bank: A Survey Experiment

Lena Dräger\*      Giang Nghiem†

February 17, 2023

## Abstract

This paper studies the causal effect of inflation literacy on inflation expectations using a randomized control trial (RCT) on a representative sample of the German population. We find that general and non-numerical information about inflation and monetary policy improves respondents' inflation literacy. It also causes a higher likelihood that respondents provide inflation predictions, but does not affect the quantitative levels of the predictions. In the second step, respondents are randomly provided with different quantitative information treatments about inflation. Those who received the literacy treatment react more strongly to some quantitative treatments regarding their reported forecast uncertainty and trust in the central bank. This suggests that general knowledge about inflation and monetary policy is relevant for inflation expectations via indirect factors such as uncertainty and trust.

**Keywords:** Inflation literacy, inflation expectations, trust in the central bank, survey experiment, randomized control trial (RCT).

**JEL classification:** E52, E31, D84.

---

\*Leibniz University Hannover and CESifo, Email: [draeger@gif.uni-hannover.de](mailto:draeger@gif.uni-hannover.de)

†Leibniz University Hannover, Email: [nghiem@gif.uni-hannover.de](mailto:nghiem@gif.uni-hannover.de)

We thank seminar participants at the 4<sup>th</sup> Behavioral Macroeconomics Workshop: Heterogeneity and Expectations in Macroeconomics and Finance and at the Leibniz University Hannover for comments and suggestions.

# 1 Introduction

Central banks increasingly communicate directly with the general public, with the aim of building trust as well as guiding and anchoring inflation expectations in the population by explaining monetary policy decisions (Blinder et al., 2022). At the same time, consumers often struggle with concepts like inflation and do not fully understand how monetary policy functions (Blinder and Krueger, 2004; Burke and Manz, 2014; van der Crujsen et al., 2015). In this environment, which type of communication would help increase literacy regarding inflation and monetary policy, and enable households to better incorporate information into their expectations on future inflation?

This paper uses randomized controlled trials (RCTs) to study the causal effect of a *literacy* treatment providing general information on inflation and the tasks of monetary policy on consumers' literacy about these topics as well as their predictions of current and expected inflation. In a second step, we evaluate whether the *literacy* treatment enables consumers to better incorporate additional quantitative information into their forecasts. Finally, we study how the literacy treatment and the quantitative information treatments jointly affect respondents' trust in the central bank. We ran the survey experiment on a representative internet-based panel of 4,000 German households during March 1-11, 2022 via *Bilendi & respondi*, one of the major institutions in data collection for market research in Europe. After 3 months, from 14 June to 11 July 2022, we ran a follow-up survey to investigate whether the treatments have persistent effects on literacy, inflation forecasts and trust in the central bank.

Our experiment is organized into two steps: In the first step, half of the respondents are randomly selected to receive a 1-minute reading text with general information about inflation and monetary policy. In this *literacy* treatment, we explain briefly how inflation/deflation is measured and its relationship with personal consumption, savings, borrowing, and investment. The text is completed with a short introduction about the Eurosystem including both the Bundesbank and the ECB, the primary goal of the Eurosystem in general terms, and the main monetary policy instruments. Note that in this text, we only focus on explaining the basic economic intuition of inflation and monetary policy, but do not provide any numerical information about the level of inflation rates or the inflation target. We then ask all respondents some test questions to measure inflation and financial literacy as well as their point predictions on perceived and expected inflation and the inflation target of the ECB.

In a second step, we randomly split the population into five groups. One group acts as control group with no further information, while the other groups receive one of the following numerical information treatments on inflation: (1) the inflation target of the ECB, (2) the inflation target of the ECB and an additional text about the ECB's commitment to take into account the effect of climate change, (3) the current inflation rate for Germany, and (4) the current inflation rate for Germany and the Bundesbank's

inflation projections over the next three years. Note that within the five treatment groups, some respondents received the initial *literacy* treatment, and some did not. We then use probabilistic questions to measure posterior perceived and expected inflation. Our survey is completed with questions on trust in the ECB and the Bundesbank. This two-step set-up allows us to evaluate, first, the causal effect of the *literacy* treatment on consumers' literacy and on their prior inflation predictions and, second, to investigate how consumers incorporate the quantitative information treatments into posterior inflation predictions and whether there are interaction effects with the *literacy* treatment.

Our results show that consumers' knowledge of inflation and monetary is generally low. In the control group, more than half of the respondents answered correctly only two out of five basic multiple-choice questions on the definition of inflation, inflation and real consumption, monetary policy objectives and instruments, and the effect of monetary policy on inflation. About a third of respondents are not able to provide point predictions on perceived and expected inflation. Just about 40% of respondents know the main objective of the ECB is to maintain price stability, and only about 20% of the surveyed population correctly report the inflation target of the ECB at 2%.

The provision of general information about inflation and monetary policy in the *literacy* treatment increases the average inflation literacy score by 20%. The effect is sizable and highly statistically significant, and remains significant in the follow-up survey after three months. Moreover, those who received the *literacy* treatment are significantly more likely to provide predictions on perceived and expected inflation. However, the *literacy* treatment has no effect on the formation of perceived and expected inflation quantitatively. This suggests that general information about inflation and monetary policy makes consumers more confident in their ability to predict inflation, but does not affect the level of predictions.

Does higher inflation literacy also enable consumers to better incorporate quantitative information into their inflation forecasts? We find that consumers update their inflation predictions in response to the quantitative information treatments, but this effect is not stronger for those who received the *literacy* treatment in the first step. In particular the information on inflation in January 2022 (the latest available data at the time of our survey) improved the accuracy of the inflation nowcast with respect to inflation realized in February 2022, but again this effect is independent of the *literacy* treatment. However, the *literacy* treatment does interact with the quantitative information treatments in terms of their effect on the uncertainty of inflation predictions and on trust in the central bank. On average, respondents in the *literacy* treatment report higher uncertainty on posterior expected inflation. However, those who received both the *literacy* treatment and the information on either the ECB inflation target or the current inflation rate report lower uncertainty. Similarly, consumers in the *literacy* treatment on average report higher trust in both the ECB and the Bundesbank, but this effect is reduced if they receive additional information about the target or about current inflation. This implies that respondents

who receive the *literacy* treatment are better able to understand that current inflation in the beginning of 2022 was far from target, which had implications for their trust in the monetary policy institutions.

Our paper makes three main contributions. First, we contribute to the literature studying the effect of economic literacy on the formation of inflation expectations (Burke and Manz, 2014, van der Crujsen et al., 2015, Rumler and Valderrama, 2020). Burke and Manz (2014) employ a Laboratory experiment and find that those with higher economic literacy are more likely to select more relevant information to form inflation expectations and have more accurate inflation expectations. van der Crujsen et al. (2015) analyze a Dutch household survey and find that better knowledge about the ECB monetary policy objectives is positively associated with more realistic and accurate inflation expectations. Rumler and Valderrama (2020) show that Austrian households who are more inflation literate have more accurate short-run and long-run inflation expectations, but they are less certain when making inflation predictions. We conduct a similar exercise in the first step of our experiment, and then proceed to test how additional quantitative information is incorporated in a second step.

Second, we add to the studies on the effect of inflation and monetary policy knowledge on trust in the central bank and the interaction with inflation expectations (Hayo and Neuenkirch, 2014, Mellina and Schmidt, 2018, Brouwer and de Haan, 2022a, Brouwer and de Haan, 2022b, Christelis et al., 2020). Using surveys on a German sample, Hayo and Neuenkirch (2014) and Mellina and Schmidt (2018) find that those who are more knowledgeable about the Bundesbank and the ECB have higher trust in these institutions. Brouwer and de Haan (2022b) evaluate a Dutch household survey and find that financial literacy is positively correlated with trust in the ECB. Christelis et al. (2020) demonstrate that trust in the ECB correlates negatively with consumers' inflation expectations. While these papers study the correlation of central bank knowledge and/or financial literacy with trust in the central bank, our paper investigates the causal effect of providing general information of inflation and monetary policy on inflation predictions and trust in the central bank.

Using an RCT among a Dutch sample, Brouwer and de Haan (2022a) study the causal effect of introducing different monetary policy instruments on inflation expectations and trust in the ECB. In this RCT setup, all respondents receive information about the ECB's goal at the beginning of the survey, and subsets of the sample receive information about different monetary policy instruments. The authors find that introducing monetary policy instruments does affect inflation expectations, but not trust in the ECB. In our study, we randomly provide general information about inflation and monetary policy and test whether those who receive this text are better at incorporating further numerical information on inflation into their inflation predictions as well as their trust in the ECB and Bundesbank.

Finally, our paper is related to the literature studying the effect of monetary policy communications on household inflation expectations using RCTs (e.g. [Coibion et al., 2022](#), [Dräger et al., 2022](#)). [Coibion et al. \(2022\)](#) conduct an RCT on 20,000 U.S. individuals in 2018 to study the causal effect on inflation expectations by providing randomly different forms of information on inflation. [Dräger et al. \(2022\)](#) field an RCT on German consumers in 2021 when inflation surged in Germany. In their RCT setup, all respondents are informed about the current inflation rate and different subsets receive additional information on future expected inflation, either as qualitative or quantitative statements. Our RCT design differs in its two-step form and enables us to jointly test the role of non-numerical and numerical information about inflation and monetary policy on the formation of inflation expectations.

Our paper is organized as follows. Section 2 presents the survey experiment and data, Section 3 shows the results, and Section 4 concludes.

## 2 Survey Experimental Design and Data

We conducted the survey on an internet-based panel of 4,000 German consumers during March 1-11, 2022 via *Bilendi & respondi*. This is a representative sample of the German population with respect to age, gender, income, and region. After 3 months, from 14 June to 11 July 2022, we ran a follow-up survey with 2,851 respondents from the first wave. Following [Binder \(2020\)](#), in both survey waves, respondents are only allowed to take the survey if they responded affirmatively to the following question:

We care about the quality of our data. In order for us to get the most accurate measures of your knowledge and opinions, it is important that you thoughtfully provide your best answers to each question in this survey. Do you commit to thoughtfully provide your best answers to each question in this survey?

In the first wave, after a set of questions designed to elicit consumers’ demographic characteristics, the survey sample is randomly split, and 50% of respondents receive a 1-minute reading text containing general and non-numerical information on inflation and monetary policy. This is the *literacy* treatment:

Inflation is the percentage increase in the general price level. This means that 1 Euro buys less than it did 12 months ago. By contrast, a fall in general prices is called “deflation”. Inflation is usually measured using the index of consumer prices and comparing prices today with prices 12 months ago. The index of consumer prices measures prices of a basket of selected goods and services, such as rent, energy, food and drink, transport, health, education and durable goods like furniture, computers or household appliances.

High inflation has economic costs, for instance reducing the purchasing power of those with fixed incomes or savings. However, people with debt, for instance

households with a mortgage, also benefit from inflation, since inflation reduces the value of their debt. Low and stable inflation is regarded as optimal for the economic development, since low inflation encourages investment, while keeping down the economic costs of inflation. Deflation is detrimental for economic development because with prices falling, there is an incentive to not consume or invest today, but rather wait to see if prices will fall further. This can cause a recession with rising unemployment.

Since Germany is part of the Euro area, its monetary policy is decided by the Eurosystem, consisting of the European Central Bank and the national central banks like the Bundesbank. The Eurosystem is responsible for keeping prices stable throughout the Euro area over the medium term. This means that average inflation over a period of 1-3 years should be low and stable. The Eurosystem can achieve this by setting interest rates and/or by buying securities from banks.

Next, we ask all respondents some test questions about inflation, monetary policy, and financial literacy. Most of these questions are taken and/or slightly modified from [Burke and Manz \(2014\)](#) and [Lusardi and Mitchell \(2011\)](#). We construct an index of inflation literacy for each consumer as the sum of the number of correct answers on five questions about (1) the definition of inflation, (2) inflation and real consumption, (3) objectives of monetary policy, (4) monetary policy instruments, (5) macroeconomic policy and inflation. Following [Lusardi and Mitchell \(2011\)](#), we construct an index of financial literacy as the number of correct answers on three questions on: (1) inflation and real consumption, (2) interest rate compounding, and (3) risk diversification.

We then ask respondents about their point predictions regarding inflation over the previous 12 months, as well as inflation expectations in the next 12 months and in the next 3 years, and the annual inflation target of the ECB over the medium run. These point predictions are evaluated with respect to the single effect of the first *literacy* treatment, and serve as prior expectations for the additional information treatments in the second step.

In the next step, we randomly split the sample again, this time into five groups. One group acts as control group and does not receive any further information. The other four groups receive four different information treatments, all of which are numerical and relate to inflation. The intention of the second round of information treatments is to study whether respondents who received the general information in the first step, are also better able to incorporate additional information into their forecasts.

Each treatment group receives one of the following information:

- Treatment 1 shows the inflation target of the ECB (*ECB target*):

Since its strategy review enacted in July 2021, the European Central Bank (ECB) is committed to setting its monetary policy to ensure that inflation stabilizes at its 2% target in the medium term. This target is symmetric,

meaning that the ECB considers negative and positive deviations from this target as equally undesirable.

- Treatment 2 shows the inflation target of the ECB and the ECB’s commitment to taking account for the effect of climate change on the stability of the financial system (*ECB targetplus*):

Since its strategy review enacted in July 2021, the European Central Bank (ECB) is committed to setting its monetary policy to ensure that inflation stabilizes at its 2% target in the medium term. This target is symmetric, meaning that the ECB considers negative and positive deviations from this target as equally undesirable.

In addition, the ECB is now committed to accounting for the effect of climate change on the stability of the financial system.

- Treatment 3 shows the inflation rate in Germany in January 2022, that is the most recent available inflation rate at the time of the first wave of our survey (*current Inf.*):

The inflation rate in Germany, measured as the year-on-year change in the consumer price index, was measured at +4.9% in January 2022. Since 1994, inflation rates across German federal states have been very close to each other.

- Treatment 4 shows the inflation rate in Germany in January 2022 as well as the Bundesbank inflation projections in the next three years (*current plus forecast Inf.*):

The inflation rate in Germany, measured as the year-on-year change in the consumer price index, was measured at +4.9% in January 2022. The Bundesbank inflation projections, published in December 2021, forecast average inflation in Germany at 3.6% in 2022, 2.2% in 2023 and 2.2% in 2024.

We then ask all respondents again about their predictions about inflation perceptions and expectations, but avoid asking the same questions twice. Instead, we follow the design of the New York Fed Survey of Consumer Expectations: We elicit a full probability distribution of expectations by asking respondents assign probabilities to ten different bins of inflation/deflation rates as follows: [-12% or less], [-12%; -8%], [-8%; -4%], [-4%; -2%], [-2%; 0%], [0%; 2%], [2%; 4%], [4%; 8%], [8%; 12%], and [12% or more]. Following [Coibion et al. \(2022\)](#), we construct the weighted average and standard deviation of inflation perceptions and expectations for each respondent by using the midpoints of each bin and use the values of -14% and 14% when respondents allocate weights to bin for [-12% or less] and [12% or more] respectively. These expectations are the posterior predictions and are compared to prior point forecasts. Finally, we ask respondents about their level of trust in the ECB as well as the Bundesbank on a scale from 0 to 10.



In the follow-up survey, we do not include any information treatments, but simply re-sample respondents' inflation predictions and trust in the ECB as well as the Bundesbank and repeat the test questions about inflation and monetary policy to measure whether the treatments have longer-lasting effects. The exact survey questions are provided in the Appendix.

In our survey, we allow the respondents to choose the option of “do not know” to mitigate the issue of forcing them to give arbitrary answers when asking about inflation predictions. We find that about a third of respondents choose the “do not know” answer for questions about inflation perceptions and expectations. Surprisingly, nearly half of the respondents said they do not know the ECB's inflation target, and among those who provided numerical predictions, only 37% answered correctly at 2%. This means that just about 20% of the surveyed population knows about the inflation target of the ECB.

As our paper aims to study simultaneously the treatment effects on the formation of inflation perceptions, short-and medium-run inflation expectations, as well as trust in the central bank, in the main analysis we exclude those who choose the option "do not know" to one of the variables of interest.

Finally, in our regression analysis, we control for a wide range of demographic characteristics, including age, education, gender, income, employment status, house owner, household size, and region. Our results generally remain unchanged if we exclude these demographic controls and are available upon request. To control for outliers, we mainly employ Huber robust regressions. Given that our surveys were conducted during a period with high and rising inflation (CPI inflation in Germany was 7.3% in March 2022, and 7.6% in June 2022), to additionally control the effect of outliers, we drop respondents who predict inflation lower than -1%. Note that in our designed survey, 14% is the maximum value of probabilistic inflation predictions, so to be consistent we also select those who have point inflation predictions less than or equal to 14%. We show these robustness checks results in the Appendix. In the main paper, we present our results using the sample without any restrictions on the value of inflation predictions.

## 3 Results

### 3.1 The effect of providing general information about inflation and monetary policy

We estimate the causal effect of providing general knowledge about inflation and monetary policy on economic literacy and inflation predictions using the following equation:

$$Y_i = \alpha + \beta Literacy_i + \gamma X_i + \epsilon_i, \quad (1)$$

where *Literacy* is a dummy variable indicating whether consumer  $i$  received a 1-minute reading text about inflation and monetary policy;  $Y$  is the outcome of interest, measured right after providing the *literacy* treatment, including inflation literacy, financial literacy, and inflation point predictions;  $X$  is a vector of control variables and includes age, education, gender, income, employment status, house owner, household size, and region.  $\beta$  is our coefficient of interest.

### 3.1.1 The effect on inflation literacy

Table 1 shows the treatment effect on the index of inflation literacy, measured as the number of correct answers to five questions about (1) the definition of inflation, (2) inflation and real consumption, (3) objectives of monetary policy, (4) monetary policy instruments, (5) macroeconomic policy and inflation. The Table also presents the treatment effect on the index of financial literacy, measured as the number of correct answers to three questions: (1) Inflation and real consumption, (2) Interest rate, and (3) Risk diversification. On average, in the control group, inflation and financial literacy scores stand at 2.3 and 1.9, respectively.

We find that the *literacy* treatment significantly improves the inflation literacy index. Compared to the sample average, receiving the general, non-numerical text on inflation and monetary policy corresponds to a 20% increase in the average score in the test questions about inflation and monetary policy in the first wave survey. The *literacy* treatment also statistically significantly improves the average score in the financial literacy test questions, but the magnitude of the effect is relatively small, corresponding about 5% increase in the average grade of the financial literacy test.

In the second wave, we repeat the test questions measuring inflation literacy. We find that the *literacy* treatment still significantly affects inflation literacy after three months, though the magnitude of the effect is only about a third compared with the first wave.

In the Appendix, Tables A1 and A2 show the effect of the *literacy* treatment on the probability of answering correctly each question included in the inflation and financial literacy scores. We find that the *literacy* treatment significantly affects the probability of answering correctly all questions included in the inflation literacy measure in the first wave. However, the treatment has no effect on answering correctly the questions about interest rate compounding and risk diversification in the financial literacy test. These results suggest that the provided information only helps the receivers in understanding the basic intuition regarding inflation and monetary policy. The significant effects of the treatment on inflation literacy also imply that respondents in the treated group pay attention to the information text they are provided with.

Table 1: Effect of the Literacy Treatment on Economic Literacy Scores

	Immediate		3 months later
	(1) Inflation literacy score	(2) Financial literacy score	(3) Inflation literacy score
Literacy	0.38*** (0.04)	0.087*** (0.03)	0.14*** (0.05)
R <sup>2</sup>	0.157	0.094	0.131
N observations	4000	4000	2851

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the OLS regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 3.1.2 The effect on inflation predictions

Table 2 shows the treatment effect on inflation point predictions, including inflation perceptions ( $\pi^p$ ), inflation expectations in the next 12 months ( $\pi^{e,1y}$ ) and in the next 3 years ( $\pi^{e,3y}$ ), as well as respondents' guess about the inflation target of the ECB ( $\pi^{ECB,target}$ ). The questions were asked *prior to* the second round of quantitative information treatments about inflation.

As about 30-40% and nearly 50% of respondents did not provide estimates of inflation perceptions, expectations and the ECB inflation target, respectively, we study both the extensive and intensive margins of the *literacy* treatment. The former measures the treatment effect on the probability of providing predictions, while the latter shows the treatment effect on the quantitative level of inflation predictions, provided that a prediction was made.

Table 2 shows that those who received the *literacy* treatment are about 5 percentage points more likely to answer these questions and the treatment effects are statistically significant at 1%. This suggests that the general information we provided made respondents more confident in providing numerical point predictions about current and future inflation, or in providing a guess about the ECB's inflation target, even though the information in the *literacy* treatment contained no numerical information about current/future inflation or the inflation target.

This is reflected also in our second finding on the intensive margin: Provided that a prediction was made, the *literacy* treatment has no significant effect on the size of respondents' prediction. Overall, these results suggest that providing some economic intuition on inflation and monetary policy potentially helps respondents to understand inflation questions, so increases the likelihood of answering them (extensive margin), but does not affect the level of the point predictions relative to the control group (intensive margin).

Table 2: Effect of the Literacy Treatment on Inflation Predictions

	Extensive Margin				Intensive Margin			
	(1) $\pi^p$	(2) $\pi^{e,1y}$	(3) $\pi^{e,3y}$	(4) $\pi^{ECB,target}$	(5) $\pi^p$	(6) $\pi^{e,1y}$	(7) $\pi^{e,3y}$	(8) $\pi^{ECB,target}$
Literacy	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	-0.05 (0.06)	-0.1 (0.10)	-0.04 (0.11)	0.02 (0.05)
Pseudo R <sup>2</sup>	0.063	0.057	0.064	0.080				
R <sup>2</sup>					0.010	0.044	0.017	0.025
N observations	4000	4000	4000	4000	1950	1950	1950	1578

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. The extensive margin measures the treatment effect on the probability of providing inflation forecasts. The intensive margin measures the treatment effect on the size of inflation forecasts, provided that a forecast is made by respondents. This table reports the marginal effect from probit regressions (columns 1-4) and estimated coefficients from Huber robust regressions (columns 5-8). Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 3.2 The effect of providing further numerical information about inflation

After evaluating the effect of the general information provided in the *literacy* treatment on prior expectations, we next turn to investigating how the literacy treatment interacts with further numerical information treatments on posterior expectations. The intention is to study whether respondents who received the general information are also better able to incorporate additional quantitative information into their forecasts.

We estimate the following equation:

$$Y_i = \alpha + \beta_0 Literacy_i + \sum_{j=1}^4 \beta_j Treatment_{j,i} + \sum_{j=1}^4 \eta_j Treatment_{j,i} \times Literacy_i + \gamma X_i + \epsilon_i, \quad (2)$$

where *Literacy* is a dummy variable indicating whether consumer  $i$  received a 1-minute reading text about inflation and monetary policy; *Treatment<sub>j</sub>* indicating whether consumer  $i$  received one of further numerical information treatments: (1) the inflation target of the ECB (*ECB target*), (2) the inflation target of the ECB and an additional text about the ECB's commitment to take into account the effect of climate change (*ECB targetplus*), (3) the current inflation rate (*current inf.*), (4) the current inflation rate and the Bundesbank's inflation projections over the next three years (*current plus forecast inf.*), in addition to a control group who did not receive any further information.  $Y$  is the outcome of interest, measured after providing further information treatments;  $X$  is a vector of the same set of control variables used in equation 1.  $\beta$  and  $\eta$  are our coefficients of interest.

We evaluate the interaction of the *literacy* treatment with numerical information treatments on the change inflation predictions after the numerical information treatments, the uncertainty of posterior predictions, the accuracy of posterior inflation perceptions and the posterior level of trust in the central bank.

### 3.2.1 Treatment effects on updates of inflation predictions

First, we study the treatment effects on updates in inflation predictions after providing further numerical information treatments. Prediction updates are measured as the difference between prior and posterior inflation perceptions or expectations, that is  $\Delta\pi = \pi_{probabilistic}^{posterior} - \pi_{point}^{prior}$ .

Table 3 shows the results. We find that the *literacy* treatment, either with or without further information, has no significant effect on updates in inflation predictions. This means that respondents who received general information about inflation and monetary policy in the first part of the survey, on average did not update inflation predictions differently compared to those who did not receive this general information. The numerical information treatments did significantly influence changes in predictions: We find that those who received the ECB inflation target or the Bundesbank inflation projections significantly reduced their perceived inflation by 0.5-0.7 percentage points compared to the control group, while those who received information on the current inflation rate gave higher predictions. We also find that the treatment *current inf.* significantly increases the expected inflation in both 1 and 3 years by about 0.6-0.8 percentage points in the first wave.

Surprisingly, we find that those who receive the information about the inflation target of the ECB and Bundesbank inflation projections show no significant differences regarding inflation expectations either in 1 or 3 years. This result is in contrast with the previous literature. For example, individuals' inflation expectations are influenced strongly when they are provided with the information on the central bank's inflation target [Coibion et al. \(2022\)](#) or professional forecasts [Dräger et al. \(2022\)](#). A possible explanation for our results is that our survey was conducted when inflation was soaring and highly volatile.

### 3.2.2 Treatment effects on the uncertainty of inflation predictions

This subsection studies the treatment effects on the uncertainty of inflation predictions, which we measured as the standard deviation of inflation predictions from probabilistic questions. Table 4 shows the results.

We find that the *literacy* treatment increases the uncertainty of inflation expectations in the next 1 and 3 years in the first wave. This result is in line with [Rumler and Valderama \(2020\)](#) who find that individuals with higher inflation literacy are more uncertain about their inflation expectations. A possible explanation for this result is that inflation-literate individuals realize the difficulties involved in predicting inflation, and therefore

Table 3: Treatment Effects on Updates of Inflation Predictions

	Immediate			3 months later	
	(1) $\Delta\pi^p$	(2) $\Delta\pi^{e,1y}$	(3) $\Delta\pi^{e,3y}$	(4) $\Delta\pi^{e,1y}$	(5) $\Delta\pi^{e,3y}$
Literacy	-0.08 (0.31)	0.2 (0.29)	0.2 (0.27)	0.2 (0.50)	-0.002 (0.46)
ECB target	-0.5* (0.32)	-0.3 (0.30)	-0.03 (0.28)	0.2 (0.53)	-0.3 (0.48)
ECB targetplus	-0.6* (0.32)	-0.1 (0.30)	0.1 (0.28)	0.6 (0.50)	-0.01 (0.46)
Current inf.	0.4 (0.32)	0.8*** (0.30)	0.6** (0.28)	-0.05 (0.51)	-0.5 (0.47)
Current plus forecast inf.	-0.7** (0.31)	-0.4 (0.30)	-0.4 (0.27)	0.4 (0.51)	-0.5 (0.47)
ECB target $\times$ Literacy	-0.01 (0.44)	-0.2 (0.42)	-0.4 (0.38)	-0.3 (0.73)	0.1 (0.67)
ECB targetplus $\times$ Literacy	0.1 (0.44)	-0.2 (0.42)	-0.4 (0.38)	-1.2* (0.72)	-0.4 (0.66)
Current inf. $\times$ Literacy	-0.2 (0.44)	-0.2 (0.42)	-0.1 (0.38)	0.5 (0.72)	0.4 (0.66)
Current plus forecast inf. $\times$ Literacy	0.3 (0.43)	0.1 (0.41)	0.09 (0.38)	-0.5 (0.71)	0.1 (0.65)
R <sup>2</sup>	0.039	0.035	0.033	0.031	0.023
N observations	1950	1950	1950	1444	1444

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

become less overconfident regarding their forecast accuracy. However, the effects become insignificant in the second wave.

The table also shows that all the numerical treatments, except for *ECB targetplus*, reduce the uncertainty of inflation perceptions in the first wave. Potentially, adding the central bank’s commitment regarding climate change makes it harder for respondents to estimate the effect of this new policy on the development of future prices compared with the monetary policy objective focused solely on the inflation target.

We find that only those who received treatment *current and forecast inf.* are more confident in predicting future inflation rates, either in the next 1 or 3 years in the first survey wave. These results imply the importance of providing inflation projections to the public if the central bank aims to anchor the general public’s inflation expectations.

Regarding the interactions of the *literacy* treatment with further information treatments, we find that more general knowledge combined with quantitative information generally reduces the uncertainty of future inflation predictions, where the interaction effect is significant for those who received either the *current inf.* or the *ECB target* and the *literacy* treatments.

### 3.2.3 Treatment effects on the accuracy of perceived inflation

Next, we study the treatment effects on the accuracy of inflation perceptions measured as the absolute and normal deviation of inflation perception in the last 12 months from the actual annual inflation rate in February 2022. While the absolute deviation measures the magnitude of the prediction error, the normal deviation reveals the sign of the error. Note that the first wave of our survey was conducted at the beginning of March 2022 (from 1-11 March) and we ask respondents to provide their perceived inflation in February 2022 compared with February 2021. Also, the information we provide on current inflation in treatments *current inf.* and *current plus forecast inf.* present the annual inflation rate in January 2022, which is the most recent official inflation data published to the time we conducted the survey. Table 5 shows the results.

Regarding the magnitude of prediction errors, we find that the *literacy* treatment has no significant effect on inflation perception accuracy. Among further numerical information treatments, only the treatment *current inf.* significantly reduces the absolute prediction errors. However, we find that those who received treatments on the *ECB target*, *ECB targetplus*, and *current plus forecast inf.* have significantly lower inflation perceptions by 0.6-0.8 percentage point compared with the control group who did not received any information. On the other hand, those who received information on the current inflation rate have no significant differences compared with the control group. These results imply that the German at the time of our survey in an environment with rising inflation, our representative sample was reasonably well informed about the current inflation rate. However, those who received the information about the ECB inflation target or inflation

Table 4: Treatment Effects on the Uncertainty of Predictions

	Immediate			3 months later	
	(1) $\sigma\pi^p$	(2) $\sigma\pi^{e,1y}$	(3) $\sigma\pi^{e,3y}$	(4) $\sigma\pi^{e,1y}$	(5) $\sigma\pi^{e,3y}$
Literacy	-0.02 (0.19)	0.4** (0.18)	0.3** (0.17)	-0.02 (0.22)	-0.02 (0.22)
ECB target	-0.4* (0.20)	0.01 (0.18)	0.1 (0.18)	-0.2 (0.23)	-0.2 (0.23)
ECB targetplus	0.008 (0.20)	0.1 (0.18)	0.2 (0.17)	-0.1 (0.22)	-0.1 (0.22)
Current inf.	-0.4* (0.20)	-0.02 (0.18)	0.2 (0.17)	0.2 (0.23)	0.05 (0.22)
Current plus forecast inf.	-0.5*** (0.19)	-0.3* (0.18)	-0.3* (0.17)	-0.2 (0.22)	-0.2 (0.22)
ECB target $\times$ Literacy	0.3 (0.28)	-0.3 (0.25)	-0.4* (0.24)	0.1 (0.32)	-0.07 (0.32)
ECB targetplus $\times$ Literacy	0.2 (0.28)	-0.05 (0.25)	-0.1 (0.24)	-0.1 (0.32)	-0.07 (0.31)
Current inf. $\times$ Literacy	0.1 (0.27)	-0.5* (0.25)	-0.4* (0.24)	-0.6* (0.32)	-0.3 (0.31)
Current plus forecast inf. $\times$ Literacy	0.2 (0.27)	-0.2 (0.25)	-0.3 (0.24)	0.10 (0.31)	-0.05 (0.31)
R <sup>2</sup>	0.083	0.060	0.056	0.078	0.067
N observations	1950	1950	1950	1444	1444

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



projections over the next three years seem to be influenced by much the much lower values of the target or the projections, leading to a downward bias in perceived inflation in February 2022.

Table 5: Treatment Effects on the Accuracy of Perceived Inflation

	(1) $ \pi_{probabilistic}^p - \pi_{actual}^{Feb2022} $	(2) $\pi_{probabilistic}^p - \pi_{actual}^{Feb2022}$
Literacy	-0.2 (0.18)	-0.07 (0.31)
ECB target	-0.1 (0.19)	-0.7** (0.32)
ECB targetplus	0.04 (0.19)	-0.6* (0.32)
Current inf.	-0.5** (0.19)	0.3 (0.32)
Current plus forecast inf.	-0.3 (0.19)	-0.8*** (0.31)
ECB target $\times$ Literacy	0.3 (0.26)	0.3 (0.45)
ECB targetplus $\times$ Literacy	0.3 (0.26)	-0.1 (0.45)
Current inf. $\times$ Literacy	0.2 (0.26)	-0.2 (0.44)
Current plus forecast inf. $\times$ Literacy	0.2 (0.26)	0.2 (0.44)
R <sup>2</sup>	0.056	0.048
N observations	1950	1950

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

### 3.2.4 Treatment effects on trust in the central banks

Finally, this subsection studies the treatment effects on trust in the central bank, including the ECB and the Bundesbank in our case. Trust in the central bank is measured with a rating scale from 0 to 10, and on average, trust in the ECB and Bundesbank stands respectively at 4.5 and 5.0 in the first wave and at 3.9 and 4.6 in the second wave.

Table 6 shows the treatment effects on trust in the ECB and the Bundesbank. We find that in the first wave, the *literacy* treatment improves trust in the central banks by 0.5-0.7 points, corresponding to an increase of 13% in the average trust in the central banks. This implies that informing consumers about the general targets of monetary policy and how they are measured and may be achieved, leads to a stronger trust in the institution. However, the effects become insignificant in the second wave.

Regarding the quantitative information treatments about inflation, we find that introducing the ECB inflation target, either with or without the news about the ECB's commitment to accounting for the effect of climate change, does not affect trust in the ECB and the Bundesbank. This may be due to the fact that actual inflation was strongly above target at the time of our survey. However, we discover that providing the current inflation information improves trust in the central banks in both survey waves, particularly if that information is coupled with inflation projections that predict a fall in inflation.

However, those who received the *literacy* treatment and further numerical information treatments on inflation generally lower their trust in the central banks. Especially, those who received both the *literacy* treatment and *current inf.* treatment have significantly lower trust in the ECB and the Bundesbank in both waves. These results make sense, as the information on the current inflation rate shows that the ECB failed to keep price stability. This implies that those who receive basic information about inflation and monetary policy adjust their trust in the institution more in response to news about current and projected inflation.

We further test whether our information treatments affect trust in the ECB and Bundesbank through the channel of inflation expectations by additionally controlling for posterior inflation expectations in the next three years into the models in Table 6. Table 7 shows the results. We find that inflation expectations are significantly negatively correlated with trust in the central banks, in line with the results in Christelis et al. (2020). However, our treatment effects generally remain unchanged compared with the models without controlling for inflation expectations. These results imply that our information treatments affect trust in the central bank through other channels than the level of posterior inflation expectations.

Table 6: Treatment Effect on Trust in the Central Banks

	Immediate		3 months later	
	(1) ECB	(2) Bundesbank	(3) ECB	(4) Bundesbank
Literacy	0.5* (0.27)	0.7** (0.27)	0.009 (0.32)	0.04 (0.32)
ECB target	0.4 (0.28)	0.1 (0.28)	0.4 (0.33)	0.3 (0.34)
ECB targetplus	0.2 (0.28)	0.4 (0.28)	-0.08 (0.31)	0.5 (0.32)
Current inf.	0.4 (0.28)	0.5* (0.27)	0.6* (0.32)	1.0*** (0.33)
Current plus forecast inf.	0.9*** (0.27)	0.8*** (0.27)	0.6* (0.32)	0.6* (0.32)
ECB target $\times$ Literacy	-0.4 (0.39)	-0.4 (0.38)	0.05 (0.46)	0.06 (0.46)
ECB targetplus $\times$ Literacy	0.05 (0.39)	-0.4 (0.38)	0.6 (0.45)	0.02 (0.46)
Current inf. $\times$ Literacy	-0.6 (0.38)	-0.9** (0.38)	-0.6 (0.45)	-0.9** (0.46)
Current plus forecast inf. $\times$ Literacy	-0.6 (0.38)	-0.5 (0.37)	0.03 (0.45)	-0.001 (0.45)
R <sup>2</sup>	0.052	0.066	0.066	0.063
N observations	1950	1950	1444	1444

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 7: Treatment Effect on Trust in the Central Banks

	Immediate		3 months later	
	(1) ECB	(2) Bundesbank	(3) ECB	(4) Bundesbank
$\pi^{posterior,3y}$	-0.1*** (0.02)	-0.1*** (0.01)	-0.08*** (0.01)	-0.07*** (0.02)
Literacy	0.5** (0.26)	0.7** (0.26)	0.03 (0.31)	0.06 (0.32)
ECB target	0.3 (0.28)	0.10 (0.27)	0.4 (0.33)	0.3 (0.33)
ECB targetplus	0.3 (0.27)	0.4 (0.27)	-0.09 (0.31)	0.4 (0.32)
Current inf.	0.5* (0.27)	0.6** (0.27)	0.6* (0.32)	1.0*** (0.32)
Current plus forecast inf.	0.9*** (0.27)	0.8*** (0.26)	0.5 (0.32)	0.6* (0.32)
ECB target $\times$ Literacy	-0.4 (0.38)	-0.4 (0.38)	0.001 (0.45)	0.02 (0.46)
ECB targetplus $\times$ Literacy	0.009 (0.38)	-0.4 (0.38)	0.6 (0.45)	-0.006 (0.45)
Current inf. $\times$ Literacy	-0.6* (0.38)	-0.9** (0.37)	-0.6 (0.45)	-0.9** (0.46)
Current plus forecast inf. $\times$ Literacy	-0.7* (0.37)	-0.6 (0.37)	0.01 (0.44)	-0.006 (0.45)
R <sup>2</sup>	0.086	0.089	0.085	0.077
N observations	1950	1950	1444	1444

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 4 Conclusion

This paper studies how general and qualitative information about inflation and monetary policy can improve consumers' inflation literacy and whether an increase in literacy enables consumers to form better inflation predictions and to better incorporate quantitative information into their predictions. We test this research question using a two-step RCT design on a sample of 4.000 German consumers surveyed in March 2022.

Our results are somewhat two-sided: On the one hand, the general information provided in the *literacy* treatment in the first step of our RCT significantly improves inflation literacy, and this effect persists after three months. While the improvement in literacy leads to a higher likelihood of providing inflation predictions, it does not affect the level of predictions in comparison to the control group. This suggests that the general and qualitative information made consumers more confident in their ability to provide quantitative inflation predictions, but did not affect the quality of their predictions.

On the other hand, we find that the *literacy* treatment does not interact with quantitative information treatments provided in the second step of our RCT design regarding the update in inflation predictions and the posterior prediction accuracy. This implies that consumers incorporated the quantitative information into their posterior predictions in the second step, but did so regardless of whether they received the *literacy* treatment in the first step. However, the *literacy* treatment affects posterior prediction uncertainty as well as trust in monetary policy institutions, and this effect also interacts with some information treatments. Overall, our results imply that qualitative information about inflation and monetary policy does not impact quantitative inflation predictions directly, but may have indirect effects via the uncertainty of predictions or consumers' trust in the monetary policy institution, which also correlates with inflation expectations.

## References

- Binder, C. (2020, 10). Coronavirus Fears and Macroeconomic Expectations. The Review of Economics and Statistics 102(4), 721–730.
- Blinder, A. and A. Krueger (2004). What does the public know about economic policy, and how does it know it? Brookings Paper on Economic Activity (1), 327–387.
- Blinder, A. S., M. Ehrmann, J. d. Haan, and D.-J. Jansen (2022). Central bank communication with the general public: Promise or false hope? Journal of Economic Literature, forthcoming.
- Brouwer, N. and J. de Haan (2022a). The impact of providing information about the ecb’s instruments on inflation expectations and trust in the ecb: Experimental evidence. Journal of Macroeconomics 73, 103430.
- Brouwer, N. and J. de Haan (2022b). Trust in the ecb: Drivers and consequences. European Journal of Political Economy 74, 102262.
- Burke, M. A. and M. Manz (2014). Economic Literacy and Inflation Expectations: Evidence from a Laboratory Experiment. Journal of Money, Credit and Banking 46(7), 1421–1456.
- Christelis, D., D. Georgarakos, T. Jappelli, and M. van Rooij (2020). Trust in the central bank and inflation expectations. International Journal of Central Banking 65.
- Coibion, O., Y. Gorodnichenko, and M. Weber (2022). Monetary Policy Communications and their Effects on Household Inflation Expectations. Journal of Political Economy forthcoming.
- Dräger, L., M. J. Lamla, and D. Pfajfar (2022). How to Limit the Spillover from the 2021 Inflation Surge to Inflation Expectations? Hannover Economic Paper 694.
- Hayo, B. and E. Neuenkirch (2014). The german public and its trust in the ecb: The role of knowledge and information search. Journal of International Money and Finance 47, 286–303.
- Lusardi, A. and O. S. Mitchell (2011). Financial literacy around the world: an overview. Journal of Pension Economics and Finance 10(4), 497–508.
- Mellina, S. and T. Schmidt (2018). The role of central bank knowledge and trust for the public’s inflation expectations. Deutsche Bundesbank Discussion Paper (No 32).
- Rumler, F. and M. T. Valderrama (2020). Inflation literacy and inflation expectations: Evidence from austrian household survey data. Economic Modelling 87, 8–23.

van der Cruijsen, C., D.-J. Jansen, and J. d. Haan (2015). How much does the public know about the ecb's monetary policy? evidence from a survey of dutch households. International Journal of Central Banking (42), 169–218.

## A Appendix

### A.1 Additional Results



Table A1: Effect of Economic Literacy on Inflation Literacy

	Immediate					3 months later				
	(1) Q1	(2) Q2	(3) Q3	(4) Q4	(5) Q5	(6) Q1	(7) Q2	(8) Q3	(9) Q4	(10) Q5
Literacy	0.081*** (0.01)	0.053*** (0.02)	0.16*** (0.02)	0.14*** (0.01)	0.042*** (0.01)	0.025* (0.01)	0.053*** (0.02)	0.037** (0.02)	0.0079 (0.02)	0.021 (0.02)
Pseudo R <sup>2</sup>	0.052	0.018	0.056	0.071	0.065	0.049	0.021	0.036	0.063	0.083
N observations	4000	4000	4000	4000	4000	2851	2851	2851	2851	2851

Note: Q1-5 refer to five inflation literacy questions: (1) Inflation definition, (2) Inflation and real consumption, (3) Objectives of monetary policy, (4) Monetary policy instrument, (5) Macroeconomic policy and inflation, respectively. Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports marginal effects of probit estimations. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A2: Effect of Literacy Treatment on Financial Literacy

	(1) Inflation	(2) Interest rate	(3) Risk Diversification
Literacy	0.053*** (0.02)	0.012 (0.01)	0.022 (0.01)
Pseudo R <sup>2</sup>	0.018	0.063	0.062
N observations	4000	4000	4000

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports marginal effects of probit estimations. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## A.2 Robustness Checks

These robustness checks show the results when we truncate inflation predictions, both point and probabilistic forecast, in a range from -1% to 14% to further control for the effect of outliers. The reason for choosing this range is due to our designed survey, 14% is the maximum value of probabilistic inflation predictions, so to be consistent we also select those who have point inflation predictions less than or equal to 14%. On the other hand, as our surveys were conducted during a period with high and rising inflation (CPI inflation in Germany was 7.3% in March 2022, and 7.6% in June 2022), we drop those who predict inflation lower than -1%. Our conclusions in the main analysis qualitatively remain unchanged.

Table A3: Effect of the Literacy Treatment on Inflation Predictions

	Extensive Margin				Intensive Margin			
	(1) $\pi^p$	(2) $\pi^{e,1y}$	(3) $\pi^{e,3y}$	(4) $\pi^{ECB,target}$	(5) $\pi^p$	(6) $\pi^{e,1y}$	(7) $\pi^{e,3y}$	(8) $\pi^{ECB,target}$
Literacy	0.06*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)	-0.01 (0.06)	-0.04 (0.10)	-0.10 (0.11)	0.04 (0.05)
Pseudo R <sup>2</sup>	0.063	0.057	0.064	0.080				
R <sup>2</sup>					0.011	0.041	0.030	0.036
N observations	4000	4000	4000	4000	1480	1480	1480	1208

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. The extensive margin measures the treatment effect on the probability of providing inflation forecasts. The intensive margin measures the treatment effect on the size of inflation forecasts, provided that a forecast is made by respondents. This table reports the marginal effect from probit regressions (columns 1-4) and estimated coefficients from Huber robust regressions (columns 5-8). Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A4: Treatment Effects on Updates of Inflation Predictions

	Immediate			3 months later	
	(1) $\Delta\pi^p$	(2) $\Delta\pi^{e,1y}$	(3) $\Delta\pi^{e,3y}$	(4) $\Delta\pi^{e,1y}$	(5) $\Delta\pi^{e,3y}$
Literacy	-0.2 (0.26)	-0.1 (0.24)	0.1 (0.23)	-0.6 (0.43)	-0.1 (0.43)
ECB target	-0.5* (0.27)	-0.4 (0.26)	-0.04 (0.24)	-0.8* (0.45)	-0.6 (0.45)
ECB targetplus	-0.6** (0.27)	-0.4 (0.26)	0.02 (0.24)	-0.2 (0.44)	-0.1 (0.44)
Current inf.	0.4 (0.27)	0.5* (0.25)	0.4* (0.24)	-0.9** (0.44)	-1.1*** (0.44)
Current plus forecast inf.	-0.6** (0.26)	-0.6** (0.25)	-0.5** (0.23)	-0.8* (0.44)	-0.7 (0.43)
ECB target $\times$ Literacy	0.2 (0.37)	-0.05 (0.34)	-0.4 (0.32)	0.5 (0.60)	0.05 (0.60)
ECB targetplus $\times$ Literacy	0.2 (0.37)	0.03 (0.34)	-0.4 (0.32)	-0.7 (0.61)	-0.1 (0.60)
Current inf. $\times$ Literacy	-0.2 (0.36)	0.07 (0.34)	0.002 (0.32)	1.1* (0.60)	1.0 (0.60)
Current plus forecast inf. $\times$ Literacy	0.3 (0.36)	0.3 (0.34)	0.2 (0.32)	0.9 (0.59)	0.4 (0.59)
R <sup>2</sup>	0.055	0.048	0.041	0.050	0.043
N observations	1480	1480	1480	830	830

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A5: Treatment Effects on the Uncertainty of Predictions

	Immediate			3 months later	
	(1) $\sigma\pi^p$	(2) $\sigma\pi^{e,1y}$	(3) $\sigma\pi^{e,3y}$	(4) $\sigma\pi^{e,1y}$	(5) $\sigma\pi^{e,3y}$
Literacy	0.05 (0.16)	0.3* (0.15)	0.3* (0.15)	-0.2 (0.22)	-0.2 (0.22)
ECB target	-0.3* (0.17)	-0.1 (0.16)	-0.03 (0.16)	-0.4* (0.23)	-0.4** (0.22)
ECB targetplus	0.02 (0.17)	0.007 (0.16)	0.06 (0.16)	-0.02 (0.23)	-0.1 (0.22)
Current inf.	-0.3* (0.17)	-0.005 (0.16)	0.1 (0.15)	-0.1 (0.23)	-0.3 (0.22)
Current plus forecast inf.	-0.4*** (0.16)	-0.3** (0.15)	-0.3** (0.15)	-0.3 (0.22)	-0.4* (0.22)
ECB target $\times$ Literacy	0.3 (0.23)	-0.1 (0.21)	-0.3 (0.21)	0.6* (0.31)	0.4 (0.30)
ECB targetplus $\times$ Literacy	0.2 (0.23)	-0.02 (0.21)	-0.07 (0.21)	-0.1 (0.31)	0.07 (0.30)
Current inf. $\times$ Literacy	0.09 (0.22)	-0.4* (0.21)	-0.4* (0.21)	-0.02 (0.31)	0.04 (0.30)
Current plus forecast inf. $\times$ Literacy	0.05 (0.22)	-0.2 (0.21)	-0.2 (0.20)	0.2 (0.31)	0.2 (0.30)
R <sup>2</sup>	0.082	0.075	0.073	0.101	0.113
N observations	1480	1480	1480	830	830

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A6: Treatment Effects on the Accuracy of Perceived Inflation

	(1) $ \pi_{probabilistic}^p - \pi_{actual}^{Feb2022} $	(2) $\pi_{probabilistic}^p - \pi_{actual}^{Feb2022}$
Literacy	0.02 (0.15)	-0.3 (0.26)
ECB target	0.2 (0.15)	-0.8*** (0.27)
ECB targetplus	0.3* (0.15)	-0.7** (0.27)
Current inf.	-0.1 (0.15)	0.1 (0.26)
Current plus forecast inf.	0.05 (0.15)	-0.7*** (0.26)
ECB target $\times$ Literacy	-0.05 (0.21)	0.6 (0.36)
ECB targetplus $\times$ Literacy	0.2 (0.21)	0.004 (0.36)
Current inf. $\times$ Literacy	-0.04 (0.20)	0.10 (0.36)
Current plus forecast inf. $\times$ Literacy	0.006 (0.20)	0.2 (0.35)
R <sup>2</sup>	0.066	0.062
N observations	1480	1480

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A7: Treatment Effect on Trust in the Central Banks

	Immediate		3 months later	
	(1) ECB	(2) Bundesbank	(3) ECB	(4) Bundesbank
Literacy	0.6** (0.31)	0.7** (0.30)	0.1 (0.44)	-0.1 (0.44)
ECB target	0.5 (0.33)	0.2 (0.32)	0.4 (0.46)	0.03 (0.45)
ECB targetplus	0.3 (0.33)	0.4 (0.32)	-0.3 (0.46)	0.3 (0.45)
Current inf.	0.6* (0.32)	0.5* (0.31)	0.8* (0.45)	0.9** (0.45)
Current plus forecast inf.	1.1*** (0.32)	0.9*** (0.31)	0.5 (0.45)	0.4 (0.44)
ECB target $\times$ Literacy	-0.7 (0.44)	-0.6 (0.43)	-0.1 (0.62)	0.3 (0.61)
ECB targetplus $\times$ Literacy	-0.07 (0.44)	-0.4 (0.43)	0.7 (0.62)	0.1 (0.61)
Current inf. $\times$ Literacy	-0.8* (0.44)	-0.9** (0.42)	-1.1* (0.62)	-1.2** (0.61)
Current plus forecast inf. $\times$ Literacy	-0.7* (0.43)	-0.5 (0.42)	0.2 (0.61)	0.6 (0.60)
R <sup>2</sup>	0.058	0.077	0.072	0.080
N observations	1480	1480	830	830

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A8: Treatment Effect on Trust in the Central Banks

	Immediate		3 months later	
	(1) ECB	(2) Bundesbank	(3) ECB	(4) Bundesbank
$\pi^{posterior,3y}$	-0.2*** (0.03)	-0.2*** (0.03)	-0.2*** (0.04)	-0.2*** (0.04)
ECB target	0.5 (0.33)	0.2 (0.32)	0.3 (0.45)	-0.1 (0.45)
ECB targetplus	0.4 (0.33)	0.4 (0.32)	-0.3 (0.45)	0.2 (0.44)
Current inf.	0.7** (0.32)	0.6** (0.31)	0.6 (0.45)	0.7* (0.44)
Current plus forecast inf.	0.9*** (0.31)	0.8*** (0.31)	0.4 (0.44)	0.2 (0.43)
Literacy	0.6* (0.31)	0.7** (0.30)	0.04 (0.44)	-0.2 (0.43)
ECB target $\times$ Literacy	-0.7* (0.44)	-0.6 (0.43)	-0.05 (0.61)	0.4 (0.60)
ECB targetplus $\times$ Literacy	-0.2 (0.44)	-0.5 (0.43)	0.7 (0.61)	0.1 (0.60)
Current inf. $\times$ Literacy	-0.8* (0.43)	-0.9** (0.42)	-0.9 (0.61)	-1.0* (0.60)
Current plus forecast inf. $\times$ Literacy	-0.7 (0.43)	-0.4 (0.42)	0.3 (0.60)	0.7 (0.59)
R <sup>2</sup>	0.074	0.089	0.100	0.111
N observations	1480	1480	830	830

Note: Demographic controls include age, education, gender, income, employment status, house owner, household size, and region. This table reports estimated coefficients from the Huber robust regressions. Standard errors are in parentheses. \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



### A.3 Survey questions

After some questions about demographics, we randomly assign each respondent to either the “Control group 1” or Treatment group. The treatment group receives the following information:

Please look at the following information carefully before continuing with the survey.

“Inflation is the percentage increase in the general price level. This means that 1 Euro buys less than it did 12 months ago. By contrast, a fall in general prices is called “deflation”. Inflation is usually measured using the index of consumer prices and comparing prices today with prices 12 months ago. The index of consumer prices measures prices of a basket of selected goods and services, such as rent, energy, food and drink, transport, health, education and durable goods like furniture, computers or household appliances.

High inflation has economic costs, for instance reducing the purchasing power of those with fixed incomes or savings. However, people with debt, for instance households with a mortgage, also benefit from inflation, since inflation reduces the value of their debt. Low and stable inflation is regarded as optimal for the economic development, since low inflation encourages investment, while keeping down the economic costs of inflation. Deflation is detrimental for economic development because with prices falling, there is an incentive to not consume or invest today, but rather wait to see if prices will fall further. This can cause a recession with rising unemployment.

Since Germany is part of the Euro area, its monetary policy is decided by the Eurosystem, consisting of the European Central Bank and the national central banks like the Bundesbank. The Eurosystem is responsible for keeping prices stable throughout the Euro area over the medium term. This means that average inflation over a period of 1-3 years should be low and stable. The Eurosystem can achieve this by setting interest rates and/or by buying securities from banks.”

☐ I have read the text in full. [Allow to proceed to the next screen only if the box is checked].

---

Now we would like to ask you a few general questions about inflation and monetary policy. Please answer all questions according to your current knowledge.

#### **Inflation, monetary, and financial literacy**

- *Inflation definition:* The rate of inflation in an economy is best described as the percentage increase in
  - 1 the overall price level of goods and services.
  - 2 the overall level of money wages.

3 the long-term interest rate.

4 prices of stocks

999 Don't know

- *Inflation and real consumption:* Suppose that in the year 2023, your net income (after taxes) has doubled and the prices of all goods have doubled as well. In 2023, how much will you be able to buy with your income?

1 More than you can buy today.

2 The same as you can buy today.

3 Less than you can buy today.

4 It cannot be determined from the information given.

999 Don't know

- *Objective of monetary policy:* The primary purpose of the monetary policy of the European Central Banks (ECB) today is to

1 Stabilize the price level of goods and services.

2 Stabilize the price of corporate stocks.

3 Keep interest rates low and steady.

4 Reduce national debt.

999 Don't know

- *Monetary policy instruments:* Which of the following is a tool of monetary policy?

1 Raising and lowering income taxes

2 Increasing and decreasing unemployment benefits

3 Raising and lowering interest rates

4 Increasing and decreasing government spending

999 Don't know

- *Monetary policy and inflation:* Which of the following measures is most likely to lead to lower inflation?

1 Raising the short-term interest rate.

2 Lowering the short-term interest rate.

3 Lowering income taxes.

4 Raising the level of government spending.

999 Don't know

- *Interest rate compounding:* Imagine you have 100 € in a bank account. Your money earns 10% interest per year. How many dollars are in your account after two years?  
 1 Exactly 110 €  
 2 Exactly 120 €  
 3 Exactly 200 €  
 4 Slightly more than 120 €  
 999 Don't know
- *Risk diversification:* 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"?  
 1 I agree  
 2 I do not agree  
 999 Don't know

### Point inflation predictions

- We would like to ask you about the rate of inflation/deflation in the last 12 months (Note: inflation is the percentage rise in overall prices in the economy, most commonly measured by the Consumer Price Index and deflation corresponds to when prices are falling). Please enter a number in the box below. If you prices did not change in the last 12 months, please enter a "0". If you think there was deflation, enter a negative value. If you think there was inflation, enter a positive value.  
  
 Over the last 12 months, the rate of inflation/deflation was ... percent (one decimal allowed).  
  
 999 Don't know
- What do you think the rate of inflation or deflation will be over the next 12 months? Please enter a number in the box below. If you think prices will not change in the next 12 months, please enter a "0". If you think there will be deflation, enter a negative value. If you think there will be inflation, enter a positive value.  
  
 Over the next 12 months, I expect the rate of inflation/deflation to be ... percent (one decimal allowed).  
  
 999 Don't know
- What do you think the rate of inflation or deflation will be on average over the next 3 years? Please enter a number in the box below. If you think prices will not change over the next 3 years, please enter a "0". If you think there will be deflation, enter a negative value. If you think there will be inflation, enter a positive value.

Over the next 3 years, I expect the average rate of inflation/deflation to be ... percent (one decimal allowed).

999 Don't know

- What is your best guess about the annual inflation rate that the ECB tries to achieve on average over the medium run (about 1-3 years)? (Please use a percentage between -100 and 100) ... % per year

999 Don't know

---

Randomly assign each respondent to either the “Control group 2” or Treatment groups 1-4. For treatment groups 1-4:

Please look at the following information carefully before continuing with the survey.

- Treatment group 1: Since its strategy review enacted in July 2021, the European Central Bank (ECB) is committed to setting its monetary policy to ensure that inflation stabilizes at its 2% target in the medium term. This target is symmetric, meaning that the ECB considers negative and positive deviations from this target as equally undesirable.

☐ I have read the text in full. [Allow to proceed to the next screen only if the box is checked].

- Treatment group 2: Since its strategy review enacted in July 2021, the European Central Bank (ECB) is committed to setting its monetary policy to ensure that inflation stabilizes at its 2% target in the medium term. This target is symmetric, meaning that the ECB considers negative and positive deviations from this target as equally undesirable.

In addition, the ECB is now committed to accounting for the effect of climate change on the stability of the financial system.

☐ I have read the text in full. [Allow to proceed to the next screen only if the box is checked].

- Treatment group 3: The inflation rate in Germany, measured as the year-on-year change in the consumer price index, was measured at +4.9% in January 2022. Since 1994, inflation rates across German federal states have been very close to each other.

☐ I have read the text in full. [Allow to proceed to the next screen only if the box is checked].

- Treatment group 4: The inflation rate in Germany, measured as the year-on-year change in the consumer price index, was measured at +4.9% in January 2022. The

Bundesbank inflation projections, published in December 2021, forecast average inflation in Germany at 3.6% in 2022, 2.2% in 2023 and 2.2% in 2024.

☐ I have read the text in full. [Allow to proceed to the next screen only if the box is checked].

### Probabilistic inflation predictions

- Now we would like to ask you about the rate of inflation/deflation you expect in February 2022 compared with February 2021.

In this question, you will be asked about the percent chance of something happening. The percent chance must be a number between 0 and 100 and the sum of your answers must add up to 100.

What do you think is the percent chance that, in February 2022... (Respondi: sum percentages automatically and only allow to go to the next question if they sum to 100%)

- 1 the rate of deflation (opposite of inflation) will be -12% or more —
- 2 the rate of deflation (opposite of inflation) will be between -8% and -12% —
- 3 the rate of deflation (opposite of inflation) will be between -4% and -8% —
- 4 the rate of deflation (opposite of inflation) will be between -2% and -4% —
- 5 the rate of deflation (opposite of inflation) will be between 0% and -2% —
- 6 the rate of inflation will be between 0% and 2% —
- 7 the rate of inflation will be between 2% and 4% —
- 8 the rate of inflation will be between 4% and 8% —
- 9 the rate of inflation will be between 8% and 12% —
- 10 the rate of inflation will be 12% or more —
- % Total —
- 999 Don't know

- Now we would like to ask you about the rate of inflation/deflation you expect in the next 12 months.

In this question, you will be asked about the percent chance of something happening. The percent chance must be a number between 0 and 100 and the sum of your answers must add up to 100.

What do you think is the percent chance that, over the next 12 months... (Respondi: sum percentages automatically and only allow to go to the next question if they sum to 100%)

- 1 the rate of deflation (opposite of inflation) will be -12% or more —
- 2 the rate of deflation (opposite of inflation) will be between -8% and -12% —
- 3 the rate of deflation (opposite of inflation) will be between -4% and -8% —
- 4 the rate of deflation (opposite of inflation) will be between -2% and -4% —
- 5 the rate of deflation (opposite of inflation) will be between 0% and -2% —
- 6 the rate of inflation will be between 0% and 2% —
- 7 the rate of inflation will be between 2% and 4% —
- 8 the rate of inflation will be between 4% and 8% —
- 9 the rate of inflation will be between 8% and 12% —
- 10 the rate of inflation will be 12% or more —
- % Total —
- 999 Don't know

- Now we would like to ask you about the rate of inflation/deflation you expect in the next 3 years.

In this question, you will be asked about the percent chance of something happening. The percent chance must be a number between 0 and 100 and the sum of your answers must add up to 100.

What do you think is the percent chance that, over the next 3 years... (Respondents: sum percentages automatically and only allow to go to the next question if they sum to 100%)

- 1 the rate of deflation (opposite of inflation) will be -12% or more —
- 2 the rate of deflation (opposite of inflation) will be between -8% and -12% —
- 3 the rate of deflation (opposite of inflation) will be between -4% and -8% —
- 4 the rate of deflation (opposite of inflation) will be between -2% and -4% —
- 5 the rate of deflation (opposite of inflation) will be between 0% and -2% —
- 6 the rate of inflation will be between 0% and 2% —
- 7 the rate of inflation will be between 2% and 4% —
- 8 the rate of inflation will be between 4% and 8% —
- 9 the rate of inflation will be between 8% and 12% —
- 10 the rate of inflation will be 12% or more —
- % Total —
- 999 Don't know

### **Trust in the central banks**

- How much do you trust the European Central Bank (ECB)? Please indicate your level of trust on a scale from 0 to 10, where 0 means you cannot trust at all and 10 means that you fully trust.

999 Don't know

- How much do you trust the Bundesbank? Please indicate your level of trust on a scale from 0 to 10, where 0 means you cannot trust at all and 10 means that you fully trust.

999 Don't know