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The impact of providing information about the ECB’s instruments on inflation expectations and trust in the ECB: Experimental evidence

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We use a randomized controlled trial among Dutch households to analyze whether communication about ECB policy instruments impacts inflation expectations and trust in the ECB. All participants in the survey receive information about the ECB’s goal, but only a subset also receives information about how the ECB tries to achieve this. Our results suggest that individuals who are informed about one of the ECB’s policy instruments have inflation expectations closer to the ECB’s inflation target than individuals who only receive information about the ECB’s objective. Our results indicate that communication about ECB instruments does not impact trust in the ECB.

1. Introduction

As central banks became more independent over time, they had to pay closer attention to explaining what they do. Communication, a crucial element of accountability, became even more important after central banks introduced controversial unconventional monetary policy instruments (Blinder et al., 2017). Nowadays, central banks increasingly reach out to the general public to explain monetary policy. Christine Lagarde, president of the European Central Bank (ECB), even considers the general public as “a new frontier” for central bank communication, arguing that: “Central banks have to be understood by the people whom they ultimately serve. This is a key to rebuilding trust”.

Apart from accountability, communication is also important because it may enhance monetary policy effectiveness (Binder, 2017). All information provided by central banks may affect expectations (Blinder et al., 2008). Even though central banks only have direct full control over the current short-term interest rate, they can use communication to influence expectations about the future path of short-term interest rates, thereby affecting long-term interest rates. Therefore, financial markets’ and the broader public’s expectations of future policy rates is critical for the way that monetary policy impacts the economy. In addition, central bank communication may affect inflation expectations. Inflation expectations are important, as they will affect actual inflation. In fact, anchoring inflation expectations is one of the reasons that central banks communicate. However, according to Coibion et al. (2022): “central banks appear to have systematically failed in achieving it across most advanced economies. Firms and households in low-inflation countries report beliefs about inflation that are far from anchored, seem unaware of even dramatic monetary policy

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announcements, and more generally display almost no knowledge of what central banks do… This ignorance may be a sign of central banks’ success (since firms and households have little incentive to worry about inflation or monetary policy), but it is unlikely to be innocuous: some of the non-traditional policies at the zero lower bound (ZLB) are thought to operate primarily through the inflation expectations of households and firms. … Understanding how central banks can better communicate with the general public to shape their expectations is therefore of first-order importance for the implementation of policies at the ZLB.”

So far, studies have mostly looked at the impact of providing information about the objective of the central bank on inflation expectations. The evidence suggests that providing information on central bank objectives may influence inflation expectations (Binder and Rodrigue, 2018; Coibion et al., 2022). An open issue is whether communication about policy instruments also affects inflation expectations. So far, only a few studies have examined the relationship between central bank communication about its policies and inflation expectations. D’Acunto et al. (2022) analyze the effect of an unexpected value-added tax increase on German consumers and compare it with the forward guidance announcement by the ECB in July 2013. Their evidence suggests that while the former has a significant effect on household consumption via influencing household inflation expectations, the effect of the latter is not significant.2 Rast (2022) studies the effect of different types of monetary policy announcements by the ECB on household inflation expectations in Germany. He finds that announcements referring to changes in the short-term policy rate significantly affect households’ inflation expectations, while announcements about forward guidance and QE have no significant effect in the short run. These findings thus suggest that communication about different policy instruments may not have the same effect on household inflation expectations. In our analysis we therefore consider different instruments used by the ECB.

Our analysis is based on a randomized controlled trial (RCT), a method which is, for example, also used by Coibion et al. (2020, 2022) for the US.3 The major advantage of RCTs is that the results can be interpreted as causal effects. In such an experiment, two groups are randomly selected from a homogenous population: the first receives a treatment (in our case: information on the ECB’s instruments), while the second gets either a different treatment or no treatment at all (in our case: no information on the ECB’s instruments). Nobel-prize laureate Imbens (2010) writes, “Randomised experiments do occupy a special place in the hierarchy of evidence, namely at the very top” (p. 407). The reason is that this approach provides much stronger identification compared to other research methods.

Our first contribution to the literature is to enhance knowledge about what the public should be informed to steer inflation expectations. Even though in principle all information provided by central banks may affect expectations, it is not clear whether communication about instruments can be used to steer inflation expectations. We examine whether communication about both the ECB’s inflation target and policy instruments is more effective in influencing inflation expectations than providing only information about its inflation target.

Similar to Baerg et al. (2020), we embed a vignette experiment into a survey to identify the impact of providing information. First, each participant receives information about the inflation target of the ECB and current inflation. Next, the participants are randomly assigned across four groups. Three of these groups receive additional information about a particular instrument of the ECB. Before and after receiving this treatment, the respondents were asked about their inflation expectations. We test the effect of providing information about policy instruments on expectations by comparing the treatment groups’ answers before and after presenting the text snippet to those of the control group which did not receive this information.

Our second contribution is that we examine the effect of central bank communication on trust in the central bank. Public trust enhances the political legitimacy of central banks (Bordo and Jonung, 2003). Furthermore, public trust may help central banks to achieve price stability as a higher level of trust is reported to lead to more accurate individual inflation forecasts (Rumler and Valderrama, 2020) and inflation expectations which are closer to the central bank’s inflation target (Christelis et al., 2020). To the best of our knowledge, previous papers using a RCT have not analyzed the impact of central bank communication on trust.

Blinder et al. (2022) point out that in view of the importance that central banks attach to public trust it is quite remarkable that there is very limited research on the effect of communication on trust in the central bank. A few studies suggest (but not unequivocally) that central bank transparency enhances trust in the central bank. Van der Cruijsen and Eijffinger (2010) show that higher perceived transparency is positively associated with trust, but the link between perceived and actual transparency is rather weak. Horvath and Katuscakova (2016) analyze the effect of actual central bank transparency on trust, while controlling for factors that prior studies reported shaping the level of trust. The authors conclude that greater transparency improves citizens’ trust in the ECB, but only up to a certain point; too much transparency is not conducive to trust. Finally, Kril et al. (2016) report on the basis of a survey among Israelis that transparency is positively related to general trust in the Bank of Israel, but not to respondents’ confidence in the Bank’s forecasting abilities.

According to the ECB (2021): “trust can be built through clear, transparent communication” (p44). However, there is hardly evidence on the impact of central bank communication on trust. The experiments using the Bank of England’s Inflation Report by Bholat et al. (2019) show that relatable content increases the public’s trust in central bank communications, and improves people’s

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2 In an earlier study, D’Acunto et al. (2020) report that central bank communication has an impact on expectations (in their case about future income instead of inflation expectations) when it focuses on policy targets and objectives rather than on monetary policy instruments. Their evidence is based on a randomized information-provision experiment on a representative sample of Finnish men who all read policy statements coming from the twitter account of the Governor of the Bank of Finland. What varied across conditions was whether the (real) tweets consisted of target- or instrument-based policy communication.

3 Coibion et al. (2020) examine how information about current and future interest rates affect households’ expectations. They find that information about current and next year’s interest rates move inflation expectations but providing also information beyond one or two years in the future has no additional effect. Coibion et al. (2022) conclude that reading the actual Federal Open Market Committee policy statement has about the same average effect on inflation expectations as simply being told about the Federal Reserve’s inflation target.
perceptions of the central bank. However, as pointed out by Istrefi (2021), the authors do not consider respondents’ perceptions about the Bank of England before entering the experiment; a before and after evaluation of perceptions and trust would have been more telling. The present paper provides such a before and after evaluation. In line with Christelis et al. (2020), we ask participants in our survey to indicate how much they trust the ECB before and after the information treatment. By comparing the answers to these two questions, we can identify the impact of communication on trust in the ECB.

Our third contribution to the literature is that we further examine the role of knowledge in driving inflation expectations and trust in the ECB. Some previous studies suggest that more knowledgeable individuals have inflation expectations that are more realistic, more accurate and more in line with the central bank’s inflation target (Van der Cruijsen et al., 2015; Baerg et al., 2020). Furthermore, there is some evidence that knowledge of the central bank enhances trust. For instance, using a public opinion survey among German households conducted in 2011, Hayo and Neuenkirch (2014) find that respondents with knowledge of the ECB have more trust in the ECB than respondents who do not have this knowledge. Likewise, Mellina and Schmidt (2018) report that knowledge of the mandate of the ECB is an important driver of trust. However, there is little support for the view that communication to the public increases knowledge of the central bank. In fact, Haldane and McMahon (2018) report that knowledge of the central bank has remained stable in the past twenty years in the UK, despite the Bank of England’s increased focus on communication to the public. Coibion et al. (2022) report that in their survey among US households almost forty percent answered that the Federal Reserve was targeting an inflation rate of 10 percent or more, which suggests a pervasive lack of knowledge on the part of households about the objectives of the Federal Reserve. Likewise, Van der Cruijsen et al. (2015) find that the public has little knowledge of the ECB’s inflation objective and instruments.

Our analysis is based on data collected using the Dutch Household Survey (DHS). The data used in this paper has several advantages over the use of the Eurobarometer data which has frequently been used for research on trust in the ECB (see, for example, Ehrmann et al. (2013), Farvaque et al. (2017), and Bursian and Fürth (2015)). First, the DHS provides detailed information on respondents’ characteristics, such as their education level, gender, and employment situation for which we can control. Second, we can control for respondents’ knowledge of the ECB’s objectives and instruments. The main drawback is that our data refer to only one country and is not longitudinal, so that we cannot include time series for macroeconomic variables. However, we construct variables reflecting respondents’ knowledge about inflation and their employment status and test whether these variables affect trust in the ECB.

We perform multiple robustness checks to ensure our study’s validity. As our sample differs significantly from the Dutch population at large on some observable characteristics (age, income and education level) we checked whether re-weighting would change our conclusions; it hardly does. Furthermore, we address the possibility that being a DHS panelist could affect individuals’ knowledge of the ECB or make the panelist no longer representative for the population at large. We identify three possible channels: (i) DHS panelists who participated in prior studies about monetary policy could have better knowledge (ii) respondents who are living together with another DHS panelist could discuss issues raised in the questionnaire before answering all questions and (iii) individuals who have participated often in DHS questionnaires might not be representative as evidence suggests that these individuals use shortcuts to answer questions (Toepoel et al., 2008). We do not find any evidence for these channels.

Our results suggest that providing information about the inflation target and monetary policy instruments affects inflation expectations more than solely providing information about the inflation target. Individuals who also receive information about (negative) policy interest rates adjust their inflation expectations more towards the ECB inflation target. However, providing information about asset purchase programs does not affect inflation expectations. Our main result is driven by individuals who are between forty and seventy years old and whose inflation expectations, prior to the experiment, are above the ECB’s inflation target. Our evidence also indicates that communicating about ECB instruments does not affect average trust in the ECB.

The rest of the paper is structured as follows. The next section provides an overview of the research design. Section 3 describes the data used, while Section 4 shows the results for the impact of the information treatment on respondents’ inflation expectations and trust in the ECB. The final section concludes.

2. Research design

2.1. Panel

We collected data using an (internet) questionnaire, which was distributed among DHS participants. A total of 3449 members received this questionnaire on May 18, 2020 and were given fourteen days to respond. Compared with surveys conducted by

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4 The DHS is a panel initiated in 1993 by Centerdata, a research institute affiliated with Tilburg University and sponsored by De Nederlandsche Bank, i.e., the Dutch central bank. The DHS has been used extensively in previous studies (see, for example, Mosch and Prast (2010) or Christelis et al. (2020)).

5 Some previous studies based on aggregated Eurobarometer data suggest that inflation and unemployment affect trust in the ECB (Roth and Jonung, 2019).

6 The problem of not having longitudinal data could be especially troublesome due to the exceptional circumstances during our data collection caused by the COVID-19 pandemic which could lead to low external validity. However, we find no indications that the COVID-19 pandemic has a substantial impact on respondents’ answers. Answers to questions in our survey that had been raised in previous rounds of the DHS and the answers to those questions in our survey are very similar.

7 Panel members are Dutch individuals aged sixteen years and older who have been selected to give a representative view of the Netherlands. Section 3.1 compares the characteristics of the DHS survey participants to the Dutch population as a whole.

8 Online Appendix A provides all relevant questions raised in the survey.
telephone or mail, the response rate of continuous internet-based surveys is usually very high. In our case, the response rate was eighty percent, which corresponds to 2749 individuals.

The data used in this paper has been collected using computer-assisted web interviews (CAWI). The use of online panels is a well-accepted strategy for conducting surveys in social sciences (Callegaro et al., 2014). However, a downside of applying this strategy is that individuals without access to the internet are not included, which could lead to a bias. The survey used in this paper was conducted in the Netherlands which has a particular high internet penetration rate (Mohorko et al., 2013) implying that only a small portion of the total population is not able to participate. However, Eckamm (2016), argues that while a high internet penetration reduces the risk of this bias, individuals who do not have internet access could differ strongly from those who do have access to the internet. Therefore, Centerdata, which conducted the survey used in this paper, actively tries to involve households which have neither internet access nor a computer by providing a simple PC and an ADSL connection to panel members who do not have these facilities so that they can participate in the questionnaires.9

De Nederlandsche Bank (DNB), i.e., the Dutch central bank, regularly conducts research via the DHS (for example, Van Rooij et al. (2011), Van der Cruyjsen et al. (2015)). As a result, the knowledge of respondents may not be representative as prior questionnaires may have provided participants with information or caused them to search for more information about monetary policy. Therefore, we examined whether participation in the survey used by Van der Cruyjsen et al. (2015) increased respondents’ knowledge of the ECB.10 We found no evidence that participants in the survey used by Van der Cruyjsen et al. (2015) have better knowledge of the ECB’s mandate and instruments than other respondents.11

Prior participation in the DHS might also affect the way individuals answer questions. The results of Toepoel et al. (2008) suggest that more experienced members of the DHS take shortcuts and study the questions less carefully than newer members as more experienced members use less time to complete a questionnaire and they choose the first answer option more often than new DHS members. Therefore, as an additional robustness check, we tested whether our results still hold if we estimate our models using only participants who participated in at most one DNB household survey (in other words: those who joined the DHS after October 2018). We choose this cut-off point to ensure that our sample remains sufficiently large (45% of the original sample is still included). We find no substantial differences between our main results and those for this smaller sample (the results are shown in online Appendix B.2).

Participants’ financial compensation is not based on the number of correct answers to the questions. Panelists receive a fixed amount for completing the questionnaire which is a standard approach in this type of survey research (see, for example, Binder and Rodrigue (2018)). This lack of financial incentive could cause our participants to rush through the questionnaire and merely scan through the information treatments. However, we do not find that removing the 5% of individuals who answered the questionnaire the quickest changes our conclusions (see online Appendix B.3).

Forty percent of DHS panelists belong to a household of which at least one other member is also participating in the DHS. We identify two possible channels how this could affect our results. Firstly, respondents could inform each other about the ECB or talk about the questionnaire which might cause them to search for more information before participating in the experiment. We test whether respondents who live in the same household with another DHS panelist who had already filled in this questionnaire have more accurate knowledge of the ECB. We do not find evidence for this. A second channel could be that the answers of individuals who are living in the same household are highly correlated due to shared experiences.12 We check whether randomly excluding participants who are living together with another DHS participant – such that from each household only one individual is included – affects our results. We find that dropping multiple participants from the same household does not change our results (see online Appendix B.4 for the detailed estimation results).

2.2. Experimental design

The questionnaire consists of nine questions. Seven of these questions were asked before respondents received information about the ECB.

Three questions assess the (self-reported) knowledge of the ECB. First, we asked participants to rate their knowledge of the ECB on a five-point scale ranging from very low to very high. Besides these answer options, participants could also answer “I don’t know”. Second, we tested the respondents’ knowledge of the mandate of the ECB using the same approach as Van der Cruyjsen et al. (2015). We presented eleven statements about the ECB’s mandate of which some are incorrect. For each statement, participants were asked to indicate whether it is correct, incorrect or that they do not know. Finally, we presented six statements about the ECB’s instruments and asked respondents to indicate for each instrument whether the ECB can use it.

Identical to Van der Cruyjsen et al. (2015), we also asked individuals to report their political orientation. They could select one or more of the five pre-described political orientations (liberal, conservative, Christian-democrat, socialist, progressive), indicate that they have not thought about it or use a text field to describe their political orientation if the aforementioned options do not apply.

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9 See Teppa and Vis (2012) for more information on how Centerdata conducts surveys.
10 We use the study of Van der Cruyjsen et al. (2015) to test whether participation in prior surveys influences individuals’ knowledge because these authors used identical questions as the present study to measure respondents’ knowledge of the ECB and because 28% of the current DHS panelists participated in the survey done by Van der Cruyjsen et al. (2015).
11 See online Appendix B.1 for the estimation results.
12 There is some empirical evidence that individuals who live in the same household grow more similar over time. Nickerson (2008), for example, finds that civic participation norms of members in the same household converge over time.
We added this question because Van der Cruyssen et al. (2015) find that individuals with a right-wing orientation (either liberal or conservative) have more realistic inflation expectations than participants with another or no ideology. Similar results are reported by Ehrmann et al. (2013).

The next two questions invited individuals to indicate their trust in other European institutions. Similar to Farvaque et al. (2017), we asked participants to rate their trust in the European Commission (EC) and the European Parliament (EP) on a ten-point scale which ranges from very low to very high. These questions were included as Farvaque et al. (2017) and Ehrmann et al. (2013) find that individuals who trust other European institutions also trust the ECB more.

The final two questions before the text snippet measured respondents’ trust in the ECB and their inflation expectations. Similar to Christelis et al. (2020), we asked respondents to indicate their trust in the ECB on a ten-point scale ranging from very low to very high. We used the same approach as Baerg et al. (2020) to ask individuals about their inflation expectations. In this approach, individuals are not asked directly about their expected annual inflation rate but receive a hypothetical situation to make the question easier to understand. We choose this approach as research has shown that many individuals find the concept of inflation hard to grasp (Leiser and Drori, 2005). Our hypothetical situation is identical to the one used by Baerg et al. (2020). Respondents had to indicate what the monthly expenditures on typical purchases for food, goods, and services such as groceries, clothes and a hair-cut will be next year if a person currently spends 1500 euros per month on these items. Response options range from “less than 1500 euros” to “1650 euros or more”. Each response option reflected a one-percentage-point higher rate of annual inflation, but at this stage respondents are not informed about this.

Next, all respondents received a text which provides information about the ECB’s inflation target and actual inflation. We described the ECB’s objective numerically (“inflation close to but below 2%”) as Baerg et al. (2020) find that quantitative information about the goal of the ECB has a more substantial effect on inflation expectations than qualitative information (like “price stability”). Furthermore, the text explained that the inflation rate had been below the target rate in the past few years and that the ECB, therefore, strives to raise inflation. This information is similar to that used by Coibion et al. (2022), who find that providing information about current inflation reduces individuals’ inflation expectations. The following text has been provided to all respondents:

**General information** The most important goal of the European Central Bank is an inflation rate of (close but below) 2% in the euro area in the medium term. In other words, the ECB’s goal is that prices increase with a maximum of 2% in the euro area as a whole. The last few years, however, the inflation was below the target rate of 2%, and therefore the ECB strives to increase inflation.

After this general information, each individual was randomly assigned to one of four groups. The first group did not receive any additional information (control group); the other three groups received an additional vignette, explaining a particular instrument of the ECB (interest rate setting, negative interest rates, and asset purchase program). The vignettes were as follows:

**Interest rate policy:** Banks deposit part of their money on an account at the European Central Bank and they receive interest on this. One of the ways the European Central Banks tries to keep inflation close to 2% is by changing the level of this interest. Banks earn less money on the amount they deposited at the European Central Bank when the interest rate is reduced. Therefore, banks are inclined to withdraw money from their account at the ECB and to use it for other purposes. Because this money is used for other purposes (for instance, granting loans to firms), the economy is stimulated, which causes the inflation rate to increase.

**Negative interest rate policy:** Banks deposit a part of their money on an account at the European Central Bank and they receive interest on this. One of the ways the European Central Banks tries to keep inflation close to 2% is by lowering the level of this interest rate to a negative level. Banks then have to pay money over the amount they deposited at the European Central Bank. Therefore, banks are inclined to withdraw money from their account at the ECB and to use it for other purposes. Because this money is used for other purposes (for instance, granting loans to firms), the economy is stimulated, which causes the inflation rate to increase.

**Asset purchase program:** Banks provide loans to consumers, firms or countries. A loan granted to a country is also called a government loan. With such a government loan a bank lends money to a country. The country repays the loan after a certain period and, until that moment, will have to pay a (yearly) compensation to the bank (interest). One of the ways the European Central Banks tries to keep inflation close to 2% is by purchasing government loans from banks. Banks do not have to wait until the country repays them, but instead, are repaid immediately by the European Central Bank. Banks can use this money for other purposes. Because the money is used for other purposes (for instance, granting loans to firms), the economy is stimulated, which causes the inflation rate to increase.

Finally, all respondents were asked again about their inflation expectations and how much they trust the ECB. Before answering these questions, the respondents received the instruction that it is not important whether they give the same answer as the first time. Similar to Baerg et al. (2020), respondents were now also reminded of their answer to the previous question about inflation and were informed what their answer implied for the annual inflation rate. This was done to make it easier for participants to compare their answer to the ECB’s inflation target which was provided to all participants in the general text.

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13 To avoid that respondents would change their initial answers, it was no longer possible for survey participants to return to previous questions from this point onward.
3. Overview of data

3.1. Demographic characteristics

Table 1 provides information on the demographic characteristics of the respondents. The majority of respondents is male, aged above 50, living with a partner and not higher-educated. For this study’s external validity, respondents’ demographic characteristics should be representative of the Dutch population at large. Table 1 also shows the averages for the Dutch population (provided by Statistics Netherlands (CBS)). Table 1 suggests that our sample differs significantly from the Dutch population on several dimensions. The average age of the participants in the survey is seven years higher, gross household income is 4% higher and the education level of respondents is eight points higher. These differences between the DHS and the Dutch population at large are comparable to those reported by Van der Cruijsen et al. (2015). Similar to these authors, we checked whether re-weighting observations changes our conclusions. Most of our results do not change (see online Appendix B.5 for more details).

3.2. Inflation expectations

Fig. 1 shows the distribution of inflation expectations in our sample. Before receiving information, 26% of the respondents expect inflation to be in line with the inflation target of the ECB (2%). Only 17% percent of the survey participants have expectations that are below this target even though inflation was less than 2% in seven out of the last ten years in the Netherlands. Moreover, many individuals expect inflation to be substantially higher than actual inflation. For example, 27% of the participants expect inflation to be 5% or higher in the next twelve months. In addition, the distribution shows a small spike at 7%, which corresponds to the answer that an individual has to pay 1600 euros in the next year. As this is the first of the answers provided that rounds up to the next hundred (from 1500 to 1600), this response option may have attracted more attention. Baerg et al. (2020), who used a similar approach to ask individuals about their inflation expectations, find a similar spike.

As mentioned earlier, respondents were asked for their inflation expectations before and after receiving information. As shown in Fig. 1, the provision of information had a profound impact on respondents’ expectations: 51% of the participants changed their expectations. In Section 4.1, we test whether individuals who not only received information about the ECB target but also about monetary policy instruments have expectations which are closer to the ECB target than individuals who only received information about the inflation objective of the ECB.

3.3. Trust

Christelis et al. (2020), who asked DHS participants about their trust in the ECB in 2015 using the same question as the present study, report a mean of 4.7 for trust in the ECB, whereas in our survey average trust amounts to 5.7. Furthermore, the standard deviation in our survey is lower (1.8 versus 2.1). This suggests that trust in the ECB has increased between 2015 and 2020. In our survey, individuals were asked twice about their trust in the ECB. Fig. 2 shows trust in the ECB before and after receiving information. The figure does not suggest a clear difference in trust in the ECB before and after respondents received information. In Section 5, we test whether there is a significant effect of our treatment on trust in the ECB.

The survey also asked participants about their trust in the European Parliament and the European Commission on a ten-point scale. Average trust in the ECB is slightly higher than trust in the European Commission (5.0) and the European Parliament (5.1). Similar to Ehrmann et al. (2013) and Farvaque et al. (2017), we find that respondents’ trust in the ECB is highly correlated with trust in the European Commission (0.76) and the European Parliament (0.72).
3.4. Knowledge of the ECB

As explained in Section 2.2, we tested participants’ knowledge of the ECB by showing them statements about the mandate and policy instruments of the ECB and asking them to indicate which of these statements are true.

Fig. 3 shows the respondents’ answers to the statements about the instruments of the ECB. Three instruments were often correctly identified, namely the ECB sets the interest rate at which banks deposit money at the ECB, the ECB lends money to banks, and the ECB determines the interest rate of these loans. However, 65% of the respondents incorrectly believe that the ECB lends money to countries.

The answers to the questions about the mandate are shown in Fig. 4. The statement that the main objective of the ECB is price stability received by far the highest percentage of correct answers (65%). Details about the inflation target are less well known. Notably, few respondents know that the ECB does not define its objective in terms of inflation in each euro area country. The (false) statement that the ECB’s objective applies to all euro area countries separately (statement ten) received the lowest score of correct answers.

As explained in Section 2.2, the statements to test individuals’ knowledge of the mandate of the ECB are identical to those used by Van der Cruijsen et al. (2015). These authors posed these statements to the members of the DHS in 2009. Surprisingly, the percentages of individuals who correctly identify whether a statement is (in)correct are very similar in both studies for all statements. Similar to the findings of Haldane and McMahon (2018) for the Bank of England, our results thus suggest that knowledge of the ECB has remained stable despite the ECB’s increased focus on communication to the public.

A majority of respondents indicate that they have (very) poor to neutral knowledge of the ECB. Fig. 5 shows the average number of correct responses grouped by participants’ self-reported knowledge level. It seems that our participants are able to correctly assess their knowledge: the higher their self-assessed knowledge is, the higher their actual knowledge of the ECB. This result is in line with...
4. Treatment effect on inflation expectations

4.1. Difference between expectations and ECB target

We first test whether respondents who receive information about ECB instruments have inflation expectations which are closer to the ECB’s inflation target than respondents who do not receive this information. We calculate the absolute difference between the inflation expectation of individual $i$ and the ECB target ($D^i$) as:

$$D^i = |E_i,\pi - 2|$$

(1)

Where $E_i,\pi$ is the inflation expectations of individual $i$ either before or after the treatment. We estimate the following model:

$$D^i_{\text{posterior}} = a + \beta_j \times \text{Treatment}_{i,j} + \gamma \times D^i_{\text{prior}} + \eta \times X_i + \epsilon_i$$

(2)
Fig. 5. Actual vs. self-declared knowledge.

Note: Response shares are shown in parentheses (2.7% of respondents indicated that they do not know their knowledge level of the ECB). The dots represent the average number of correct answers to the question.

Where $D_{\text{posterior}}^i$ is the absolute distance between the inflation forecast of individual $i$ and the ECB’s inflation target after receiving information. Treatment is a dummy which is one if individual $i$ received treatment $j$, where $j$ indicates whether information was provided about the ECB’s interest rate policy, negative interest rate policy or asset purchase program. $D_{\text{prior}}^i$ is the absolute difference between the inflation expectation of individual $i$ and the ECB’s inflation target before receiving information — in the regression tables this variable is described as Distance inflation expectations prior.

The vector with control variables $X_i$ includes several demographic characteristics. This vector includes a dummy Male which is 1 if individual $i$ is male and 0 otherwise. Age is a discrete variable for the age of individual $i$ in years. Education is a binary variable which is 1 for respondents who completed vocational or university education and 0 otherwise. Social Status is an ordinal variable and ranges from 1 (weak status) to 5 (strong status). This variable is originally defined by Statistics Netherlands and takes a person’s profession into account and whether that person holds a managing position. If so, the number of employees is also taken into account. The variable Unemployed is 1 if an individual is unemployed and 0 otherwise, while Income is a continuous variable for the gross monthly income of individual $i$. The variable Financial decision maker is 1 if individual $i$ makes the financial decisions in the household to which the individual belongs. The variable Partner is one if an individual is living with a partner and 0 otherwise, while Household size is the number of persons living in the same household as individual $i$. Finally, City is an ordinal variable which ranges from 1 (respondent lives in a rural area) to 5 (respondent lives in a very strongly urbanized area).

Next, we also include two binary variables for the ideology of an individual: No ideology and Right-wing. These variables are 1 if individual $i$ indicates to have, respectively, no ideology or a right-wing ideology (liberal or conservative) and 0 otherwise.

Furthermore, we also include an individual’s trust in the ECB (prior to receiving a text snippet) and in European institutions. Trust: ECB Prior is an ordinal variable which runs from 1 (very little confidence) to 10 (very much confidence). The (ordinal) variable Trust: EU institutions is the average of an individual’s trust in the European Commission and in the European Parliament and ranges from 1 (very little confidence) to 10 (very much confidence). See Section 3.3 for more information on these variables.

Finally, we include two variables related to an individual’s knowledge of the ECB. Self-reported is an ordinal variable which reflects an individual’s subjective knowledge of the ECB. This variable ranges from 1 (I have very little knowledge of the ECB) to 5 (I have very much knowledge of the ECB). Knowledge: objective measures respondents’ objective knowledge of the ECB. This variable is constructed as follows. First, we calculate the average percentage of correct answers given by an individual to our statements about the ECB’s mandate and instruments. Then, we divide this percentage by twenty to make this variable range from 1 to 5 in order to make it easier to compare to our subjective knowledge measure. See Section 3.4 for more information on these variables.

We have checked whether explanatory variables that are included in our analysis are correlated (the correlation and VIF tables are presented in online Appendix C.1). Among our explanatory variables all variables are weakly or moderately correlated except trust in the ECB and trust in other EU institutions which are strongly correlated (0.76). This suggests that there might be a possible multicollinearity issue. However, the moderately high VIF-value (2.45) for both variables suggests that adding both variables simultaneously is not a problem. Dropping the variable trust in the EU, reduces the fit of our model but does not substantially change the size or significance of the coefficients of our treatment dummies (results are available upon request).

The estimation results as shown in Table 2 suggest that individuals who received information about the interest rate policy or negative interest rate policy have inflation expectations which are closer to the inflation target of the ECB. These results remain
Table 2  
Effect of treatment on distance between inflation expectations and the ECB's inflation target.

<table>
<thead>
<tr>
<th>Treatment:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Interest rate policy</td>
<td>$-0.24^{**}$</td>
<td>$-0.24^{**}$</td>
<td>$-0.23^{***}$</td>
<td>$-0.23^{***}$</td>
</tr>
<tr>
<td>- Negative interest rate policy</td>
<td>$-0.15^{*}$</td>
<td>$-0.15^{*}$</td>
<td>$-0.15^{*}$</td>
<td>$-0.15^{*}$</td>
</tr>
<tr>
<td>- Asset purchasing program</td>
<td>$-0.09$</td>
<td>$-0.09$</td>
<td>$-0.09$</td>
<td>$-0.08$</td>
</tr>
<tr>
<td>Inflation expectation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Distance inflation expectations prior</td>
<td>0.62***</td>
<td>0.61***</td>
<td>0.60***</td>
<td>0.59***</td>
</tr>
<tr>
<td>Demographic characteristics:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>0.23***</td>
<td>0.26***</td>
<td>0.25***</td>
<td>0.25***</td>
</tr>
<tr>
<td>- Age</td>
<td>0.00**</td>
<td>0.01***</td>
<td>0.01***</td>
<td>0.01***</td>
</tr>
<tr>
<td>- Education</td>
<td>$-0.22^{**}$</td>
<td>$-0.14^{**}$</td>
<td>$-0.11$</td>
<td>$-0.09$</td>
</tr>
<tr>
<td>- Social Status</td>
<td>0.07***</td>
<td>0.06**</td>
<td>0.05$^{*}$</td>
<td>0.04</td>
</tr>
<tr>
<td>- Unemployed</td>
<td>0.21</td>
<td>0.24</td>
<td>0.18</td>
<td>0.11</td>
</tr>
<tr>
<td>- Income (x1000)</td>
<td>$-0.00$</td>
<td>$-0.00$</td>
<td>$-0.00$</td>
<td>$-0.00$</td>
</tr>
<tr>
<td>- Financial decision maker</td>
<td>$-0.12$</td>
<td>$-0.11$</td>
<td>$-0.10$</td>
<td>$-0.08$</td>
</tr>
<tr>
<td>- Partner</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>- Household size</td>
<td>0.03</td>
<td>0.01</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>- City</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Ideology:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- None</td>
<td>0.46***</td>
<td>0.43***</td>
<td>0.32***</td>
<td>0.32***</td>
</tr>
<tr>
<td>- Right-wing</td>
<td>0.14**</td>
<td>0.12*</td>
<td>0.13*</td>
<td>0.13*</td>
</tr>
<tr>
<td>Level of trust:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- ECB Prior</td>
<td>$-0.05^{*}$</td>
<td>$-0.05^{*}$</td>
<td>$-1.84$</td>
<td>$-1.71$</td>
</tr>
<tr>
<td>- EU institutions</td>
<td>$-0.04$</td>
<td>$-0.04$</td>
<td>$-1.38$</td>
<td>$-1.64$</td>
</tr>
<tr>
<td>Knowledge level:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Self-reported</td>
<td>0.09**</td>
<td>0.09**</td>
<td>0.09**</td>
<td>0.09**</td>
</tr>
<tr>
<td>- Objective</td>
<td>$-0.12^{***}$</td>
<td>$-0.12^{***}$</td>
<td>$-0.12^{***}$</td>
<td>$-0.12^{***}$</td>
</tr>
</tbody>
</table>

| $N$ | 2724 | 2724 | 2724 | 2624 |
| $R^2$ | 0.465 | 0.472 | 0.477 | 0.485 |

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

$t$ statistics in parentheses.

Notes: This table shows the estimation results of Eq. (2) and is used to test whether informing individuals about a particular instrument of the ECB affects the distance between an individual’s inflation forecast and the ECB's inflation target. The dependent variable is the absolute difference between the inflation expectation of an individual and the ECB's inflation target. The variables of interest are the three treatments dummies: Interest rate policy, Negative interest rate policy and Asset Purchasing program. These dummies are one if an individual received information about how this particular instrument works. Section 2.2 shows the various treatment texts.

significant and similar in size when various control variables are added. The effect of the treatment in which information is provided about the interest policy is stronger (0.23) than the effect of the treatment in which information is provided on negative
Appendix C.2 for more information.

**Effect of treatment on distance between inflation expectations and the ECB’s inflation target.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Gender</th>
<th>Age</th>
<th>Knowledge objective</th>
<th>Inflation expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Below-Median</td>
<td>Above-Median</td>
</tr>
<tr>
<td>Interest rate policy</td>
<td>−0.45***</td>
<td>−0.04</td>
<td>−0.09</td>
<td>−0.38***</td>
</tr>
<tr>
<td>(−3.47)</td>
<td>(−0.35)</td>
<td>(−0.50)</td>
<td>(−3.44)</td>
<td>(−0.14)</td>
</tr>
<tr>
<td>Negative interest rate policy</td>
<td>−0.14</td>
<td>−0.15</td>
<td>0.10</td>
<td>−0.20***</td>
</tr>
<tr>
<td>(−1.04)</td>
<td>(−1.41)</td>
<td>(0.53)</td>
<td>(−1.82)</td>
<td>(−1.40)</td>
</tr>
<tr>
<td>Asset purchase program</td>
<td>−0.07</td>
<td>−0.09</td>
<td>0.21</td>
<td>−0.22***</td>
</tr>
<tr>
<td>(−0.57)</td>
<td>(−0.80)</td>
<td>(1.12)</td>
<td>(−2.00)</td>
<td>(−0.20)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.30</td>
<td>0.22</td>
<td>0.70</td>
<td>0.47</td>
</tr>
<tr>
<td>(0.88)</td>
<td>(0.71)</td>
<td>(1.40)</td>
<td>(1.12)</td>
<td>(−0.40)</td>
</tr>
</tbody>
</table>

| Observations | 1271 | 1353 | 549 | 1446 | 629 | 1306 | 1318 | 423 | 1503 |

| R²       | 0.423 | 0.564 | 0.440 | 0.509 | 0.498 | 0.482 | 0.473 | 0.486 | 0.439 |

| Control variables | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*p < 0.1.

**p < 0.05.

***p < 0.01.

* statistics in parentheses.

**Notes:** See notes to Table 2 for more information on the estimation method and a full list of the control variables.

Interest rates (0.15). A possible explanation for this difference is that individuals find the concept of negative interest rate more difficult to understand. The effect of the asset purchase program treatment is insignificant.

We also find that some of the control variables have a significant effect. These effects arise, most likely, because different individuals react different to the “general information” snippet which is presented to both the control and treatment group. This snippet contains information about the ECB’s inflation target (see for more information Section 2.2). For example, the average male moves his inflation expectation 0.25 percentage point away from the inflation target of the ECB after reading the general information snippet if the male is in the control group or after reading both the general information snippet and one of the treatment snippets if the male is part of the experiment group. As we control for the effect of the treatment snippet – by including treatment dummies – the resulting effect is most likely caused by the general information snippet.

The impact of knowledge is inconclusive as both knowledge measures have an opposite sign; individuals who report to have more knowledge of the ECB move their inflation expectations further away from the ECB’s inflation target after receiving information while individuals who answer more statements about the ECB’s instruments and mandate correctly move their inflation expectations towards the ECB’s inflation target.

Furthermore, older individuals, individuals with no or a right-wing ideology and individuals who trust the ECB less move their inflation expectations further away from the ECB target inflation rate after reading the text snippets.

### 4.2. Heterogeneity among individuals

Section 4.1 showed that, on average, individuals who received the treatment regarding the ECB’s (negative) interest rate policy have inflation expectations which are closer to the ECB inflation target than individuals who did not receive the treatment. Here we explore whether the treatment effect depends on individuals’ characteristics, namely gender, age, ideology, actual knowledge of the ECB, trust in the ECB, and their inflation forecast prior to the experiment.

Table 3 shows the effect of the treatment for various subsets of our sample, using the same model as in Section 4.1.

We find mixed evidence for gender. The results suggest a significant effect of the interest rate policy treatment on the inflation expectations of women, whereas the effect on the inflation expectations of men is insignificant. For the other treatments, we find no significant differences. This result is partly in line with the work of Coibion et al. (2022) who find that women adjust their inflation expectations more than men when they receive information about the central bank’s inflation target or the current inflation rate.

We find that age matters for the effect of our treatment. We find a significant effect for all of our treatments for individuals aged between forty and seventy and no significant treatment effect for the other age groups. A possible explanation could be that different generations prefer different ways to acquire new information. For instance, there is a body of literature suggesting that Millennials (those born after 1980) prefer other learning methods than the generations before them (see, for instance, Skiba and Barton (2006)). However, more research is needed to test whether this could explain the different treatment effects among age groups.

We find a significant effect for the interest rate policy treatment for individuals who have below median knowledge of the ECB, while we do not find a significant effect for individuals with above median knowledge.

---

*There is some evidence to support this interpretation. The DHS includes a question asking respondents to evaluate the survey. Individuals who received the negative interest treatment indicated that they found the questionnaire hard to answer; for the other treatment groups, we did not find such an effect. See Appendix C.2 for more information.
Finally, we find that our results are driven by individuals whose inflation expectations, prior to the experiment, are above the inflation target of the ECB. Individuals who, prior to the experiment, have inflation expectations above 2% and who receive information about the ECB’s (negative) interest rate policy report inflation expectations which are closer to the inflation target of the ECB after receiving this information. We find no significant effect for individuals whose inflation expectations, prior to the experiment, were below 2%.

5. Effect of treatment on trust in the ECB

5.1. Average effect of treatment on trust in the ECB

Similar to the previous section on inflation expectations, we start by looking at average treatment effects using the following model:

\[ T_{i}^{\text{posterior}} = \alpha + \beta_{j} \times \text{Treatment}_{i,j} + \gamma \times T_{i}^{\text{prior}} + \eta \times X_{i} + \epsilon_{i} \]  

(3)

In which \( T_{i}^{\text{posterior}} \) is trust in the ECB after receiving information, \( T_{i}^{\text{prior}} \) denotes trust before the information treatment; this variable is described as Level of trust: ECB prior in the regression tables. \( X_{i} \) is a vector of controls which is similar to the controls used in Section 4. The variable of interest is \( \text{Treatment}_{i,j} \) which is one if an individual \( i \) received treatment \( j \). Table 4 shows the results. We find no significant effects for all treatments which indicates that the additional information provided on the ECB instruments has no impact on trust in the ECB.

We also find that some of the control variables have a significant effect which is most likely caused by the general information snippet (see Section 4 for more information). Individuals who trust the ECB or EU institutions more, who are not unemployed, who have a right-wing ideology and who self-report to have less knowledge of the ECB have more trust in the ECB than prior to receiving the text snippets.

5.2. Heterogeneity among individuals

Similar to Section 4.2, we examine whether our treatment effect differs among various subgroups of our sample. We, therefore, regress Eq. (3) on various subsets of our sample. The results are shown in Table 5.

We find some evidence that age matters for the effect of the treatments on trust in the ECB. The effect of the asset purchasing program treatment on individuals aged between forty and seventy is positive and significant. In other words, individuals in this age cohort who received this treatment trust the ECB more than individuals who did not receive any additional information about how the ECB tries to achieve price stability. The effect of the (negative) interest rate policy remains insignificant. This result is, partially, in line with the effect of our treatment on inflation expectations for which we found that age matters. However, more research is needed to find out why we find this mixed evidence.

Furthermore, we find no evidence that gender or prior knowledge of the ECB matter for the effect of the treatments on trust in the ECB.

6. Concluding remarks

Nowadays, central bankers not only communicate with financial markets but also with the public at large. This reflects that central bankers believe that communicating with the public could increase their political legitimacy and may help them achieve their price stability goal. This growing attention for communication to the general public among policymakers is mirrored in increased attention for this issue in the academic world. However, a lot is still unknown: about what should the central bank inform the public? And can central bank communication also affect trust in the central bank? What is the role of financial literacy?

This paper offers new insights into these questions by assessing the impact of providing certain information on monetary policy on individuals’ inflation expectations and trust in the ECB. We use a random controlled trial in which the treatment groups receive information about the ECB’s price stability objective and actual inflation and a particular monetary policy instrument (interest rate policy, negative interest rate policy and asset purchasing program) of the ECB. The control group only received information about the ECB’s price stability objective and actual inflation. Before and after receiving this information, individuals were asked about their inflation expectations and trust in the ECB. This way, we can identify the effect of providing information on inflation expectations and trust in the ECB.

We find evidence that providing information about how the ECB tries to achieve price stability affects individuals’ inflation expectations. Compared to individuals who only receive information about the inflation target of the ECB, individuals who receive additional information about the ECB’s (negative) interest rate policies adjust their inflation expectations more towards this target. However, providing information on asset purchases has no effect on inflation expectations. Our results therefore deviate from the finding of D’Acunto et al. (2020) that providing information on instruments has no effect on expectations.

Our main finding that providing information about monetary policy instruments affects inflation expectations is in line with the optimistic tone of some recent studies on central bank communication with the general public. However, an important caveat is in order here. Our evidence is based on a random controlled trial, which has the obvious advantage of strong identification. However, in a RCT set-up, it is ensured that participants get exposed to central bank communication, while in real life the public may be inattentive. In contrast to financial market participants and professional forecasters, households and firms seem to have a low
Table 4
Effect of treatment on level of trust in ECB.

<table>
<thead>
<tr>
<th>Treatment:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Interest rate policy</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>(0.94)</td>
<td>(0.91)</td>
<td>(0.86)</td>
<td></td>
</tr>
<tr>
<td>- Negative interest rate policy</td>
<td>0.03</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>(0.53)</td>
<td>(0.58)</td>
<td>(0.32)</td>
<td></td>
</tr>
<tr>
<td>- Asset purchasing program</td>
<td>0.06</td>
<td>0.06</td>
<td>0.05</td>
</tr>
<tr>
<td>(1.33)</td>
<td>(1.33)</td>
<td>(1.13)</td>
<td></td>
</tr>
<tr>
<td>Level of trust:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- ECB prior</td>
<td>0.56***</td>
<td>0.56***</td>
<td>0.57***</td>
</tr>
<tr>
<td>(23.61)</td>
<td>(23.67)</td>
<td>(24.57)</td>
<td></td>
</tr>
<tr>
<td>- EU institutions</td>
<td>0.41***</td>
<td>0.41***</td>
<td>0.41***</td>
</tr>
<tr>
<td>(17.99)</td>
<td>(18.18)</td>
<td>(17.97)</td>
<td></td>
</tr>
<tr>
<td>Demographic characteristics:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>−0.05</td>
<td>−0.07*</td>
<td>−0.03</td>
</tr>
<tr>
<td>(−1.47)</td>
<td>(−1.86)</td>
<td>(−0.88)</td>
<td></td>
</tr>
<tr>
<td>- Age</td>
<td>0.00</td>
<td>−0.00</td>
<td>−0.00</td>
</tr>
<tr>
<td>(0.15)</td>
<td>(−0.14)</td>
<td>(−0.11)</td>
<td></td>
</tr>
<tr>
<td>- Education</td>
<td>−0.02</td>
<td>−0.03</td>
<td>−0.04</td>
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<td>(−0.44)</td>
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<td>(−1.07)</td>
<td></td>
</tr>
<tr>
<td>- Social Status</td>
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<td>−0.02</td>
<td>−0.02</td>
</tr>
<tr>
<td>(−1.56)</td>
<td>(−1.29)</td>
<td>(−0.93)</td>
<td></td>
</tr>
<tr>
<td>- Unemployed</td>
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<td>−0.31**</td>
<td>−0.31**</td>
</tr>
<tr>
<td>(−2.04)</td>
<td>(−2.11)</td>
<td>(−2.01)</td>
<td></td>
</tr>
<tr>
<td>- Income (x1000)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(0.97)</td>
<td>(1.05)</td>
<td>(1.55)</td>
<td></td>
</tr>
<tr>
<td>- Financial decision maker</td>
<td>−0.03</td>
<td>−0.03</td>
<td>−0.02</td>
</tr>
<tr>
<td>(−0.67)</td>
<td>(−0.72)</td>
<td>(−0.38)</td>
<td></td>
</tr>
<tr>
<td>- Partner</td>
<td>−0.00</td>
<td>−0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>(−0.03)</td>
<td>(−0.09)</td>
<td>(0.04)</td>
<td></td>
</tr>
<tr>
<td>- Household size</td>
<td>−0.00</td>
<td>−0.00</td>
<td>−0.01</td>
</tr>
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<td>(−0.05)</td>
<td>(−0.00)</td>
<td>(−0.45)</td>
<td></td>
</tr>
<tr>
<td>- City</td>
<td>0.01</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>(0.66)</td>
<td>(0.66)</td>
<td>(0.60)</td>
<td></td>
</tr>
<tr>
<td>Ideology:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- None</td>
<td>−0.06</td>
<td>−0.08</td>
<td></td>
</tr>
<tr>
<td>(−1.25)</td>
<td>(−1.62)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Right-wing</td>
<td>0.08**</td>
<td>0.10**</td>
<td></td>
</tr>
<tr>
<td>(1.99)</td>
<td></td>
<td>(2.49)</td>
<td></td>
</tr>
<tr>
<td>Knowledge level:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Self-reported</td>
<td>−0.04*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(−1.95)</td>
<td></td>
<td>(−0.40)</td>
<td></td>
</tr>
<tr>
<td>- Objective</td>
<td>−0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(−0.40)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| N          | 2723  | 2723  | 2623  |
| R²         | 0.785 | 0.785 | 0.795 |

* p < 0.1.
** p < 0.05.
*** p < 0.01.
t statistics in parentheses.

Notes: This table shows the estimation results of Eq. (3) and is used to test whether informing individuals about a particular instrument of the ECB affects the level of trust in the ECB. The dependent variable is the level of trust an individual has in the ECB. The variables of interest are the three treatments dummies: Interest rate policy, Negative interest rate policy and Asset purchasing program. These dummies are one if an individual received information about how this particular instrument works. Section 2.2 shows the various treatment texts.

We do not find evidence that providing information about ECB instruments impacts average trust in the ECB. There are several possible explanations for this finding. First, individuals may not understand the provided information. However, this possibility seems improbable as we did find an effect of the information treatment on inflation expectations. Second, the level of trust in the ECB may be relatively rigid: a text may not be sufficient to change peoples’ feelings towards the ECB. For instance, studies in sociology stress the importance of “engagement” instead of merely providing information. Warren et al. (2014), for example, find that frequent engagement between the government and citizens via social media increases public trust. However, more research is needed to understand what the ECB can do to increase public trust.
Table 5
Effect of treatment on trust in the ECB.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Knowledge objective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Treatment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Interest rate policy (0.24)</td>
<td>0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>- Negative interest rate policy (0.32)</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>- Asset purchasing program (0.50)</td>
<td>0.04</td>
<td>0.07</td>
</tr>
<tr>
<td>Constant (1.65)</td>
<td>0.34*</td>
<td>0.57***</td>
</tr>
<tr>
<td>Observations</td>
<td>1270</td>
<td>1353</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.740</td>
<td>0.836</td>
</tr>
<tr>
<td>Control variables</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*p < 0.1.

**p < 0.05.

***p < 0.01.

$t$ statistics in parentheses.

Notes: see Table 4 for more information on the estimation method and a full list of the control variables.

needed to examine whether more frequent or more interactive communication increases trust in the central bank. A challenging but interesting avenue for future research is to analyze the impact of other, more complicated monetary policy instruments on inflation expectations and trust in the ECB.

Finally, our results concerning financial literacy are rather mixed. In our main model for inflation expectations we find that self-reported and objective knowledge have opposite effects, while in our main model for trust in the ECB we find that respondents who (self-report to) have less knowledge of the ECB have more trust in the ECB than prior to the experiment.

CRediT authorship contribution statement

Nils Brouwer: Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Formal analysis, Visualization.

Jakob de Haan: Conceptualization, Methodology, Writing – original draft, Writing – review & editing.

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Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jmacro.2022.103430.

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