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Central bank communication with non-experts: insights from a randomized field experiment

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Abstract

We conducted a randomized field experiment to investigate the impact of direct central bank communication on the monetary policy knowledge and expectations of non-experts. Between 2022 and 2025, at the ECB Visitor Centre, we exposed nearly 5,000 participants from diverse visitor groups to policy briefings, similar to the communication at ECB press conferences. The random assignment of participants to treatment, placebo, or control groups created exogenous variation in the information they received. We implemented a new survey to gain insights into participants' monetary policy knowledge, as well as their inflation and growth expectations, both before and after the information treatment. This approach enabled us to explore how knowledge and trust influence the economic expectations of non-experts. Our findings indicate that treated individuals improved their monetary policy knowledge and developed a better understanding of the ECB's inflation target, which proved to be a key factor in explaining why a substantial share of treated non-experts revised their medium-term inflation expectations, aligning them with the inflation target. However, the improved understanding of monetary policy did not lead to systematic revisions in their economic growth expectations. Removing potential language barriers amplified the effects of direct communication on monetary policy knowledge and individual inflation expectations, confirming the importance of addressing citizens in their native language.

JEL Codes: C83, C93, D83, D84, E31, E58.

Keywords: Central bank communication, Behavioral economics, Randomized controlled trial, Monetary policy knowledge, Inflation expectations.

Non-technical summary

Effective communication strategies with diverse stakeholders are essential for central banks to maintain price stability and ensure the smooth transmission of monetary policy measures. This research examines the impact of direct central bank communication with non-experts on their understanding of monetary policy and macroeconomic expectations. Our study is motivated by the need to understand better how effectively such communication conveys information to the public, enabling them to form well-informed economic expectations. A key challenge stems from the often found dominance of the media as the primary information source for non-experts, whose inflation expectations show significant dispersion compared to the well-anchored expectations of professionals. Recent episodes influenced by supply shocks have further emphasized this disparity. While communications at ECB press conferences play a crucial role in clarifying policy intentions and reducing market uncertainty, their potential to shape the expectations of non-experts is less understood. Non-experts tend to favor indirect communication through media channels, suggesting that central banks may need to adapt their strategies to better engage this audience and align their expectations with policy objectives. Direct communication could help anchor citizens' inflation expectations if it increases public attention to monetary policy news and enhances the broad understanding of how monetary policy works. Identifying the effects of direct communication on non-experts' literacy and expectations in real-world settings is challenging, and a field experiment provides a practical approach to studying these effects. The main conclusion is that direct communication, similar to that of press conferences, shapes non-experts' inflation expectations by improving their knowledge of monetary policy and enhancing their trust. This conclusion is drawn from sessions with diverse international groups totaling 5,000 individuals who visited the ECB between December 2022 and May 2025 at its headquarters in Frankfurt and volunteered to participate.

Experimental design and treatment: Visitors with varying levels of monetary policy knowledge attended policy briefing sessions, akin to communication at ECB press conferences. We exposed them to information treatments and created exogenous variation in the information they received about monetary policy. Participants were randomly assigned by group session to one of three treatments: (i) Treated group: it received presentations from ECB experts on the ECB's monetary policy framework and its decisions; (ii) Control group: it received no treatment; (iii) Placebo group: it received presentations from experts about other ECB tasks, though unrelated to its monetary policy. We implemented a new survey to gather insights into participants' monetary policy knowledge, inflation, and growth expectations before and after the treatment. The inclusion of a placebo group allowed us to prove that monetary policy-specific learning effects were genuine. The population primarily consisted of younger, financially educated individuals with a wide range of prior knowledge about monetary policy, but it also included older adults and individuals without a university education.

Method: The methodology involved treatment analysis with regression adjustment to estimate average treatment effects, complemented by a heterogeneity analysis to explore variations in treatment effects across different subgroups. This analysis examined differences in outcomes based on participant characteristics, such as age, sex, educational background, origin, and prior knowledge of monetary policy. Additionally, it considered the potential influence of speaker-related factors and the language used, shedding light on how these elements may shape the effectiveness of the treatment. Matching methods were applied to address potential biases arising from pre-treatment differences among visitors from different sessions, ensuring the robustness of the results. This approach included the use of propensity score matching techniques to account for imbalances in individual demographic factors.

Discussion of findings: The results show that participants who received briefings on monetary policy demonstrated a significant improvement in their understanding of the ECB's monetary policy compared to those in the control and placebo groups. The intervention had a notable impact on anchoring inflation expectations, as treated individuals not only enhanced their knowledge of monetary policy but also gained a clearer understanding of the ECB's inflation target. Notably, the most pronounced improvements were observed among participants who initially had lower levels of knowledge of monetary policy. Two key mechanisms explain the significant treatment effects: improved knowledge and enhanced trust (in the speaker). These mechanisms operated differently across subgroups: (i) Participants with higher prior knowledge benefited more from detailed information and aligned their expectations based on a precise understanding of the ECB's inflation target; (ii) Participants with limited prior knowledge responded more to trust-building measures, aligning their inflation expectations with the ECB's target even without understanding the mandate. But, there were no significant effects on growth expectations, suggesting that participants perceived growth forecasts as more uncertain or less directly influenced by monetary policy. Additionally, the findings highlight the importance of addressing language barriers. Communicating with participants in their native language further amplified these treatment effects, underscoring the value of tailoring communication to local audiences.

Policy implications: The research supports the value of direct central bank communication in enhancing monetary literacy and shaping inflation expectations among non-experts. The findings provide valuable insights for central banks on designing effective communication strategies to enhance transparency, comprehension, and public engagement. Direct central bank communication can improve public understanding of monetary policy and align inflation expectations with policy objectives, thereby supporting price stability. We suggest that central banks should strengthen efforts to improve financial and monetary literacy. This could include targeted educational programs on monetary policy for high schools and universities, complemented by indirect communication through various media outlets (e.g., social media, television, radio, newspapers, the ECB website, and the visitor centre).

1. Introduction

A "quiet revolution" in recent years refers to the growing recognition that central banks need to communicate clearly, consistently, and transparently about how monetary policy is conducted (Blinder, 2004; Issing, 2005; Yellen, 2012). This shift acknowledges that well-communicated policies enhance public understanding, manage expectations, and build trust, ultimately aiding central banks in fulfilling their mandates. One key finding of the ECB's 2021 strategy review is that effective communication helps central banks guide inflation expectations among both expert and non-expert audiences. It also supports accountability by enhancing transparency, credibility, and trust (Assenmacher et al., 2021). According to the ECB's 2025 strategy assessment, a sequential and layered communication of monetary policy decisions is crucial, while a symmetric two percent inflation target has facilitated clearer communication to the public at large (ECB, 2025). As ECB President Lagarde (2023) emphasized, the primary challenge for central bank communication today is to capture the attention of the public in an "*ever-increasing competition for attention*", amid a rapidly changing communications landscape and an "*overarching decline in trust*" (see also Ehrmann, 2025). Communication strategies can successfully anchor public inflation expectations if they break the "*cycle of selective inattention*", where citizens tend to ignore inflation news when inflation is near the target but pay attention when it overshoots it (Coibion and Gorodnichenko, 2025). ECB press conferences are particularly important for effective communication as they clarify policy intentions and reduce market uncertainty (Blinder et al., 2008; Ehrmann and Fratzscher, 2009; Parle, 2022; Abkaya et al., 2025; Lane, 2025). However, public awareness of the ECB's monetary policy strategy and its primary objective of price stability has remained low; yet, this knowledge is critical for understanding key monetary policy messages and forming inflation expectations (Assenmacher et al., 2021; Schnabel, 2025; van der Cruijsen et al., 2015). For example, knowledge about monetary policy is an essential part of information selection, as it enables non-experts to focus on relevant information and align their expectations with those of the central bank (Burke and Manz, 2014).

Direct central bank communication with non-experts faces three critical challenges: (i) households often ignore it, as they may not actively engage with central bank information and improved central bank websites or digital tools may not effectively capture the attention of non-expert audiences; (ii) households generally have limited knowledge about monetary policy and inflation dynamics, which makes it difficult for them to interpret the information provided; and (iii) understanding direct communication requires a basic level of monetary policy literacy, which many non-experts lack, further limiting the effectiveness of such efforts. While direct communication at press conferences significantly influences financial market expectations, its impact on non-experts' expectations remains less well understood. This knowledge gap is partly due to the specific information-seeking behavior of

households, which predominantly rely on indirect communication through the media (e.g., Binder, 2017; Gardt et al., 2021). Additionally, households may have little incentive to pay attention to economic news and monetary policy signals in an environment of price stability, as they perceive the benefits as small and the costs of information search as high (Sims, 2003; Coibion et al., 2020; Maćkowiak et al., 2023).[1] Since non-experts rarely engage directly with central bank communication, identifying the effects of direct communication on non-experts' literacy and expectations in real-world settings is a challenging task. Field experiments provide a practical approach to studying these effects.[2]

Academic research on direct central bank communication with non-experts is still in its early stages (de Guindos, 2019). A key insight is that inflation expectations among most economic agents remain unanchored when supply shocks are significant drivers of inflation (Coibion and Gorodnichenko, 2025). The content of communication also matters: direct communication with households can support the effective management of non-experts' expectations when it focuses on policy targets and objectives. However, technical messages about monetary policy instruments and strategies are unlikely to resonate with non-experts (D'Acunto, Hoang et al., 2021). Effective central bank communication could require that central banks reach all citizens with accessible monetary policy messages, both in terms of content and delivery (D'Acunto et al., 2024). Whether the public receives a clear signal depends on the consistency between central bank messaging and media reporting. Furthermore, specific demographic groups have different preferences for receiving monetary policy news: younger individuals tend to favor social media, while older citizens rely more on traditional media, such as newspapers and television (Conrad et al., 2022; D'Acunto et al., 2024).

Households' limited knowledge of how monetary policy affects prices is well-documented, as are persistently low levels of financial literacy, which interfere with the public's ability to understand financial news (Lusardi and Mitchell, 2011, 2014). At the same time, financial education and knowledge about monetary policy can have a profound impact on economic expectations (Burke and Manz, 2014; Lusardi and Mitchell, 2014; McCowage and Dwyer, 2022). Financial literacy equips individuals to process information and make informed decisions, yet it remains persistently low (Lusardi and Mitchell, 2023). Financially literate individuals form more accurate expectations about economic conditions. As individuals gain financial knowledge, they learn to interpret economic signals, form expectations, and make sound financial decisions (van Rooij et al., 2011). Additionally, trust in the central bank may be necessary for shaping inflation expectations (Christelis et al., 2020; Eickmeier and Petersen, 2024).

[1] Recent event studies suggest that, in contrast to the predictions of the rational inattention hypothesis, individuals may still have an incentive to pay attention to economic and monetary news when forming their inflation expectations (Lewis et al., 2020; Jung and Kühl, 2022).
[2] Field experiments, as discussed by Harrison and List (2004), are well-suited to evaluate policies and interventions in real-world settings.

We investigate whether knowledge about monetary policy has an independent influence on the public's ability to forecast inflation. We hypothesize that direct central bank communication influences citizens' economic expectations by improving their knowledge of monetary policy, clarifying the central banks' reaction function, and enhancing trust (see the channels outlined in Figure 1). Between 2022 and 2025, we conducted a randomized controlled trial (RCT) with ECB visitors attending briefing sessions on monetary policy at the ECB headquarters in Frankfurt. We investigate whether direct central bank communication, akin to communication at ECB press conferences, influences non-experts' medium-term expectations for inflation and growth. We focus on individuals with varying levels of prior knowledge about the ECB's monetary policy. To measure monetary policy knowledge before and after treatment, we developed a novel monetary literacy survey, a metric that is correlated with, but different from, financial literacy. The anchoring of medium-term expectations, rather than short-term dynamics, is the focus of the analysis, as it is central to central bank communication goals (Williams, 2022).

***** Insert Figure 1 here *****

This paper is the first to use a field experiment to quantify the impact of direct central bank communication on non-experts' knowledge of monetary policy and their inflation and growth expectations. At the ECB Visitor Centre, nearly 5,000 participants from 117 international visitor groups with diverse monetary policy knowledge attended policy briefings, akin to communication at ECB press conferences.[3] The random assignment of participants to treatment, placebo, or control groups created exogenous variation in the information they received. The placebo treatment consisted of briefing sessions with a similar timing but covered unrelated topics (such as the digital euro, climate change, or banking supervision), allowing us to disentangle genuine from spurious learning, which could arise if individuals anticipating their visit to the ECB paid special attention to monetary policy information beforehand.[4] The RCT also allowed us to gain insights into how individuals select and process information when confronted with new information about monetary policy and the economic outlook. The diverse levels of participants' prior knowledge, learning skills, and personal demographics enabled us to explore the extent to which direct communication influences the monetary literacy of non-experts.

[3] Before their visit to the ECB, visitors received no information about the field experiment, since this could have changed their behavior. At the ECB, they did not receive any information about whether they were in the treatment, placebo, or control group. The heterogeneous composition of those groups provides us with a broad spectrum of individuals' monetary knowledge, ranging from no or little previous exposure to monetary policy to extensive experience with it.

[4] The ECB conducts on-site expert lectures for non-expert groups on "*specific topics [which] are aimed at groups with a good understanding of the ECB's mandate.*" For details, see https://www.ecb.europa.eu/ecb/visits/html/index.en.html#onsiteexp. Visitor sessions are free, but travel costs are not reimbursed. Note that the ECB Visitor Centre also offers other events to less experienced groups that were not exploited in this RCT (virtual presentations, virtual expert lectures, a guided tour of its premises, and virtual tours).

Amid the growing literature on central bank communication with non-experts, this paper makes a significant contribution by using a field experiment to show that direct communication from central banks enhances non-experts' understanding of monetary policy and helps anchor their inflation expectations. Building on earlier research that highlights the role of targeted communication and trust in facilitating the transmission of monetary policy, our findings demonstrate that improved understanding of the ECB's objectives or increased trust (in the speaker) leads a substantial share of non-experts to align their medium-term inflation expectations with the ECB's inflation target. Crucially, we find that removing language barriers amplified the effects of direct communication on monetary literacy and inflation expectations, underscoring the importance of addressing citizens in their native language. This finding also highlights the importance of effective transmission of information and audience comprehension in enhancing the accessibility and impact of central bank communication, particularly for non-expert audiences.

The remainder of the paper is structured as follows: Section 2 reviews the literature, Section 3 describes the survey, Section 4 explains the experimental design and treatments, Section 5 presents survey results, Section 6 discusses the empirical findings, and Section 7 concludes.

2. Central Bank Communication, Monetary Policy Knowledge and Trust

Citizens' knowledge about monetary policy is a key constraint for effective central bank communication with non-experts. Central bank communication on monetary policy decision-making days significantly influences financial market expectations, especially after press conferences (Gürkaynak et al., 2005; Blinder et al., 2008 and 2024; Hayo et al., 2022). Yet, unlike financial market participants, who efficiently incorporate monetary policy signals, households often fail to do so. This gap poses a significant challenge for the effective transmission of monetary policy.

There is a growing consensus that households' information processing differs from that of professionals. Households' inflation expectations are primarily influenced by their perceptions of inflation, whereas professionals consider the broader economic picture and assess various risks and uncertainties (Adam, 2007; Georgarakos et al., 2023). Some studies have shown that the formation of households' inflation expectations may be strongly influenced by other factors such as lifetime experience (Malmendier and Nagel, 2011 and 2016), gasoline prices (Binder, 2018), observed price-setting during everyday shopping experiences (D'Acunto, Malmendier et al., 2021; Huber et al., 2023), and recent crises (Ferreira and Pica, 2024). However, extreme circumstances can amplify the impact of central bank communication, as evidenced by former ECB President Mario Draghi's "*whatever it takes*" speech in the summer of 2012, which had a profound effect on public expectations (Ehrmann and Wabitsch, 2022).

Non-experts' inflation expectations matter for monetary policy transmission, as indicated, for example, by an RCT with Dutch households, which shows that inflation expectations have a causal influence on households' spending decisions (Coibion et al., 2023). However, many studies doubt the impact of direct central bank communication on household inflation expectations (e.g., Carroll, 2003; Lamla and Vinogradov, 2019; De Fiore et al., 2021). This skepticism is based on the premise that households' attention to economic and financial news is generally low and more influenced by media news, lack of trust, and limited knowledge about monetary policy among citizens (Sims, 2003; Maćkowiak et al., 2023; Eusepi and Preston, 2010; Lusardi and Mitchell, 2014 and 2023; Lamla and Lein, 2014; Conrad et al., 2022; Coibion et al., 2020). In contrast, some studies indicate that when households understand how policy decisions affect their finances, they are more likely to align their expectations with the central bank's goals (Burke and Manz, 2014; van der Cruijsen et al., 2015; Rumler and Valderrama, 2020). Recent studies suggest that targeted central bank communication aimed at specific audiences to influence economic expectations and behaviors works more effectively. By tailoring messages to different groups, such as households, firms, or financial markets, central banks can enhance the transmission of monetary policy (Coibion et al., 2022; Dalloul et al., 2024; Ehrmann et al., 2023; Mochhoury, 2023; Dräger and Nghiem, 2023). At the same time, evidence on the causal impact of central bank communication strategies on non-expert audiences with varying literacy levels is scant.

Many studies have shown that central bank communications based on simple rather than complex messages are more effective for the management of public expectations (Blinder et al., 2024; Haldane and McMahon, 2018; Kryvtsov and Petersen, 2021; de Haan and Hoogduin, 2024). Less complex messages also support trust-building in the central bank (Haldane, 2021). However, over recent decades, the complexity has increased as central banks have had to explain the interplay between standard and non-standard monetary policy measures (Masciandaro et al., 2023). Because central bank messages on monetary policy are often very complex, understanding them requires many years of financial education (Coenen et al., 2017; de Haan and Hoogduin, 2024). However, households' literacy levels are usually relatively low and heterogeneous.[5]

Furthermore, heterogeneity in the ability to process economic and financial information may hamper the effective transmission of central bank messages to the public.[6] Financial literacy, i.e., an individual's ability to "*process economic information and make informed decisions about household*

[5] For example, the ECB simplified the language used in its monetary policy statements and clarified its inflation target following the strategy review in 2021 (Blinder et al., 2024; Gardt et al., 2021).
[6] In the euro area, heterogeneity may also reflect diverse individual experiences by country and before the monetary union.

finances" (Lusardi and Mitchell, 2014), is typically found to be low (Batsaikhan and Demertzis, 2018; OECD, 2020; European Commission, 2023) and varies across demographics. Lower levels of financial literacy are observed among women, older individuals, and those with lower income and education (Klapper et al., 2014; Bruine de Bruin et al., 2010; di Nino et al., 2022; d'Acunto et al., 2024; McCowage and Rickards, 2024).[7] A growing number of studies suggest that increased investment in financial education is necessary to enhance the financial knowledge of citizens, which is generally low (Lusardi and Mitchell, 2014; Kaiser and Menkhoff, 2017; Sutter et al., 2023).

The way central banks inform the public about their inflation target and inflation projections is crucial for effectively managing public expectations. A lack of understanding of the central bank's inflation target can lead to unanchored inflation expectations (Binder, 2017). Moreover, the central bank's inflation target must be credible to effectively anchor inflation expectations, as expectations are formed through a process of perpetual learning (Hofmann et al., 2021). A study by Cobion et al. (2022) finds that targeted communication, using simple messages about the level of inflation and the central bank's inflation goal, influenced households' inflation expectations. In contrast, indirect communication through the media was less effective in this respect.

The study by Rholes and Petersen (2021) suggests that the effectiveness of managing inflation expectations decreased when a central bank communicated inflation uncertainty through density forecasts rather than precise point forecasts. A recent survey experiment by McCowage and Rickards (2024) found that the public's knowledge of the inflation target played a crucial role in shaping their inflation expectations, as evidenced by an experiment where Australian households with more precise knowledge about the Reserve Bank's inflation target tended to have more anchored inflation expectations. However, as shown for the United States, households' knowledge about the inflation target is often vague or even absent (Coibion et al., 2022).

Survey experiments exposing participants to news about the central bank's monetary policy showed that this form of communication increased individuals' trust in the central bank (Haldane and MacMahon, 2018; Bholat et al. (2019); Dräger and Nghiem, 2023). The RCT by Brouwer and de Haan (2022) suggests that complementing information on the ECB's inflation target with information about its policy instruments moves inflation expectations of Dutch households closer to target, but does not affect trust, while the RCT by D'Acunto, Hoang et al. (2021) for households from Finland finds that

[7] The literature distinguishes between financial literacy (the numeracy of the non-experts) and monetary literacy (the public's understanding of central bank actions and inflation dynamics). According to the OECD International Network on Financial Education (OECD/INFE), financial literacy is a combination of several factors necessary "*to make sound financial decisions and ultimately achieve individual financial well-being*" (OECD, 2022, p. 6). It is a broader concept that captures an individual's understanding of the "*broader economic context and thereby the situation of others*" (McCowage and Dwyer, 2022).

communication about the target is more important than communication about instruments. This difference could be owing to the fact that many households do not understand the significance of changes in the monetary policy strategy, even if extensively communicated by the central bank and the media. In their natural experiment with German households, Hoffmann et al. (2023) found little difference in inflation expectations after the ECB introduced its new symmetric 2% inflation target in 2021, compared with the previous definition of price stability -"below, but close to 2%"- which was asymmetric. Though when households were informed that this strategic change would imply increased tolerance for inflation overshooting, they revised their medium-term inflation expectations upwards.

Other factors may influence the transmission of central bank signals to non-experts, , such as trust in political institutions more generally, as well as personal values (Eickmeier and Petersen, 2024). Individuals with no trust in the ECB have higher inflation expectations than those with full trust in the ECB, while individual trust levels show high persistence (Dreher, 2024). Moreover, improving women's knowledge about the ECB, and at the same time promoting their confidence in such knowledge, seems to contribute to improving overall trust in the central bank (Angino and Secola, 2022). Recently, the aspect of speaker-related effects has has gained importance, as evidenced by research showing that communication can be more effective, both in terms of reaching out to and influencing households, when the messenger and receiver share similar characteristics, such as the same nationality (Wabitsch, 2024).

Hence, enhancing knowledge about monetary policy and inflation dynamics, as well as building trust in the central bank, should enable households to more accurately interpret and respond to key messages from central banks, thereby improving the effectiveness of central bank communication. Our study sits at the confluence of several strands of central banking and monetary policy literature. By investigating how direct communication impacts non-experts' monetary policy knowledge and inflation expectations, it sheds light on the mechanisms through which central banks can engage with the public and improve monetary literacy. This contributes to the growing literature on the role of communication in shaping expectations and trust in central banks, while also offering insights into how such efforts can enhance the transmission of monetary policy to households. Furthermore, the findings have broader implications for the literature on rational inattention, financial literacy, and public outreach strategies, highlighting the value of tailoring communication to diverse audiences for greater inclusivity and impact.

3. Assessment of Visitors' Knowledge about Monetary Policy

The ECB has been hosting visitor groups since its inception, providing an opportunity to engage with diverse audiences on the role and functions of the central bank. In 2022, the idea emerged to

systematically assess the impact of expert presentations on various types of visitors. This initiative led to the development of a novel survey designed to collect detailed information about participants' socio-demographic characteristics, as well as their monetary policy knowledge, perceptions, and expectations regarding euro area inflation and growth. This approach allowed us to conduct a structured evaluation of how direct communication influences public understanding and expectations. In terms of scope, our survey aligns with earlier attempts by Burke and Manz (2014) and McCowage and Dwyer (2022) to examine households' knowledge of monetary policy and the macroeconomy, as well as how literacy influences their expectations. However, unlike most earlier studies, we did not test participants' numeracy, and we faced constraints in terms of how many questions we could ask without interfering with; instead, we focused on individuals with advanced levels of financial education.

3.*1 The Monetary Literacy Questionnaire*

All participants were asked to complete a three-part questionnaire (see Appendix B).[8] In Part I, we collected data on the personal demographics of visitors, including age, gender, education, and country of origin. Part II included questions requiring institutional knowledge about the ECB's mandate, monetary policy instruments, decision-making bodies, past inflation and growth in the euro area, as well as the main current driver of euro area inflation. In Part III, we asked questions that required quantitative knowledge about the ECB's mandate, monetary policy instruments, and decision-making bodies. Participants were also asked to provide their medium-term expectations about inflation and economic growth and to identify the main future driver of euro area inflation. They were instructed to mark the single answer they deemed correct, choosing from six to nine answer choices depending on the question.

3.2 Computation of Monetary Literacy Scores

Our dataset was collected via questionnaires from individual participants of 117 visitor group sessions, totaling 4,750 visitors. The monetary literacy score is a quantitative measure derived from a scoring model that counts the correct answers for each respondent, allowing for comparisons across visitors.[9] In line with OECD (2016), the scoring model assigns equal weights for each question, ensuring that scores are not biased by the weighting scheme. Total literacy scores and subscores for institutional (or ex ante) and quantitative (or ex post) literacy have been normalized to a scale of 0 to 100 for ease of interpretation.[10] The two questions on the main current and future driver of euro area inflation were

[8] The English version of the questionnaire was translated into German and is available from the authors.
[9] In the literature, scoring models have been successfully applied to create consumer credit ratings and assess financial literacy (OECD, 2022).
[10] The institutional literacy score counts the correct answers to five questions in Section II (notably Q1-Q5 and

excluded from the score because it turned out that more than one answer could be correct.

3.3 Survey-related issues

When designing and conducting surveys, it is crucial to ensure that the instrument used is both reliable and valid to obtain meaningful and trustworthy results from the RCT. In surveys with multiple items, consistency issues may arise. We therefore computed Cronbach's alpha for the questionnaire, which measures internal consistency based on the average intercorrelation of questions. Its value is 0.68, which aligns with the widely used threshold of acceptable reliability.[11] Furthermore, in experimental surveys, several possible biases can occur and must be addressed, as they could otherwise invalidate the findings. Below, we discuss those issues and explain what strategies we have implemented to mitigate them (for a detailed discussion, see Stantcheva, 2023):

Survey Demand Effects: could arise if participants infer the purpose of an experiment and respond in ways that help confirm a researcher's hypothesis (Mummolo and Peterson, 2019). In our RCT, individuals voluntarily participated and were given no prior information that they would be surveyed when visiting the ECB. Additionally, there was competition within groups to perform well in the survey.

Experimenter Demand Effects: may occur when participants modify their behavior to conform to what they believe the experimenter is hoping for. To minimize these effects, we provided visitors with limited information about the study's purpose, explaining only that the survey was conducted for academic research. To further mitigate this effect, we avoided asking the same question twice, ensuring that revisions in participants' expectations due to treatment could be accurately measured relative to the control group.

Non-response Bias: it could be an issue if the demographics or opinions of abstainers systematically differed from those who participated in the survey (attrition). We found that the average response rate was around 60%, with variation by session (see Table A.2 in the Appendix). While this rate is relatively high, non-response bias could still be present. Therefore, we also checked whether our response rates broadly aligned with those reported for well-established household surveys, such as the Consumer Expectations Survey (CES) for the euro area, which documents a response rate of 66.7% (see

excluding the question on the drivers of current inflation). The quantitative literacy score counts the correct responses to five questions in section III (notably Q7-Q11 and excluding the question on the drivers of future inflation). The monetary literacy score is calculated by combining the individual scores from those two components: institutional and quantitative financial literacy. The resulting score could range from 0 to 10, counting the number of correct answers.

[11] Cronbach's alpha captures the degree to which items in a survey are interrelated. A higher alpha value suggests that the items are measuring the same underlying construct, indicating consistency across the survey.

Bańkowska et al., 2021). When analyzing the reasons for non-response behavior, we found that abstention was often due to technical rather than motivational reasons. To complete the questionnaire, participants needed to use their mobile phones, but not all brought theirs to the session.[12] Moreover, in smaller groups, the non-response bias could be more impactful. Therefore, we excluded visitor groups with five or fewer respondents from the RCT.

Guessing Behavior: this issue may arise when survey participants are unsure of the correct answer to a question. For example, participants might systematically select the first, middle, or last response option. To avoid response order bias, which is more likely when respondents must read through long lists of alternatives, we limited the number of alternatives to a maximum of nine responses. We also designed the answers to appear symmetric, allowing respondents to identify their preferred option quickly. After the experiment, we checked the distribution of responses and found no evidence of systematic biases of this kind. However, since we did not penalize for incorrect answers, the literacy scores could slightly overstate participants' knowledge of monetary policy due to guessing behavior. This limitation applies equally to both the treatment and control groups.

Priming Effects: We also checked whether the tone of the questions was neutral and avoided unintended priming that could influence treatment (Stantcheva, 2025). Unintended priming effects could bias key results, for example, if participants obtained hidden clues from the questionnaire about what levels of inflation they should rationally expect over extended periods. To measure economic expectations and perceptions of visitors, we used interval-based questions, which provided respondents with a fixed set of predefined answers to choose from, limiting the range of possible responses. This approach is a common practice in economic surveys, where precise numerical values are difficult to elicit (e.g., the Fed's New York Survey of Consumer Expectations). This technique reduces the cognitive burden on respondents by providing structured options and is inclusive, accommodating respondents with varying levels of financial literacy. However, interval-based responses do not capture exact numerical expectations. Open-ended questions could have been used to measure expectations, as is done in D'Acunto et al. (2023) and several established household surveys (e.g., the CES or the Michigan Survey of Consumers). The advantage of open-ended questions is that respondents are not primed by predefined categories or subject to anchoring bias (Haaland et al., 2023). However, this technique often leads to wide distributions, unless the audience has sufficient financial knowledge, which cannot be assumed for the average household. A hybrid approach, combining interval-based and open-ended questions (e.g.,

[12] We considered distributing hard copies of the questionnaire to participants without mobile phone or access to the internet. However, this possibility turned out to be impractical to implement and had the drawback that we could not monitor when the survey was filled by those participants.

the Fed's New York Survey of Consumer Expectations), could have been adopted. However, this was not done in the present study due to constraints on the number of questions during the field experiment.

Timing Issues: Incorrect timing when filling out the questionnaire could violate the randomization. Using timestamps from the mobile app, we recorded the exact time of the questionnaire submission for each participant. In some sessions, a small number of participants failed to submit it at the beginning or end of the session as instructed. This meant that the initial assignment to the treatment or control group was not respected in these rare cases. These outliers, who received treatment despite being allocated to the control group (or vice versa), were excluded from the measurement (in total, 474 responses). This adjustment addressed potential bias arising from the failure of randomization.

4. Experimental Design

This section outlines the design of the field experiment and the methods used to estimate average treatment effects. Through the RCT, we examine the influence of direct central bank communication on the monetary literacy and inflation (and growth) expectations of non-experts, considering their varying pre-existing knowledge of monetary policy.

4.1 The RCT

As part of its outreach activities, the ECB offers on-site expert lectures to international visitor groups (with a minimum group size of 15 persons), which interested parties with prior knowledge about monetary policy can sign up for. These lectures cover specific topics in more detail, namely monetary policy, the institutional framework ("*role and tasks of the ECB*"), banking supervision, climate change, and the (digital) euro. Visitor groups choose the topics of their training session from those principal options, whereas the ECB visitor centre selects and invites eligible groups and makes all organizational arrangements. Groups were randomly assigned to ECB speakers based on their chosen topics and the availability of speakers.[13]

In this field experiment, speakers varied across presentations, while presenters were part of a speaker pool and gave several presentations every year. We recorded information about the nationality, the gender, and the business area of each speaker. This RCT utilizes the ECB's in-person briefing sessions with visitors at the ECB headquarters in Frankfurt, Germany, which are conducted in either English or German (see Table A.2 in the Appendix).[14] Between December 2022 and May 2025, we

[13] Typically groups apply for several topics and the visitor centre checks the availability of a speaker for those options.

[14] Very few sessions were held in French or Italian. One initial session was held at the Goethe University of

conducted 117 group sessions with 4,750 visitors and 2,949 respondents (i.e., the response rate was 62%). Most participants were high-school students or university students from international universities majoring in business or economics and came from a euro area country, but it also included older adults and individuals without a university education.[15] The typical size of visitor groups ranged from 20 and 100 people (see Table A.2 in the Appendix).

We used a monetary literacy survey to assess participants' prior knowledge of the ECB's monetary policy and to compare the responses of the treated individuals with those of the control group. The answers to the monetary literacy questionnaire were collected via a mobile phone app, which allowed us to record the exact submission time for each participant.[16] Participants received oral instructions on how to use the app and when to complete each section of the questionnaire. It typically took participants less than five minutes to respond, and the information was kept confidential to protect their data. In each session, participants were evaluated on their monetary literacy and asked about their perceptions and (medium-term) expectations regarding euro area inflation and economic growth. Additionally, demographic information was collected for each participant. Unlike studies using online surveys, the physical presence of participants and the time constraints for completing the questionnaire ensured that the scores reflected individual knowledge, minimizing the likelihood of participants searching for correct answers on the internet.

The information treatment during a monetary policy session (baseline) consisted of an intense briefing on the ECB's monetary policy decisions and its institutional framework. This was delivered through a 90-minute lecture by a senior monetary policy expert from the ECB, featuring interactive elements similar to the Q&A session at press conferences.[17] Participants were encouraged to ask questions on monetary policy topics during the session. Alternative information treatments comprised of briefings on the institutional framework only. Placebo treatments included presentations on central bank issues not directly related to monetary policy decisions, notably banking supervision, climate

Frankfurt and we excluded it for consistency (43 observations were dropped), since all other sessions were held at the ECB's visitor centre.

[15] These sessions are free, but travel costs are not reimbursed. Note that, the ECB Visitor Centre also offers a guided tour of its premises to less experienced groups (mostly school groups), which we are not using for the RCT. However, it is noteworthy in terms of self-selection that requests from visitor groups allow to sign up for both kinds of sections, and this has implied that groups with more knowledge and an interest in discussing monetary policy issues signed up for the on-site expert lectures.

[16] In the first two sessions of the field experiment, we had collected the responses in the form of printed questionnaires.

[17] The monetry policy lectures covered the ECB's assessment of the current economic situation, future outlook (including staff projections), risk assessment, the mandate and institutional setting of the ECB (including the price stability objective, central bank independence, prohibition of monetary financing and voting at the Governing Council), the ECB's monetary policy strategy, the outcome of the ECB's 2020/21 strategy review, the monetary policy tools including conventional and non-conventional monetary policy instruments, channels of monetary policy transmission (material on the details on the presentations is available from the authors).

change, and the (digital) euro.[18]

Our key outcome variables are participants' monetary literacy scores and medium-term inflation and economic growth expectations. A treatment effect should manifest in differences regarding outcome variables between the treatment and control groups, and there should be no significant differences for placebo relative to control groups.[19]

Participation in the field experiment was voluntary, no individual rewards were given, and no ex post performance measurement was promised to visitor groups. Each session lasted approximately 90 minutes and proceeded as follows: At the start of a session, participants were asked whether they would be willing to participate in a survey to test their knowledge of the ECB's monetary policy. They were then asked to load a questionnaire into their mobile app and answer the questions. Control groups were asked to fill out the full questionnaire at the beginning of the session whereas other groups were asked to fill out the first two parts at the beginning and the third part of the questionnaire at the end of the session (treatment groups). While some of the sessions included details about the ECB's monetary policy and institutional framework, other sessions provided visitors with information about the ECB's other tasks, without giving details about monetary policy (placebo treatment). Participants received no explicit information about whether they belonged to the treatment, placebo or control group, respectively. Groups were allocated to the treatment, placebo treatment, and control groups through randomization by session (cluster randomization) rather than individually, as in many laboratory experiments. This approach preserved the nature of a field experiment with minimal intervention in the format of those visits while facilitating the implementation of the survey process and keeping the group engaged and active in the discussion (see Figure 2).

***** Insert Figure 2 here *****

The control group answered all questions from the literacy questionnaire (parts I-III) before receiving any additional information during a briefing session by the ECB expert. In contrast, At the start of the session, the treatment group only responded to questions about their demographics, institutional literacy, and perceptions about euro area inflation and growth (parts I and II of the questionnaire) at the start of the session and answered the questions on quantitative literacy and medium-term euro area inflation and growth expectations (part III) after the briefing from the ECB expert.

In all sessions with ECB experts, the treatment was fairly homogeneous in terms of length,

[18] Under placebo treatment, no information on recent monetary policy decisions and the ECB's institutional framework was provided.

[19] Since it is conceivable that individuals attending visitor sessions are incentivized to pay more attention to economic and financial news ahead of the meetings, potentially biasing the results, some sessions with an identical format covering topics unrelated to monetary policy were used for placebo treatment.

structure, and main communication messages. However, there were minor differences in the contents of the briefings depending on the presenter, group dynamics differed during the Q&A parts of the sessions, and there was variation in the language (mostly between English and German). Thes factors may explain group-related effects beyond what can be attributed to differences in prior knowledge. In the econometric analysis of treatment effects, we explore the impact of the content of the briefings and the use of English relative to German, two main aspects of heterogeneity across sessions. Additionally, because the RCT sessions were conducted between 2022 and 2025, there were variations in policy rates, inflation levels, and the economic situation in the euro area. Since we collected information about participants' prior perceptions of inflation and economic growth, we also report results controlling for these variables, thereby accounting for differences in the inflation and economic growth outlook throughout the group sessions.

4.2 Econometric Analysis of Treatment Effects

We analyze average treatment effects to gauge the impact of ECB monetary policy communication on visitors' monetary literacy and their inflation and growth expectations. To measure the impact of treatment on the dependent variable, we focus on the difference in outcomes with and without treatment. There are two population parameters of primary interest (Wooldridge, 2010): the average treatment effect (ATE) and the average treatment effect on the treated (ATET), defined as follows:

$$ATE = E(y_1 - y_0) \quad (1)$$

$$ATET = E(y_1 - y_0 \mid w=1) \quad (2)$$

where w is the treatment indicator, a binary variable that equals 1 if the individual is treated.[20] ATE represents the mean effect for a randomly drawn person from a population, defined as the difference between the outcome for an individual if they are treated (y_1) and the outcome for the same individual if they are not treated (y_0). While ATE captures the mean effect for all participants in the RCT, ATET reports the mean effect for those who were treated, excluding the non-treated from the measurement.

When estimating treatment effects, we control for various factors. Under two standard assumptions in program evaluation literature, namely "*unconfoundedness*" and "*ignorability*", no (unobserved) characteristics of the individual are associated with both the potential outcomes and the

[20] Imbens and Angrist (1994) define another measure of the treatment effect, namely the local average treatment effect (LATE). LATE can be estimated using instrumental variables under very weak conditions. However, this would be needed if the randomized treatment would not guarantee that a difference-in-means estimator from basic statistics is unbiased, consistent, and asymptotically normal. In our RCT, the administration of the visitor centre randomly chooses whether a group that attends a monetary policy session will be a treatment or a control group.

treatment beyond the observed covariates (Imbens and Wooldridge, 2009).[21] These assumptions are satisfied since individuals were randomly assigned to treatment (i.e., the selection was exogenous to visitors), and covariates for demographics, perceptions, and prior knowledge have been included.[22]

To estimate average treatment effects (β_1), we regress an outcome variable (y_i) for visitor i on a dummy variable for their respective treatment applying regression adjustment based on:[23]

$$y_i = \alpha + \sum_{j=1}^{2} \beta_j \, Treat_{ji} + \gamma X_i + \varepsilon_i \qquad (3)$$

where j denotes the different treatments (j=1 for the information treatment, and j=2 for the placebo treatment), $Treat_{ji}$ are dummy variables that take the value one if an individual i received treatment and the value 0 if an individual received no treatment, X_i is a vector of individual-specific controls including demographics (gender, age, education, origin), inflation and growth perceptions, and prior knowledge, as obtained from the survey, α is a constant (outcome when no treatments are applied), γ is a vector of coefficients for the control variables, and ε_i is an error term for individual i.[24]

The outcome variables are visitors' monetary literacy scores (or subscores) and the number of correct answers concerning medium-term inflation or growth expectations for the euro area. We estimate treatment effects by applying regression adjustment, which offers the advantage of a fully interacted parametric model while applying generalized methods of moments estimation.[25] To address potential bias due to pre-treatment differences among visitors from different sessions, we apply matching methods and estimate (3) using propensity score-matching (Rosenbaum and Rubin, 1983; Imbens, 2004).

5. Evidence from the Monetary Literacy Survey

This section provides evidence about the visitors' performance in the monetary literacy surveys and

[21] Under ignorability it is possible to apply approaches to matching such as propensity scores, while in the absence of ignorability, we would have to resort to instrumental variable approaches.
[22] Note also that the design of the RCT is such that the stable unit treatment assumption (SUTVA) holds meaning that treatment of one individual only affects the outcome variable of that individual.
[23] Specifically, we use the STATA command "*teffects RA*" to estimate average treatment effects. In a three-group design, it compares the treatment and control group as well as the placebo and control group. Note in our experiment there are no combined effects between the treatments. For a discussion of the efficiency gains from a three-group design see Gerber et al. (2010). Note that session specific factors (language, speaker, group size, response ratio) have not been included in the baseline regressions and are captured by the constant.
[24] The binary dummy variable Higheredu is 1 for visitors with a university degree, Young is 1 for visitors below 30 years, Female is 1 for women, Euroarea is 1 for visitors who stated that their currency is the euro, The variable Language captures if the session was in English, German, French or Italian, the variable Speaker codes the name of each prsenter and captures that a speaker gave multiple presentations and that speaker characteristics may differ, the variable Group size counts the number of participants per session, and the variable Response ratio measures how many participants in a specific session actively participated in the experiment.
[25] See (Wooldridge, 2010). Other studies have also used robust regressions using the Huber estimator. That approach should provide identical results when estimating ATE (or ATET) if account is taken for treatment heterogeneity. We have checked that the results for ATE using that approach are similar.

compares their economic expectations with the ECB's Consumer Expectations Survey, which is representative of the broader European public.[26]

5.1 Evidence on Visitors' Monetary Literacy and Demographics

Table 1 reports the descriptive statistics of ECB visitors who participated in our RCT. The majority of visitors came from the euro area (71.4% of total respondents) and were below 30 years old (77.9%). About half of the visitors had a university degree (50.8%), and more than half (56.5%) were male. Our sample is well balanced across treated and untreated groups in terms of origin, age, and inflation perceptions, as confirmed by further tests (Table 1, column 4). However, partly reflecting the design of this field experiment, where visitor groups are assessed without actively influencing their composition, some imbalances occurred, especially for gender and education, but also in terms of growth perceptions, inflation, and growth expectations. Moreover, the group size differed across sessions, implying heterogeneous group dynamics. To address imbalances in visitor group characteristics and group size, we include control variables in the regressions, specify group fixed effects, use stratification, and apply matching techniques when estimating treatment effects.

The average monetary literacy score of 42.6% indicates that the average visitor answered four out of 10 questions correctly. Participants found it more challenging to answer questions requiring quantitative knowledge about the ECB's monetary policy than those reproducing institutional facts. The average subscore for institutional literacy, measuring prior knowledge, was 47.1%, higher than the quantitative literacy score (38.1%), which partly reflects treatment.

***** Insert Table 1 here *****

The empirical distribution of prior knowledge, which closely resembles a normal distribution, is similar for the treated and control groups (Figure 3a, LHS). As expected, if the treatment is effective, the monetary literacy scores treatment of the treated group show a clear improvement relative to the control group. This is evidenced by a rightward shift blue line in Figure 3a, RHS).

Consistent with patterns observed in financial literacy surveys conducted by the OECD (and the ECB), prior knowledge about monetary policy varies according to the respondents' demographic factors (Figure 3b). On average, men had higher initial scores than women, and scores tended to increase with

[26] Note that, in line with the ECB's official reporting in real time, CES data are based on six-euro area country aggregates until January 2024 (including Belgium, Germany, Spain, France, Italy, and the Netherlands) and thereafter on 11-euro area country aggregates (including the above six countries and Ireland, Greece, Austria, Portugal, and Finland).

age.[27] Visitors from the euro area generally had higher literacy scores than those from other regions. Furthermore, visitors with a university education had higher monetary literacy scores than those with no university education (e.g., middle or high school diploma or professional qualification).

***** Insert Figure 3 here *****

Table 2 illustrates the influence of personal demographics on monetary literacy scores based on a panel regression analysis. To facilitate the economic interpretation of our main characteristics, we create binary dummy variables to represent the four individual visitor demographics (education, age, origin, and gender) in a binary format ([0,1]). The variable *Higheredu* is 1 for visitors with a university degree, *Young* is 1 for visitors below 30 years, *Female* is 1 for women, and *Euroarea* is 1 for visitors who stated that their currency is the euro. Using a Huber panel estimator to estimate robust regression coefficients that control for outliers (Table 2, columns 1 to 3) and panel OLS (columns 4 to 6),[28] we confirm the results on heterogeneity from the above descriptive analysis.

***** Insert Table 2 here *****

In summary, the descriptive results suggest that visitors who received treatment had higher monetary literacy scores compared to those who received no treatment. The main cross-sectional stylized facts concerning demographic heterogeneity, known from financial literacy surveys regarding gender, age, and education, are preserved in our RCT when assessing monetary literacy.

5.2 Evidence on Visitors' Monetary Literacy by Subject

Figure 4 illustrates selected answers from all visitors to the monetary literacy questionnaire, showing the dispersion of their knowledge by subject. Regarding the ECB's mandate, a large majority of participants (77.5%) were aware that the ECB's primary objective is price stability, and more than half (63.4%) knew that the ECB's symmetric inflation target is set at an annual rate of 2% (Figure 4a). Interestingly, around one-fifth of the respondents chose the 0 to 2% range, which underlies the ECB's definition of price stability that applied before the ECB's 2021 strategy review, after which the ECB adopted a symmetric, medium-term inflation target of 2%. This change, as noted by Ehrmann et al. (2023), initially went largely unnoticed by European citizens. However, in our case, this outstanding result was due to the treatment, as 81% of the treatment group and only 45% of the control group

[27] There appears to be a discontinuity around the age of 19, above which literacy scores jump upwards, and there is a peak for the age group between 30 and 39 years.

[28] In comparison with panel OLS, this methodolgoy is more efficient than panel OLS since potential outliers and influential observations are removed, which makes estimates less sensitive to extreme observations in the data and leads to significant improvements in the R^2. The results for panel OLS are available from the authors.

participants knew the precise value of the inflation target, indicating that they had learned from the ECB expert presentations.

Many visitors demonstrated a good understanding of the ECB's conventional monetary policy tools (see Figure 4b). Only 5.9% mistakenly thought the interest rate was not a monetary instrument, while 26.0% correctly identified that the exchange rate is not part of the ECB's monetary policy toolkit. However, the survey revealed a lack of knowledge concerning unconventional measures, despite the extensive media coverage of the ECB's large-scale asset purchases over the last decade. Around 46% of the respondents incorrectly believed that either the ECB's Asset Purchase Programme (APP) or the Pandemic Emergency Purchase Programme (PEPP) was not a monetary policy instrument of the ECB.

Regarding decision-making, almost half of the visitors knew that the Governing Council is responsible for monetary policy decisions in the euro area (Figure 4c). A minority of visitors (14.6%) wrongly indicated that the European Commission or the Heads of State take monetary policy decisions. However, relatively few visitors (15.2%) were aware that the Governing Council meets eight times a year to take monetary policy decisions, and the majority of respondents thought it would be less frequent. We also asked visitors about the drivers of euro area inflation. Since euro area inflation is always driven by several factors whose influence varies over time, this question created unforeseen complexities. Therefore, we did not include the scores from the two questions about past and future inflation drivers in the monetary literacy score.

Overall, the results suggest that the average visitor possesses advanced knowledge about the ECB's monetary policy, amid substantial heterogeneity across groups and individuals. When comparing the findings with those from surveys of the broader European population, it is evident that ECB visitors tend to have more comprehensive knowledge about monetary policy, particularly regarding the goal of monetary policy (both treated and non-treated individuals). While in our RCT about 70% of the participants initially knew that price stability is the primary objective of the ECB, the Winter 2025 Eurobarometer survey by the European Commission, suggests that a much smaller share of around 43% of the European citizens normally is aware that the ECB is responsible for maintaining price stability. Information from the CES (for details, see D'Acunto et al., 2024) suggests that a large and significant fraction of the public is unaware of the ECB's mandate and that the level of knowledge about monetary policy differs across the demographics of respondents. According to that survey, only half of the citizens were aware that price stability is the primary objective of the ECB. At the same time, about two-thirds of respondents correctly associated the ECB with banking supervision. In line with our results, the CES suggests that lower levels of knowledge about the ECB can be expected for younger and female citizens. The ECB's (2021) Knowledge and Attitudes survey highlights that most citizens have heard about the ECB. However, there is still confusion in the population about its goals and instruments, particularly

across countries. At the same time, the survey suggests that a majority (59%) tend to trust the ECB, while a minority (30%) tend not to trust it. In our survey, we did not collect information about trust levels that likely,that could be compared; however, given that the groups decided to visit the ECB, it is expected that their initial trust levels also exceeded what is known for the broader population from established surveys.

***** Insert Figure 4 here *****

5.3 Evidence on Visitors' Perceptions and Expectations

Participants' mean inflation perceptions and expectations were, in general, more accurate than the mean respondent of the CES, which represents an average European household (Figure 5, panels b and c). This comparison implies that the average respondent from our survey had a better judgment about inflation than the average respondent in the CES. This finding also holds for a comparison of median inflation perceptions. Still, it does not hold for median medium-term inflation expectations, for which CES respondents typically aligned closer with the inflation target (see Figure A.2 in the Appendix). Moreover, participants tended to underestimate the level of the actual policy rate systematically (Figure 5, panel a) and to overestimate current and future economic growth in the euro area, relative to conventional estimates for potential output growth ranging between 1 and 2 percent and relative to CES respondents (see Figure A.1 in the Appendix).

***** Insert Figure 5 here *****

6. Results from the RCT

This section presents the empirical results on the impact of direct communication on monetary policy knowledge.[29] It discusses how this factor contributed to the formation of inflation and the growth expectations of non-experts.

6.1 Treatment Effects on Monetary Literacy

Our findings indicate that direct communication by ECB experts significantly improved participants' monetary literacy. Visitors who received the treatment (i.e., attended sessions focused on monetary policy or the ECB's institutional framework) scored higher on monetary literacy tests compared to the control group. Table 3 presents the results of the intervention by ECB experts on monetary literacy and

[29] Note that we did robustness checks in which we included group and speaker fixed effects and that the findings presented in this section are robust to that modification. For robustness, we also applied inverse propensity score weighting (Imbens and Wooldridge, 2009), and confirmed our findings. Those results are not reported here for brevity of the exposition but are available from the authors.

the subscore for quantitative literacy, which reflects learning from the communication intervention. The average treatment effects for both literacy scores, estimated using regression adjustment, are significantly positive when compared to the control group.

Our baseline results are estimated, including all demographic controls, inflation, and perceptions of economic growth, but excluding prior knowledge. The results for monetary literacy (Table 3, column 1) indicate gains of 6.7 points (out of 100) relative to the control group, while for quantitative literacy (Table 3, column 5), gains of 11.7 points are estimated, corresponding to 0.7 and 1.2 more correctly answered questions, respectivel (Table 3, column 7). This improvement was statistically significant at the 1% significance level. The respective results applying propensity score-matching (Table 3, columns 2 and 6) confirm the results but show slightly higher gains. Separate post-estimation tests demonstrate that imbalances across subjects were absent when applying propensity-score matching.

This analysis also suggests that the treatment effect varied across demographic groups, particularly concerning prior knowledge. The treatment effect was more pronounced for participants with less monetary policy knowledge who learned more from the expert presentations. To capture systematic differences among participants related to prior knowledge, we added individual institutional literacy scores as an additional control in the regressions. Column 3 (of Table 3) shows that gains for monetary literacy are still positive and significant, but decline to 4.7 points. In contrast, gains for quantitative literacy (Table 3, column 7) modestly decline to 11.1 points relative to the baseline. These results remain broadly similar when using propensity score-matching.

Additionally, a significant adverse placebo treatment effect for monetary and quantitative literacy scores (Table 3, second row) confirms that the results are due to genuine learning during the group session. Placebo treatment effects measure the differences between the group that received placebo treatment (i.e., treatment with no relevant information) and the control group.

***** Insert Table 3 here *****

The heterogeneity analysis reveals that average treatment effects display heterogeneity across personal demographics. Females, older participants (above 30 years old), and those with a university education benefited the most from the treatment, even if we control for differences in prior knowledge (see Figure 6a). However, the origin of visitors does not explain heterogeneity. These patterns of treatment heterogeneity are confirmed when examining quantitative literacy (see Figure 6b), which focuses on learning during the sessions and excludes effects due to differences in initial knowledge.

***** Insert Figure 6 here *****

Next, we reestimate average treatment effects on literacy and distinguish between different buckets of prior knowledge, as proxied by the institutional literacy score, while controlling for

heterogeneity across participants in terms of demographics, inflation, economic perceptions, and prior knowledge. These results (see Figure 7) indicate that the detected gains in monetary (quantitative) literacy relative to the control group were significant for participants who were less literate before visiting the ECB, but insignificant for participants with very high initial knowledge levels.

***** Insert Figure 7 here *****

To check for the potential presence of a selection bias, we estimate average treatment effects of the treated population (ATET). Table 4 (columns 1 and 5) shows that the baseline results are broadly similar to those from ATE (reported in Table 3), as expected under randomization, indicating the likely absence of a selection bias.[30] The baseline ATET results indicate gains of 6.6 points in terms of visitors' monetary literacy and 10.9 points in quantitative literacy. Placebo treatment effects are again negative, and propensity-score matching leads to similar gains as above, confirming the robustness of the findings. Additionally, accounting for prior knowledge (Table 4, column 3 and 7) gives similar treatment effects for monetary and quantitative literacy.

***** Insert Table 4 here *****

Overall, these findings suggest that when we expose individuals to direct communication about monetary policy, this leads to significant improvements in monetary policy knowledge, which are explained by the learning behavior of participants with low and medium levels of prior knowledge.[31] We observe significant treatment heterogeneity indicating larger average treatment effects for females, participants above 30 years, and those with no university degree.

6.2 Treatment Effects on Inflation and Growth Expectations

The RCT results also show that direct communication influenced participants' inflation expectations but not their growth expectations. Table 5 presents the results of direct central bank communication on (medium-term) euro area inflation and growth expectations of individuals. The average treatment

[30] Re-randomisation can address imbalances in the demographics between treated and non-treated groups. Additional regressions with randomization inferences and permutation tests, as in Hess (2017), confirm the validity of the above inference. For brevity of the analysis these results are not reported here but are available from the authors upon request.

[31] As a robustness check, we consider that unobservables influence literacy scores and treatment simultaneously, leading to endogeneity. To uncover such effects, we explain literacy as a function of prior knowledge while conjecturing that treatment was influenced by the individual demographics characterizing the different visitor groups. We use the STATA procedure "*eteffects*" to estimate average treatment effects accounting for treatment endogeneity. Those results, which are available from the authors, show that the treatment effects of ECB communication on monetary and quantitative literacy, accounting for endogeneity, are robust but larger than those in the baseline (shown in Table 3).

effects, estimated using regression adjustment, are significant at the 1% level for medium-term inflation expectations but insignificant for economic growth expectations. In our baseline model, we include all demographic controls as well as individual inflation and economic growth perceptions, but exclude prior knowledge.

The results for medium-term inflation expectations (Table 5, column 1 and 3) show that, on average, there was an increase in the number of correct answers for medium-term inflation excpectations relative to the control group, indicating that 15% of the participants aligned their expectations fully with the ECB's medium-term inflation target of two per cent following the intervention. However, a similar alignment is not observed for growth expectations (Table 5, columns 5 to 8), where the estimated effect is not significantly different from zero. The results remain robust when controlling for participants' prior knowledge (Table 5, columns 4 and 8) and support genuine learning, as evidenced by insignificant coefficients for placebo groups (Table 5, second row). Moreover, the respective results applying propensity score matching (Table 5, columns 2 and 6) are broadly similar. Furthermore, the results suggest that more participants had realistic expectations about euro area economic growth than about inflation: 52 percent of the visitors had growth expectations consistent with the euro area's longer-run (real) economic growth potential of between 1 and 2%, while only 32 percent of the visitors had medium-term inflation expectations in line with the ECB´s inflation target (see row: "Pomean"). Despite this observation, we suspect that the differing behavior between inflation and growth expectations could be related to the fact that the ECB communicates a precise point target for inflation for the medium term, but not for economic growth.

***** Insert Table 5 here *****

We also find that average treatment effects on inflation expectations display heterogeneity across personal demographics and depend on prior knowledge. The treatment effects are larger for older visitors (above 30 years) and those without a university education, while gender effects are absent, and geographic effects related to local knowledge are fairly small (see Figure 8a). When isolating the impact of prior knowledge on participants' expectations formation, we again distinguish between different buckets of prior knowledge, as proxied by the institutional literacy score, while controlling for heterogeneity across participants in terms of demographics, inflation and economic perceptions, and prior knowledge. The results confirm that the size and significance of average treatment effects depend on prior knowledge, with participants who had no prior knowledge benefiting the most (see Figure 8b). While a large share of participants with no knowledge (42%) revised their medium-term inflation expectations towards the ECB's inflation target, the effects for participants with full knowledge were not significant. On average, 15% of the participants exposed to the communication treatment showed a

better anchoring of their inflation expectations.

***** Insert Figure 8 here *****

Overall, these findings suggest that when when individuals are exposed to direct communication about monetary policy, their medium-term inflation expectations become more anchored. However, these results do not extend to economic growth expectations, for which no significant revisions are detected. The result for inflation expectations is driven by the learning behavior of all participants, except those with very high levels of prior knowledge. We observe significant treatment heterogeneity, with larger average treatment effects for older participants and those without a university degree.

6.3 Inflation Expectations and Knowledge about the ECB's Mandate

Given the prominence of the inflation target in the ECB's official communication following its 2021 strategy review - and its role as a medium-term anchor of inflation expectations - we explore whether participants' knowledge of the target is a key factor explaining revisions to their medium-term inflation expectations. We categorize participants into three subgroups based on their prior knowledge about the ECB's mandate, as assessed in the monetary literacy survey: *Full literacy*: Participants understand both the mandate and the point inflation target; *Partial literacy*: Participants know the mandate but not the precise inflation target; *No literacy*: Participants neither understand the ECB's mandate nor the point inflation target. In the regressions, we include all demographic controls and controls for heterogeneity in terms of individual perceptions of inflation and economic growth.

The results for the total population (Table 6, first line) suggest a significant positive impact on participants' inflation expectations for the groups with full literacy and no literacy. In contrast, no significant effect is detected for the group with partial literacy. These findings support the existence of two distinct channels of transmission, by which communication leads to improved anchoring of participants' inflation expectations: (1) *Knowledge-based channel:* Participants obtaining precise knowledge of the ECB's medium-term inflation target revise their expectations accordingly; (2) *Trust-based channel:* Participants with no prior knowledge rely on trust in the speaker and revise. Interestingly, the size of the trust-based effect on inflation expectations is found to be stronger than the knowledge-based effect.

For the subpopulation of German speakers who received their communication treatment in German (Table 6, lower panel), the knowledge-based effects on inflation expectations (channel 1) were larger than those for the total population. However, the trust-based effects (channel 2) were similar to those observed in the total population, albeit only significant at the 10% level. Furthermore, for the German subpopulation, information treatments that improved participants' understanding of the ECB's

mandate to be price stability also contributed to the anchoring of inflation expectations. Although the effect was substantial, it was not generalizable to the total population.

Overall, these findings suggest that increasing non-experts' literacy about the ECB's inflation target can strengthen the anchoring of medium-term inflation expectations, thereby contributing to price stability. Increasing trust in central bank communication may serve as another effective channel to anchor public inflation expectations; however, the evidence for this channel in our RCT was less compelling.

***** Insert Table 6 here *****

6.4 The Role of the Communication Language

Similar to real-world interactions at ECB press conferences, in our experiment, most participants received a presentation in English, although only a few of them were native English speakers. Language barriers may constitute constraints in the interaction between the sender and receiver of messages. They can reduce the ability of non-experts to fully comprehend direct central bank communication, for example if citizens are not addressed in their native language. In the experiment, language barriers potentially affected many participants during the English sessions, both when listening to the speaker and when completing the literacy questionnaire. We assess the relevance of such language barriers by comparing the average treatment effects from the total population with the subpopulation of German speakers who received the presentation and completed the questionnaire in German.[32]

The results confirm the above findings on enhancing monetary policy knowledge, but suggest that learning effects are somewhat stronger when language barriers are not a constraint. While monetary literacy gains for German speakers are overall broadly similar in both cases (Table 7 vs. Table 3), the results for quantitative literacy are larger for German speakers when differences in prior knowledge are accounted for. These findings are robust, as indicated by a comparison of the estimated gains from propensity-score matching. Additionally, Table 8 (row 1) shows a significant impact of direct communication on German speakers' medium-term inflation expectations; however, the effects on growth expectations remain insignificant. As illustrated in Figure 9, treatment effects on inflation expectations are stronger when direct communication about monetary policy is delivered in participants' native language. The finding is robust to the application of propensity score matching techniques.

Overall, the results for the subsample of German-speakers suggests that the average treatment effects on non-experts' monetary knowledge and inflation expectations are stronger if the central bank communicates in the native language of the audience.

[32] Table A.3 in the Appendix shows descriptive statistics of the German-speaking group.

***** Insert Figure 9 here *****

6.5 The Role of the Information Treatment

The effects of direct communication on monetary policy knowledge and expectations may depend on the contents of the information treatment. To explore this point, we examine treatment heterogeneity between groups based on the differing content of the ECB expert presentations. We exploit the fact that the monetary policy sessions and the institutional framework sessions did not contain the same level of detail about monetary policy. In both types of sessions, briefings included information about the ECB's mandate and inflation target. However, recent monetary policy decisions were covered in greater detail during the monetary policy sessions, along with discussions of the economic outlook and the ECB staff's projections for inflation and economic growth in the euro area.

The results show that the average treatment effects on monetary literacy are larger for groups that attended a session on monetary policy compared to those that participated in sessions on the institutional framework (see Table A.4 in the Appendix). Although part of this difference can be attributed to the higher prior knowledge of participants in the monetary policy sessions compared to those in the institutional framework sessions, the results show broadly similar improvements in quantitative literacy scores, indicating a similar learning behavior. However, when examining the effects on anchoring medium-term inflation expectations, the gain is significantly larger for the groups attending the institutional framework sessions than for those attending monetary policy sessions (see Table A.5 in the Appendix).[33] In part, this result reflects speaking a native language, since a relatively large share of the institutional framework sessions were conducted in German, a native language for many participants. The results align with those from a separate analysis of the transmission channels (similar to Section 6.3 and Figure 9), indicating that the knowledge-based effects of direct communication on monetary policy and inflation expectations (channel 1) were somewhat more substantial for participants from the institutional framework sessions.

In summary, this robustness check confirms that direct communication, which provides clear guidance about the precise inflation target and the mandate, helps participants better anchor their inflation expectations.

6.6 Limitations of the field experiment

We acknowledge two important limitations of this field experiment, which should be addressed in future

[33] However, when introducing group (and speaker) fixed effects in the regressions, this result was not robust, i.e. the treatment effects were significant for the monetary policy sessions but not for the instituional framework sessions.

research. First, the sample primarily consists of younger, financially educated individuals visiting the ECB. This group may not fully represent the public, as their knowledge about monetary policy is, on average, more advanced. Future research should replicate these surveys with groups that have lower average levels of prior knowledge about monetary policy to enhance external validity. Additionally, the ECB's institutional context may limit the generalizability of the results beyond advanced economies. Comparative studies with other central banks, particularly those in emerging markets or developing countries, may provide further valuable insights. Moreover, it could also be helpful in such RCTs to include further confounding factors, such as income and employment, which are relevant for a comprehensive understanding of the influence of central bank communication on the public (see Coibion et al., 2022; Blinder et al., 2024).[34] However, in our RCT, the inclusion of these factors was less relevant, given that a large part of the population consisted of students with little or no income and who were not yet employed. Instead, we included the age factor, which is correlated with income.

Second, the findings capture short-term impacts but do not account for the longevity of treatment effects related to direct central bank communication. Repeating our group sessions with the same individuals over time would have required changing the RCT design, as visitor groups returning to the ECB in almost all cases consist of different individuals each time. Treatment effects on monetary knowledge may be enduring, depending on individual skills, but evidence from an RCT with German households (Draeger and Nghiem, 2023) suggests that treatment effects on literacy could be relatively short-lived (i.e., lasting around three months) and depending on the context. According to that study, central bank communication should repeat similar information treatments with non-experts to generate long-lasting effects on literacy.

7. Conclusion

We conducted a field experiment between 2022 and 2025 with volunteers from diverse visitor groups at the ECB. Our analysis provides new insights into the causal effects of direct central bank communication on the monetary literacy of non-experts and their inflation and growth expectations. Our main finding is that direct communication can shape the inflation expectations of non-experts by improving their monetary policy knowledge, thereby strengthening their understanding of the monetary policy goals, and by enhancing trust in the central bank's communication. Our information treatments, akin to communication at press conferences, generate statistically significant effects on non-experts' monetary literacy and improve the anchoring of their inflation expectations. However, we find no

[34] Based on the CES, the main factors influencing financial literacy are gender age, education, and income (see for example the results by D'Acunto et al., 2024).

significant influence on the growth expectations of non-experts. We also provide evidence that language barriers matter, underscoring the importance of addressing citizens in their native language.

Our findings suggest that central banks can significantly enhance the effectiveness of their communication strategies by tailoring them to diverse audiences and prioritizing efforts to improve financial and monetary literacy. Direct communication, such as press conference-style briefings, can have a powerful impact on non-experts' medium-term inflation expectations, aligning them with central bank targets. This implies that central banks should expand their outreach efforts, particularly through targeted educational programs in schools and universities, which can help build foundational monetary literacy over time. Additionally, indirect communication channels, such as social media, television, radio, newspapers, and resources like the ECB website and visitor centre, can complement these direct efforts, ensuring that communication reaches a broader and more diverse audience. Notably, trust-building measures and addressing language barriers by tailoring communication in different official languages of the European Union (EU) can further enhance public engagement and effectiveness of direct communication. These insights can help central banks refine their communication strategies to ensure they are impactful, inclusive, and sustainable.

However, achieving similar outcomes in real-world settings presents challenges due to low financial literacy and rational inattention. To sustain the short-term gains observed in monetary literacy and inflation expectations, periodic outreach initiatives or targeted campaigns may be necessary to maintain these gains. Furthermore, future research should explore whether the observed effectiveness of direct communication across specific groups, such as German speakers, extends to other linguistic and cultural contexts within the EU.

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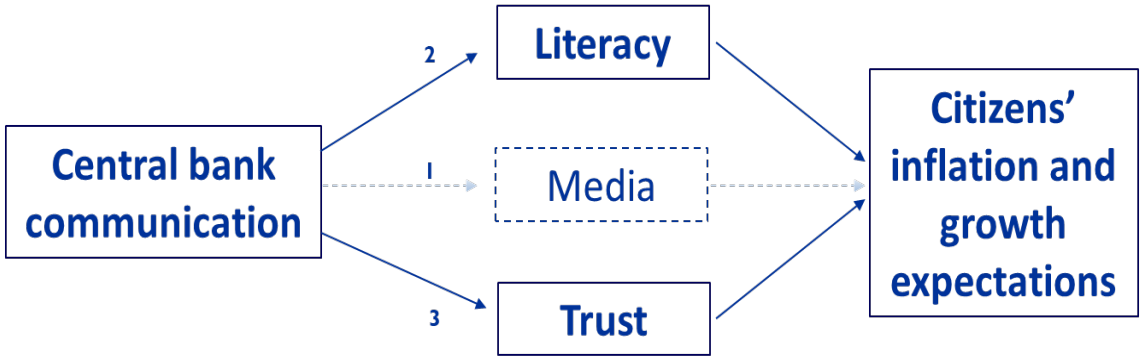
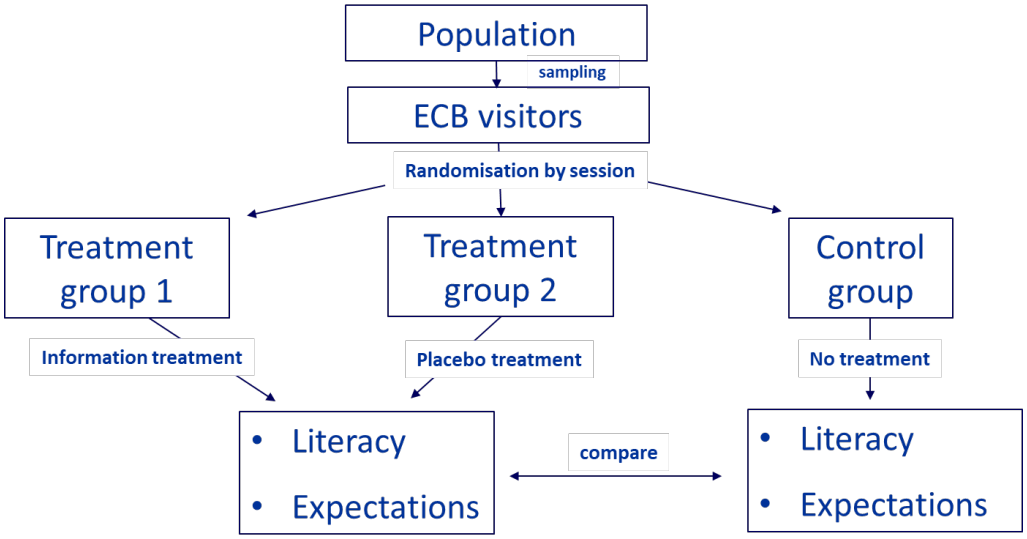
Figures and Tables

Figure 1: Central bank communication and inflation expectations of citizens



Notes: The figure schematically illustrates the three key channels through which central bank communication reaches households' inflation expectations. The media channel (1 with dashed lines) is important but not part of this RCT study. The focus is on the financial education channel (2) and the trust channel (3).

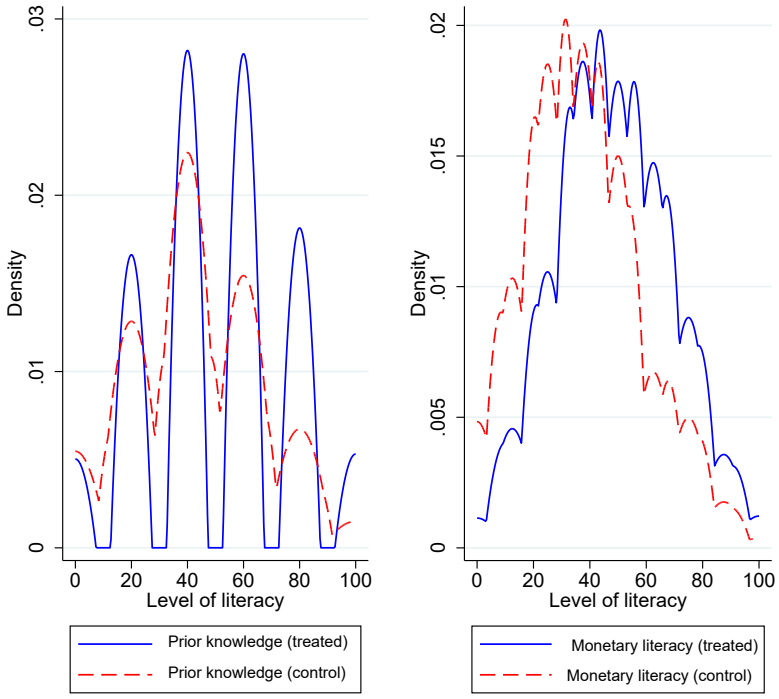
Figure 2: The RCT study design



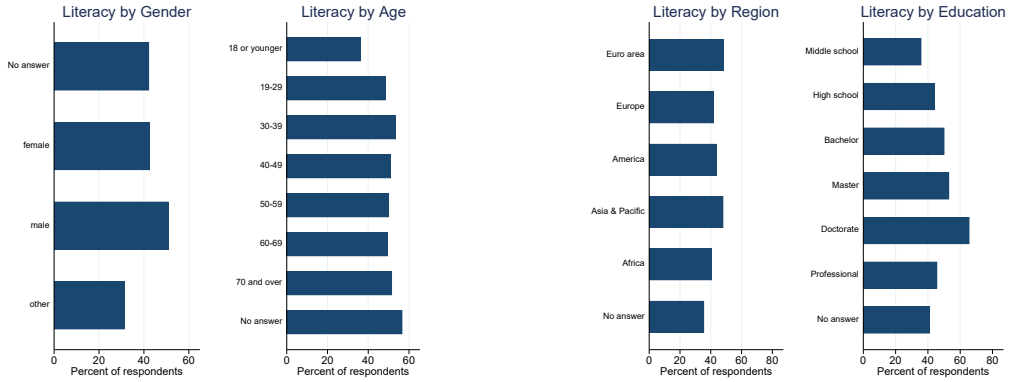
Notes: The figure schematically illustrates the sampling process and the different treatment ECB visitor groups received during the experiment. Average treatment effects were computed for three outcome variables - monetary literacy, inflation, and growth expectations - by comparing the outcomes for participants receiving treatment with those for participants receiving no treatment.

Figure 3: Monetary literacy of ECB visitors

a) Distribution of monetary knowledge



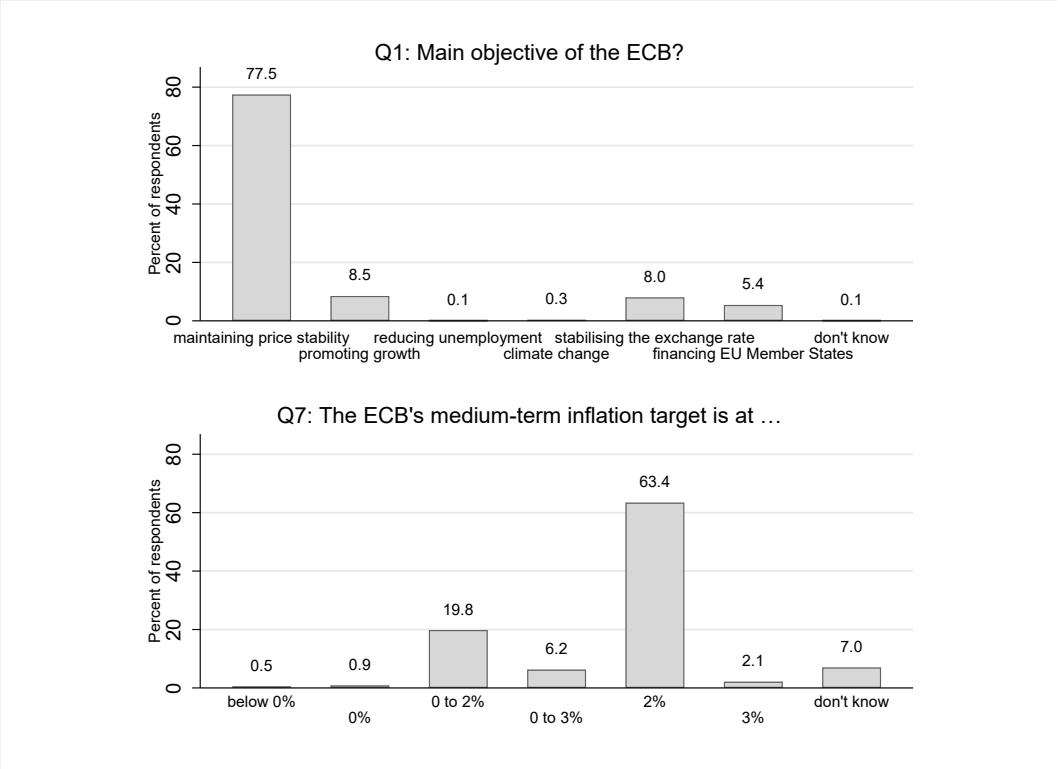
b) Prior knowledge by demographics



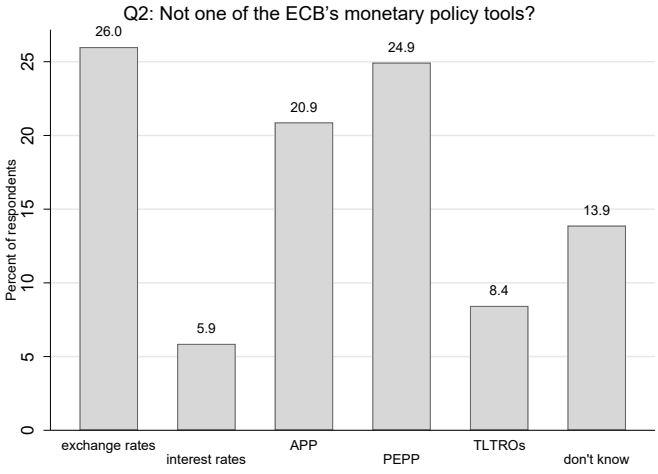
Notes: Panel (a) shows the distribution of literacy scores for the treated and the control group. Panel (b) shows the distribution of institutional literacy scores for all participating ECB visitors and by demographics.

Figure 4: Selected answers to the monetary literacy questionnaire

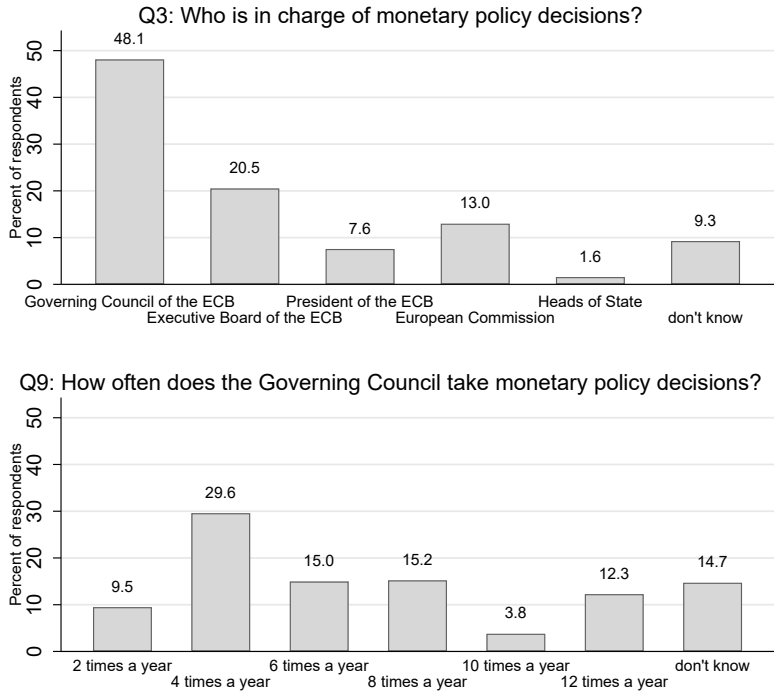
a) The ECB's mandate



b) The ECB's instruments



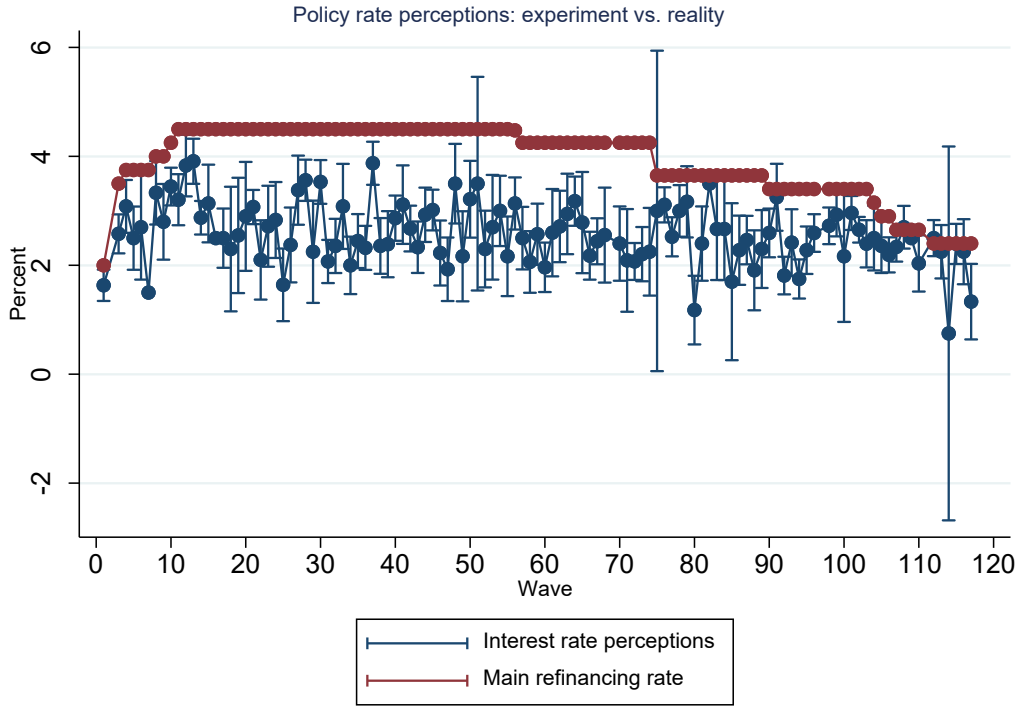
c) The ECB's decision-making bodies



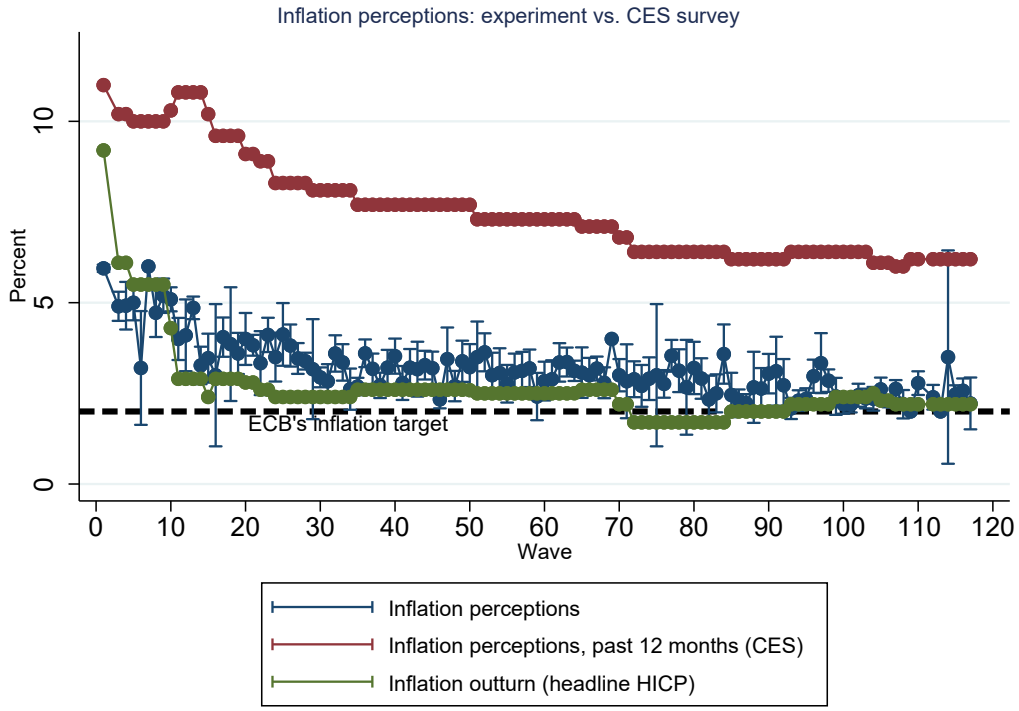
Notes: The figures show the distribution of answers to selected monetary literacy questions for all participating ECB visitors. APP: asset purchase programme; PEPP: pandemic emergency purchase programme; TLTROs: targeted longer-term refinancing operations.

Figure 5: Visitors' perceptions and expectations about policy rates and headline inflation

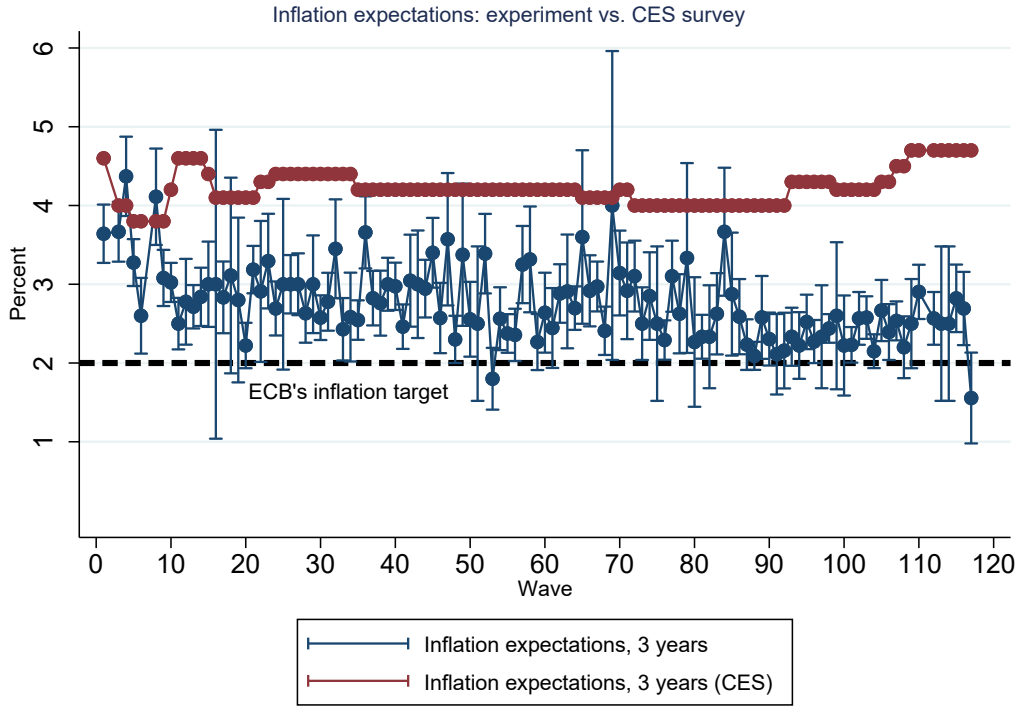
a) Policy rate perceptions



b) Inflation perceptions



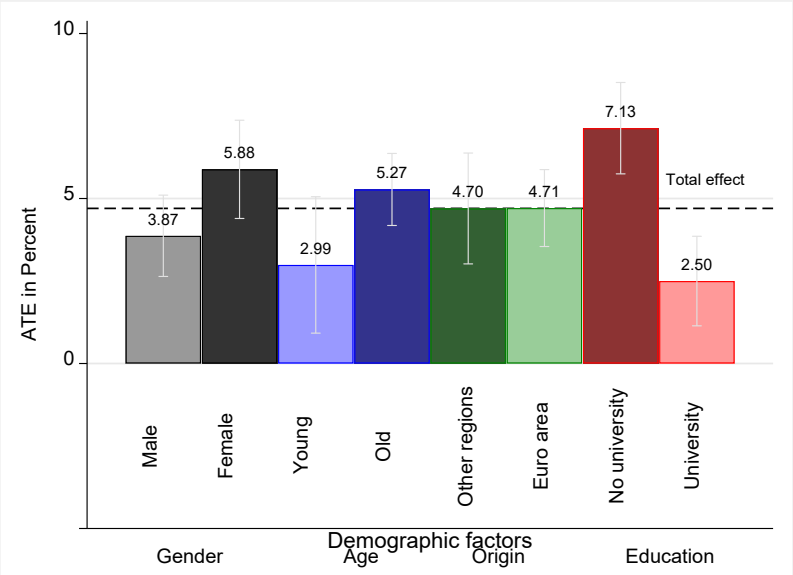
c) Medium-term inflation expectations



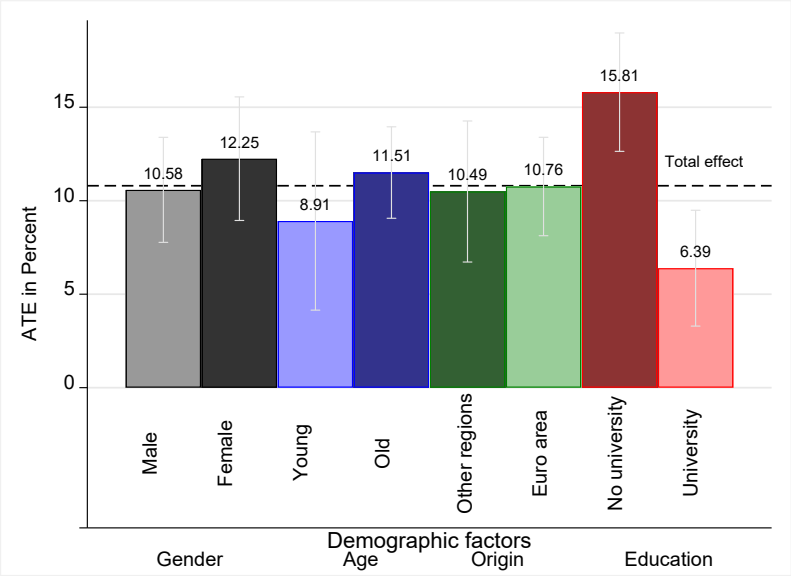
Notes: The figures show the distribution of (mean) perceptions and expectations for all participating ECB visitors and the the wider public from the CES. The vertical lines show the distribution (95% confidence interval around the mean). The x-axis shows the session number ordered by date of the group session. The black (dashed) line shows the ECB's symmetric, medium-term inflation target of 2%.

Figure 6: Treatment heterogeneity by demographics

a) Monetary literacy



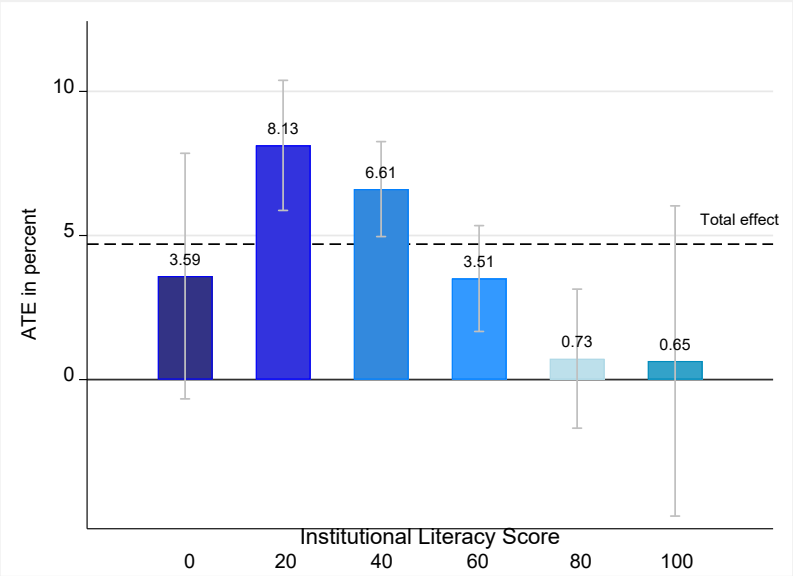
b) Quantitative literacy



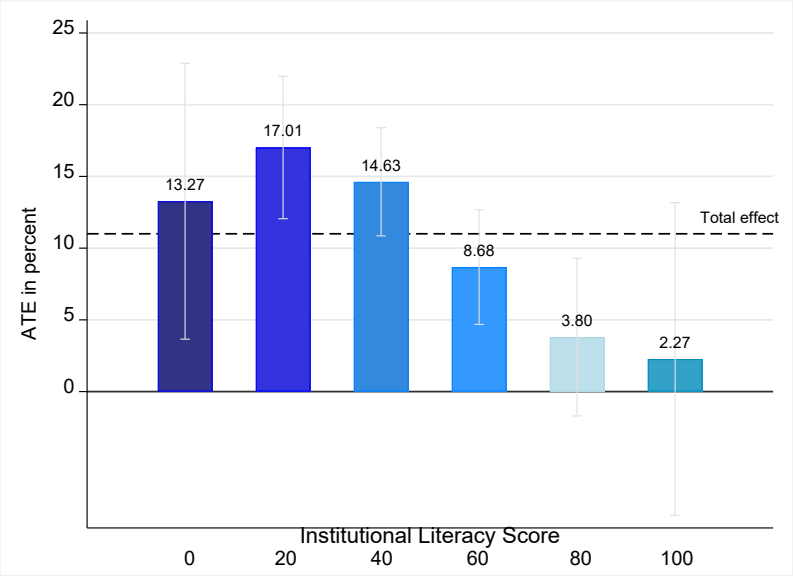
Notes: The figures show a breakdown of average treatment effects for the treatment group relative to the control group by demographics with regression adjustment including confidence intervals. ATE estimates include controls for individual demographics: i.e. the binary variables Young, Female, Euroarea, and Higheredu, inflation and economic perceptions, and prior knowledge. The dashed horizontal lines show the respective total effect. The x-axis shows the four demographics, gender (male vs. female), age (younger vs. older), origin (euro area vs. outside euro area), and education (no university education vs. university education).

Figure 7: Treatment effects on literacy by prior knowledge

a) Monetary literacy



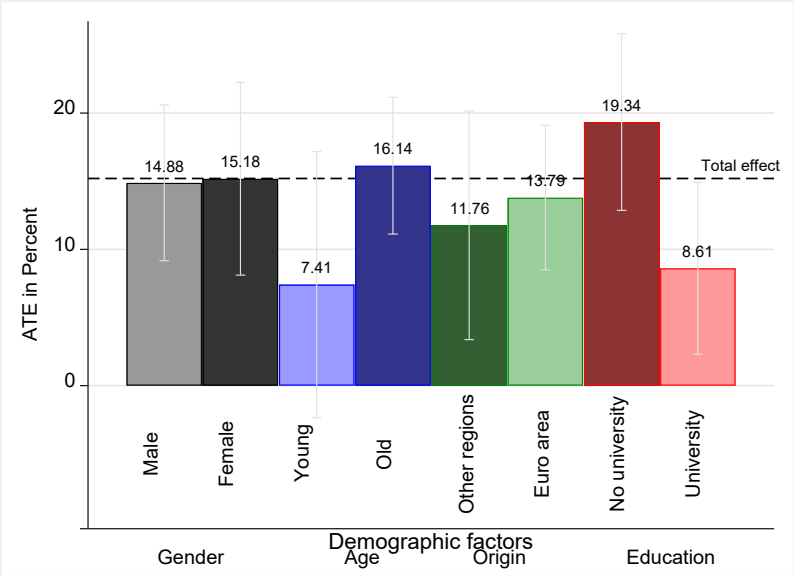
b) Quantitative literacy



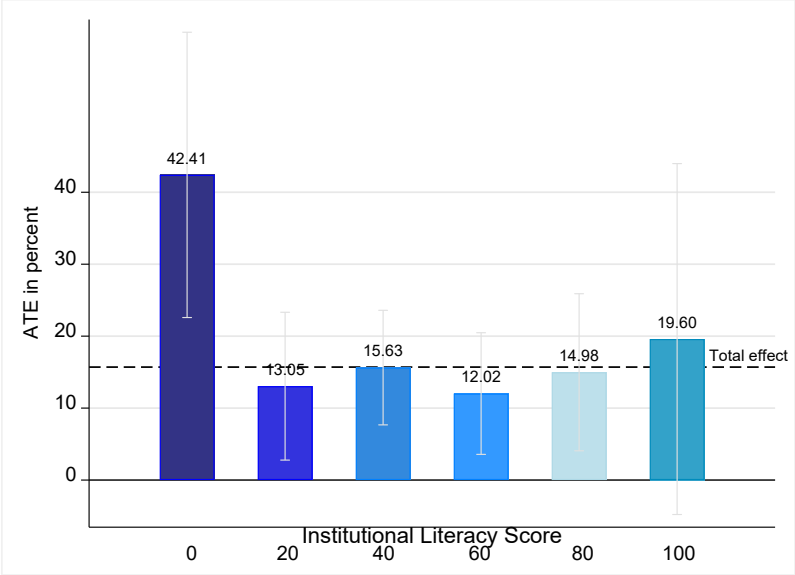
Notes: The figures show a breakdown of average treatment effects for the treatment group relative to the control group by prior knowledge with regression adjustment including confidence intervals. ATE estimates include controls for individual demographics: i.e. the binary variables Young, Female, Euroarea, and Higheredu, and inflation and economic perceptions, and prior knowledge. The dashed horizontal lines show the respective total effect.

Figure 8: Treatment heterogeneity and inflation expectations

a) Demographics



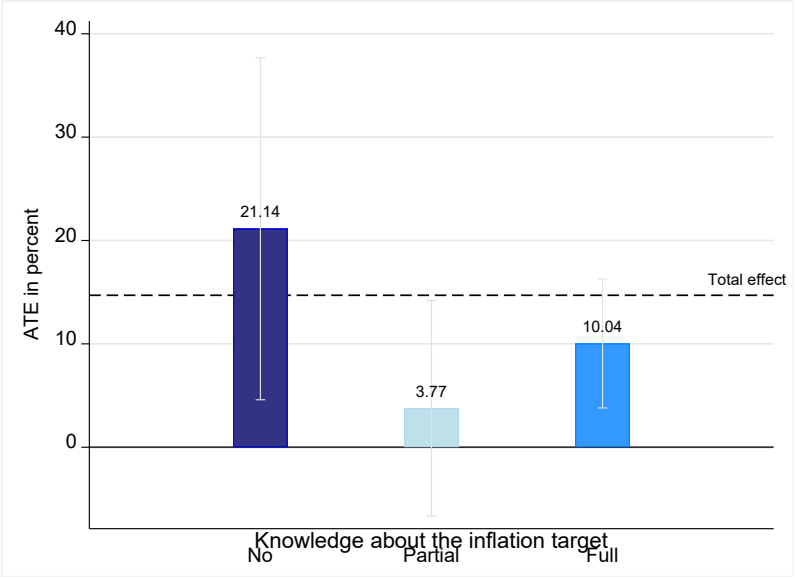
b) Prior knowledge



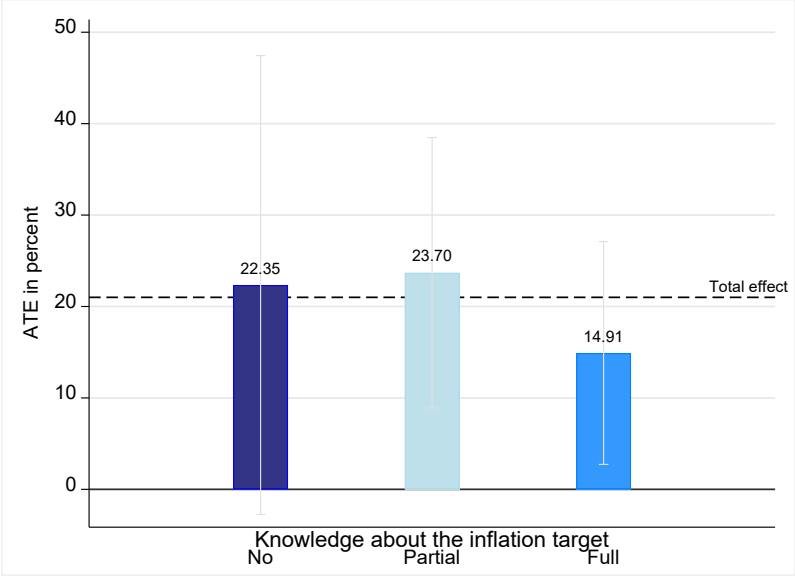
Notes: The figures show a breakdown of average treatment effects for the treatment group relative to the control group by demographics and prior knowledge with regression adjustment including confidence intervals. ATE estimates include controls for individual demographics: i.e. the binary variables Young, Female, Euroarea, and Higheredu, inflation and economic perceptions, and prior knowledge. The dashed horizontal lines show the respective total effect. In the upper chart, the x-axis shows the four demographics, gender (male vs. female), age (younger vs. older), origin (euro area vs. outside euro area), and education (no university education vs. university education). In the lower chart, the x-axis shows different levels of the institutional literacy score, as proxy for prior knowledge.

Figure 9: Treatment effects on inflation expectations: Key channels

a) All participants



b) German speakers



Notes: The figures show a breakdown of average treatment effects for the treatment group relative to the control group by knowledge about the ECB's inflation target with regression adjustment including confidence intervals. ATE estimates include controls for individual demographics: i.e. the binary variables Young, Female, Euroarea, and Higheredu, and for individual inflation and economic growth perceptions. The dashed horizontal lines show the respective total effect.

Table 1: Descriptive statistics by group

Variables	(1) Total population	(2) Treatment group	(3) Control group	(4) Placebo group	(5) Balance tests
Total observations	2,432	1,067	1,118	247	
Of which: German language	798	307	446	45	
Individual demographics (%)					
Female	41.9	38.9	46.3	34.4	
Male	56.5	59.6	51.7	64.4	
Euro area	71.4	73.7	70.1	67.2	
European (other)	9.2	10.5	8.9	4.9	
America	8.1	3.3	11.4	13.8	
Africa	1.4	1.7	0.9	2.0	
Asia & Pacific	9.6	10.4	8.3	12.2	
Age (below 30 years)	77.9	76.1	80.7	73.3	
Age (30 to 59 years)	19.1	19.7	17.4	24.3	
Age (60 years and above)	2.8	3.9	1.7	2.4	
Bachelor	23.3	26.9	17.2	35.8	
Master	24.8	30.6	19.6	24.0	
Doctorate	2.7	3.2	2.1	3.3	
Middle school	13.2	8.6	19.1	5.7	
High school	32.4	28.0	37.8	26.4	
Professional	2.2	1.4	1.7	3.7	
Binary demographics (%)					
"Female"	43.0	40.1	47.3	35.6	0
"Euroarea"	71.3	73.6	70.1	67.2	0.07
"Young"	77.9	76.1	80.7	73.3	0.01
"Higheredu"	50.3	59.4	38.8	62.8	0
Expectations and perceptions (mean in %)					
Inflation perceptions	3.3	3.3	3.4	2.7	0.78
Growth perceptions	2.2	2.1	2.4	2.2	0
Inflation expectations, 3 years	2.8	2.7	3.0	2.6	0
Growth expectations, 3 years	2.3	2.1	2.5	2.2	0
Literacy scores (mean in %)					
Monetary literacy	42.6	48.5	37.3	41.1	0
Institutional literacy	47.1	50.6	43.0	50.9	0
Quantitative literacy	38.1	46.9	30.9	33.0	0

Notes: This table reports selected summary statistics for participating ECB visitors for the full sample (December 2022 to May 2025). Balance tests report p-values of Chi-square tests for categorical variables reported under "Binary dynamics" and otherwise p-values of t-tests comparing the mean of the treatment group and the control group; the null hypothesis is that the average characteristics in the treatment and control groups are equal.

Table 2: The influence of demographics on literacy

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Monetary literacy	Institutional literacy	Quantitative literacy	Monetary literacy	Institutional literacy	Quantitative literacy
"Young"	-0.95	-2.62**	-3.41***	-5.53***	-7.23***	-4.37**
	(1.08)	(1.28)	(1.31)	(1.38)	(1.69)	(1.72)
"Female"	-8.45***	-7.00***	-10.11***	-6.25***	-5.31***	-7.17***
	(0.85)	(1.01)	(1.03)	(0.87)	(1.08)	(0.96)
"Higheredu"	10.36***	11.21***	8.03***	5.41***	6.11***	5.12***
	(0.91)	(1.08)	(1.11)	(1.68)	(1.93)	(1.94)
"Euroarea"	6.78***	6.88***	4.58***	5.49***	5.04***	3.71**
	(0.96)	(1.14)	(1.17)	(1.30)	(1.50)	(1.47)
Constant	36.57***	41.51***	37.29***	42.93***	48.36***	39.41***
	(1.43)	(1.69)	(1.74)	(1.73)	(2.03)	(2.07)
R-squared	0.11	0.08	0.08	0.06	0.04	0.04
Observations	2,432	2,432	2,432	2,432	2,432	2,432

Notes: Results (1) to (3) are from Huber robust regressions to control for outliers and influential observations. Results (4) to (6) are from panel OLS and include group fixed effects for each session. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively.

Table 3: Average treatment effects of the whole population (ATE): Literacy

Variables	(1) Monetary literacy	(2) Monetary literacy	(3) Monetary literacy	(4) Monetary literacy	(5) Quantitative literacy	(6) Quantitative literacy	(7) Quantitative literacy	(8) Quantitative literacy
Treatment	6.66***	7.50***	4.68***	5.61***	11.71***	12.68***	11.09***	10.63***
	(0.89)	(1.03)	(0.48)	(0.78)	(1.11)	(1.37)	(1.09)	(1.28)
Placebo	-3.13**		-2.86***		-3.59*		-3.81**	
	(1.51)		(0.81)		(1.90)		(1.85)	
Pomean	42.49***		43.60***		36.15***		36.57***	
	(0.69)		(0.54)		(0.83)		(0.81)	
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prior knowledge	No	No	Yes	Yes	No	No	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,059	1,837	2,059	1,837	2,059	1,837	2,059	1,837

Notes: With regression adjustment. Matching refers to propensity score matching. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, Euroarea, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Table 4: Average treatment effects of the treated (ATET): Literacy

Variables	(1) Monetary literacy	(2) Monetary literacy	(3) Monetary literacy	(4) Monetary literacy	(5) Quantitative literacy	(6) Quantitative literacy	(7) Quantitative literacy	(8) Quantitative literacy
Treatment	6.64***	7.62***	4.09***	5.24***	10.91***	12.04***	9.94***	9.31***
	(0.96)	(1.35)	(0.51)	(0.93)	(1.18)	(1.59)	(1.15)	(1.43)
Placebo	-4.36***		-3.90***		-4.82**		-5.35***	
	(1.60)		(0.87)		(2.01)		(1.95)	
Pomean	43.73***		46.29***		37.49***		38.46***	
	(0.79)		(0.74)		(0.94)		(0.93)	
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prior knowledge	No	No	Yes	Yes	No	No	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,059	1,837	2,059	1,837	2,059	1,837	2,059	1,837

Notes: With regression adjustment. Matching refers to propensity score matching. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, Euroarea, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Table 5: Average treatment effects: Visitors' inflation and growth expectations

Variables	(1) Inflation	(2) Inflation	(3) Inflation	(4) Inflation	(5) Economic growth	(6) Economic growth	(7) Economic growth	(8) Economic growth
Treatment	0.15***	0.13***	0.15***	0.13***	0.04*	0.04	0.03	0.01
	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)
Placebo	0.06		0.06		-0.02		-0.03	
	(0.04)		(0.04)		(0.04)		(0.04)	
Pomean	0.32***		0.32***		0.52***		0.52***	
	(0.02)		(0.02)		(0.02)		(0.02)	
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prior knowledge	No	No	Yes	Yes	No	No	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,059	1,837	2,059	1,837	2,059	1,837	2,059	1,837

Notes: With regression adjustment. Matching refers to propensity score matching. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, Euroarea, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Table 6: Average treatment effects on inflation expectations: the ECB's mandate

Variables	(1) Full knowledge	(2) Partial knowledge	(3) No knowledge
Total Population			
Treatment	0.10***	0.04	0.21**
	(0.03)	(0.05)	(0.08)
Placebo	0.04	0.06	0.12
	(0.08)	(0.06)	(0.09)
Pomean	0.36***	0.29***	0.23***
	(0.03)	(0.03)	(0.04)
Demographics	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes
Observations	1,009	518	231
German-speakers			
Treatment	0.15***	0.24***	0.22*
	(0.06)	(0.08)	(0.13)
Pomean	0.31***	0.24***	0.18***
	(0.04)	(0.04)	(0.05)
Demographics	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes
Observations	264	134	85

Notes: With regression adjustment. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, Euroarea, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Table 7: Average treatment effects (ATE): Literacy of German speakers

Variables	(1) Monetary literacy	(2) Monetary literacy	(3) Monetary literacy	(4) Monetary literacy	(5) Quantitative literacy	(6) Quantitative literacy	(7) Quantitative literacy	(8) Quantitative literacy
Treatment	2.90*	4.49***	5.00***	5.00***	12.51***	15.32***	12.98***	15.57***
	(1.54)	(1.55)	(0.85)	(1.52)	(1.97)	(2.26)	(1.96)	(2.55)
Pomean	42.83***		41.77***		33.64***		33.32***	
	(1.15)		(0.92)		(1.31)		(1.28)	
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prior knowledge	No	No	Yes	Yes	No	No	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	614	614	614	614	614	614	614	614

Notes: With regression adjustment. Matching refers to propensity score matching. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Table 8: Average treatment effects: Expectations of German speakers

Variables	(1) Inflation	(2) Inflation	(3) Inflation	(4) Inflation	(5) Economic growth	(6) Economic growth	(7) Economic growth	(8) Economic growth
Treatment	0.21***	0.20***	0.20***	0.24***	0.04	0.07	0.05	0.06
	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)	(0.04)	(0.05)
Pomean	0.28***		0.28***		0.51***		0.51***	
	(0.03)		(0.03)		(0.03)		(0.03)	
Demographics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Prior knowledge	No	No	Yes	Yes	No	No	Yes	Yes
Matching	No	Yes	No	Yes	No	Yes	No	Yes
Observations	614	614	614	614	614	614	614	614

Notes: With regression adjustment. Matching refers to propensity score matching. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Appendix A: Dataset description

Table A.1. Data and data sources

Variable	Definition	Data sources
Treatment	Numerical variable with three values: Control group (0); Treatment group (1); Placebo group (2).	Authors
Totalscore	Numerical variable measuring participants' monetary literacy score and derived from a scoring model that counts the correct answers for each respondent based on 10 questions of the questionnaire answered. It is the sum of the Exantescore and the Expostscore.	Authors
Exantescore	Numerical variable measuring participants' institutional literacy score by counting the correct answers to five questions in Section II of the questionnaire (excluding the drivers of current inflation).	Authors
Expostscore	Numerical variable measuring participants' quantitative literacy score by counting the correct responses to five questions in section III of the questionnaire (excluding the drivers of future inflation).	Authors
Finlitscore1	Individual score on answer to Q1: Main objective of the ECB; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore2	Individual score on answer to Q2: ECB's monetary policy tools; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore3	Individual score on answer to Q3: Decision-making body; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore4	Individual score on answer to Q4: Current level of the (annual) inflation rate in the euro area; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore5	Individual score on answer to Q5: Current level of (annual) real economic growth in the euro area; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore6	Individual score on answer to Q7: The ECB's medium-term inflation target; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore7	Individual score on answer to Q8: The level of the ECB's main refinancing rate; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore8	Individual score on answer to Q9: Number of Governing Council meetings on monetary policy decisions; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore9	Individual score on answer to Q10: Annual inflation rate in the euro area over the next three years; value 1 (correct answer), value 0 (false answer).	Authors
Finlitscore10	Individual score on answer to Q11: Annual real economic growth rate in the euro area over the next three years; value 1 (correct answer), value 0 (false answer).	Authors
Userid	Identifier: number of each individual participant.	Authors
Groupid	Identifier: number of the group session.	Authors
German	Binary dummy, takes the value 1 for German sessions or value 0 otherwise	Authors
Choice	Categorical variable, takes the values MP (Monetary Policy), IO (Institutional Framework), BS (Banking Supervision), CC (Climate Change), DE (Digital Euro), respectively.	Authors
Timestamp	Time when an individual participant submitted his/her survey.	Authors
Speaker	Name of speaker who gave the expert presentation (anonymized).	Authors
Speaker_nat	Nationality of the speaker who gave the expert presentation. Categorical variable, takes the value AT (Austria), DE (Germany), ES (Spain), FI (Finland), FR (France), GR (Greece), IT (Italy), NL (Netherlands), respectively.	Authors
Speaker_gen	Gender of the speaker who gave the expert presentation. Categorical variable, takes the values Male or Female.	Authors
Speaker_ba	ECB business area of the speaker who gave the presentation. Categorical variable, takes the values CCC (Climate Change Centre), DGC	Authors

	(Communications), DGE (Economics), DGI (International & European Relations), DGL (Legal Services), DGM (Market Operations), DGMP (Monetary Policy), DGMIP (Payment), DGSEC (Secretariat), EB (Counsel to the Executive Board), SSM (Banking Supervision), respectively.	
Infperc	Individual inflation perceptions, over the past 12 months, from Q4 of the questionnaire.	Authors
Infexp	Individual inflation expectations, over the next 3 years, from Q10 of the questionnaire.	Authors
Intperc	Individual interest rate perceptions, ECB's main refinancing rate, from Q8 of the questionnaire.	Authors
Yperc	Individual economic growth perceptions, Real GDP, over past 12 months, from Q5 of the questionnaire.	Authors
Yexp	Individual economic growth expectations, Real GDP, over the next 3 years, from Q11 of the questionnaire.	Authors
Inftarget	The ECB's symmetric inflation target of 2%.	Authors
Infpercces	Inflation perceptions over the previous 12 months (mean and median).	CES
Infexpces	Inflation expectations three years ahead (mean and median).	CES
Yexpces	Household net income expectations 12 months ahead (mean and median).	CES
IECB	Policy rate of the ECB (main refinancing rate).	SDW
HICP	Annual inflation for the euro area measured by the harmonized consumer price index.	Eurostat
YGROWTH	Real annual GDP growth for the euro area.	Eurostat
Female	Binary dummy, takes the value 1 (Female) or value 0 (otherwise).	Authors
Euroarea	Binary dummy, takes the value 1 (participant is from the Euro area) or value 0 (otherwise).	Authors
Young	Binary dummy, takes the value 1 (age of the participant is below …) or value 0 (otherwise).	Authors
Higheredu	Binary dummy, takes the value 1 (participants with university studies) or value 0 (otherwise).	Authors
Gender	Categorical variable, takes the values: Male, Female, Other, No answer.	Authors
Origin	Categorical variable, takes the values: Africa, America, Asia & Pacific, Euro area, Europe, No Answer.	Authors
Age	Categorical variable, takes the values: 18 or younger, 19-29, 30-39, 40-49, 50-59, 70 and over, No answer.	Authors
Education	Categorical variable, takes the values: Middle school, High school, Bachelor, Master, Doctorate, Professional, No answer.	Authors

Notes: CES: Consumer Expectations Survey of the ECB; weighted estimates are used; the median is computed on the basis of a symmetric linear interpolation that accounts for rounding of responses; mean values are winsorised at the 2nd and 98th percentiles of each survey round and country. SDW: Statistical Data Warehouse of the ECB.

Table A.2. Overview of sessions

Date	Country	Language of presentation	Level of education	Group ID	Number of participants	Number of responses	Response ratio
01/12/2022	Portugal	English	Students	1	61	58	95.08
09/12/2022	France	English	Students	2	100	43	43.00
05/05/2023	Portugal	English	Students	3	89	68	76.40
16/05/2023	Germany; United States	English	Students	4	49	35	71.43
06/06/2023	Germany	English	Professionals; Students	5	76	53	69.74
14/06/2023	France	French	Students	6	26	18	69.23
20/06/2023	Germany	English	Students	7	20	15	75.00
21/06/2023	Germany	English	Students	8	22	18	81.82
30/06/2023	Germany	German	Students; Professionals	9	50	27	54.00
07/09/2023	Netherlands	German	Professionals	10	70	53	75.71
10/10/2023	Germany	English	High school students	11	29	22	75.86
11/10/2023	Germany	German	Students	12	16	11	68.75
18/10/2023	Netherlands	English	Students	13	69	51	73.91
31/10/2023	Denmark	English	Students	14	45	35	77.78
24/11/2023	Netherlands	English	Students	15	39	21	53.85
05/12/2023	Germany	English	Students	16	33	16	48.48
08/12/2023	France	English	Students	17	60	56	93.33
08/12/2023	Netherlands	English	Professionals	18	52	13	25.00
13/12/2023	Germany	English	Students	19	40	22	55.00
10/01/2024	France	English	Students	20	53	13	24.53
10/01/2024	Germany	English	Students	21	84	47	55.95
14/02/2024	Italy	English	Students	22	38	13	34.21
20/02/2024	Germany	German	High school students	23	54	18	33.33
11/03/2024	United States	English	Students	24	20	14	70.00
14/03/2024	Italy	English	Students	25	38	13	34.21
18/03/2024	Germany	German	Students	26	34	15	44.12
18/03/2024	Germany	German	Students	27	36	27	75.00
22/03/2024	Netherlands	English	Professionals	28	20	19	95.00
05/04/2024	Germany	German	Professionals	29	25	6	24.00
12/04/2024	Germany	German	Students	30	37	34	91.89
18/04/2024	United Kingdom	English	Students	31	63	34	53.97
26/04/2024	Germany	German	High school students	32	23	22	95.65
29/04/2024	Germany, United States	English	Students	33	24	18	75.00
30/04/2024	Denmark	English	Students	34	32	13	40.63
03/05/2024	Portugal	English	Students	35	74	46	62.16
06/05/2024	Germany	German	Students	36	56	48	85.71
07/05/2024	Germany	German	Students	37	19	17	89.47
13/05/2024	Spain	English	Students	38	38	26	66.67
13/05/2024	Germany	German	Students	39	30	20	84.00
14/05/2024	Germany	English	Students	40	50	42	70.00

15/05/2024	Germany	German	Students	41	20	14	96.00
15/05/2024	Netherlands, Germany	English	Students	42	25	14	56.00
16/05/2024	Germany	English	Students	43	42	12	28.57
17/05/2024	Germany	English	Students	44	47	36	83.93
21/05/2024	United States	English	Students	45	56	47	35.56
23/05/2024	Canada	English	Students	46	45	16	50.00
24/05/2024	Germany	English	Students	47	24	12	27.27
27/05/2024	Germany	German	Professionals	48	44	12	83.33
27/05/2024	France	French	Students	49	18	15	69.23
28/05/2024	Germany	German	Students	50	13	9	82.54
03/06/2024	Poland	English	Students	51	63	52	90.48
03/06/2024	Germany	German	High school students	52	21	19	16.13
05/06/2024	Germany	English	Professionals	53	31	5	85.00
07/06/2024	France	French	Students	54	20	17	45.95
10/06/2024	Germany	German	Students	55	37	17	93.33
11/06/2024	Germany	German	Students	56	15	14	78.38
14/06/2024	Germany	German	Students, High school students	57	37	29	52.38
17/06/2024	Germany	German	High school students	58	42	22	77.27
17/06/2024	United States	English	Students	59	22	17	82.35
19/06/2024	Germany	German	Students	60	51	42	52.78
19/06/2024	Germany	English	Students	61	36	19	73.91
24/06/2024	Germany	German	Students	62	23	17	46.67
25/06/2024	Germany	German	Students, High school students	63	30	14	52.38
28/06/2024	Germany	English	Students	64	63	33	70.00
01/07/2024	Germany	English	Students	65	30	15	50.00
01/07/2024	Germany	English	High-school students	66	50	45	90.00
15/07/2024	Germany	German	Students	67	43	39	90.70
22/07/2024	Germany	English	Students, High school students	68	37	25	67.57
31/07/2024	Germany	English	Students	69	27	6	22.22
01/08/2024	Germany	German	Students	70	20	17	77.27
30/08/2024	Germany	German	Professionals	71	20	13	65.00
03/09/2024	Germany	German	High school students	72	44	29	65.91
10/09/2024	Germany	German	High school students	73	28	22	78.57
11/09/2024	Germany	German	Professionals	74	49	24	48.98
18/09/2024	Japan	English	Students	75	18	8	44.44
19/09/2024	Germany	English	Students	76	37	29	78.38
23/09/2024	Germany	German	High school students; Students	77	83	60	72.29
24/09/2024	Netherlands	English	Professionals	78	20	17	85.00
24/09/2024	Germany	German	High school students; Students	79	22	6	27.27
25/09/2024	Taiwan	English	Professionals	80	36	34	94.44
25/09/2024	Germany	English	Professionals	81	24	17	70.83
27/09/2024	Germany	German	Professionals	82	23	7	30.43
27/09/2024	Germany	German	Professionals	83	20	8	40.00
30/09/2024	Germany	German	Professionals	84	16	14	87.50
01/10/2024	Germany	German	Professionals	85	22	12	54.55
04/10/2024	Germany	German	Students	86	20	17	85.00
10/10/2024	Italy	Italian	Professionals	87	65	37	56.92
15/10/2024	Germany	German	Students; Professionals	88	28	13	46.43
22/10/2024	Germany	German	High school students	89	88	24	27.27

24/10/2024	Hungary	English	Students	90	40	29	72.50
28/10/2024	Germany	English	Professionals	91	17	14	82.35
28/10/2024	Germany	German	Professionals	92	69	33	47.83
04/11/2024	Germany	German	Professionals	93	27	16	59.26
04/11/2024	Netherlands	English	Students	94	57	37	64.91
18/11/2024	Germany	German	Students	95	50	30	60.00
19/11/2024	Germany	English	Students	96	50	42	84.00
20/11/2024	Germany	German	Professionals	97	15	7	46.67
26/11/2024	Germany	German	Students	98	80	51	63.75
03/12/2024	Germany	English	Students	99	27	12	44.44
03/12/2024	Germany	German	Students	100	67	13	19.40
09/12/2024	Luxembourg	English	High-school students	101	81	34	41.98
10/12/2024	Germany; Spain	English	Students	102	66	37	56.06
13/12/2024	France	French	Students	103	85	53	62.35
21/01/2025	Australia	English	Students	104	30	25	83.33
20/02/2025	Germany	German	Professionals	105	18	18	100.00
26/02/2025	Portugal	English	Students	106	44	36	81.81
21/03/2025	Portugal	English	Students	107	76	56	73.68
31/03/2025	Germany	German	Students	108	69	11	15.94
02/04/2025	Italy	Italian	Professionals	109	63	13	20.63
03/04/2025	Netherlands	English	Professionals	110	56	39	69.64
08/04/2025	Germany	English	Professionals	111	41	9	21.95
12/05/2025	Spain	English	Students	112	50	35	70.00
13/05/2025	Germany	English	Students; Professionals	113	76	10	13.16
15/05/2025	United States; Spain	English	Students	114	81	19	23.46
19/05/2025	Germany	German	Students	115	42	37	88.10
20/05/2025	United States	English	Students	116	32	21	65.63
21/05/2025	France	English	Students	117	27	19	70.37

Notes: Date is in European format. Visitor groups with 5 respondents or less were excluded. For Group 2 the session was conducted at the Goethe University of Frankfurt.

Table A.3. Descriptive statistics by group: German speakers

Variables	(1) Total population	(2) Treatment group	(3) Control group	(4) Placebo group
Observations	798	307	446	45
Individual demographics (%)				
Female	46.5	40.7	49.3	57.8
Male	52.5	57.3	50.2	42.2
Age (below 30 years)	80.5	68.4	88.1	86.7
Age (30 to 59 years)	15.5	25.1	9.4	11.1
Age (60 years and above)	3.9	6.5	2.3	2.2
Bachelor	8.0	13.9	4.7	2.3
Master	15.2	25.4	9.0	11.3
Doctorate	1.9	4.2	0.7	0
Middle school	27.3	17.8	33.1	29.6
High school	40.8	33.1	45.7	40.9
Professional	4.6	2.4	4.9	15.9
Binary demographics (%)				
"Female"	47.5	42.7	49.8	42.2
"Young"	80.5	68.4	88.1	86.7
"Higheredu"	24.4	40.7	14.4	13.3
Expectations and perceptions (mean in %)				
Inflation perceptions	3.0	2.8	3.3	2.4
Growth perceptions	2.2	2.0	2.4	1.8
Inflation expectations, 3 years	2.8	2.5	3.1	2.7
Growth expectations, 3 years	2.2	2.0	2.4	1.9
Literacy scores (mean in %)				
Monetary literacy	40.6	46.2	36.7	41.9
Institutional literacy	45.9	48.7	43.4	51.6
Quantitative literacy	35.1	46.5	27.9	28.9

Notes: This table reports selected summary statistics for participating ECB visitors from Germany for the full sample (December 2022 to May 2025).

Table A.4. Average treatment effects based on stratification: Literacy

Variables	(1) Monetary literacy	(2) Monetary literacy	(3) Quantitative literacy	(4) Quantitative literacy
		Monetary policy sessions		
Treatment	8.72***	5.89***	12.82***	11.94***
	(1.05)	(0.59)	(1.35)	(1.33)
Pomean	41.77***	43.60***	36.07***	36.77***
	(0.70)	(0.60)	(0.84)	(0.83)
Demographics	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes
Prior knowledge	No	Yes	No	Yes
Observations	1,519	1,519	1,663	1,663
		Institutional framework sessions		
Treatment	3.39***	3.40***	11.04***	11.09***
	(1.31)	(0.71)	(1.66)	(1.63)
Pomean	41.44***	41.12***	34.69***	34.57***
	(0.68)	(0.60)	(0.81)	(0.80)
Demographics	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes
Prior knowledge	No	Yes	No	Yes
Observations	1,219	1,219	1,219	1,219

Notes: With regression adjustment. Robust standard errors are below the estimates.
***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively.
Demographics include the binary variables Young, Female, Euroarea, and Higheredu.
Perceptions include those for euro area inflation and economic growth.

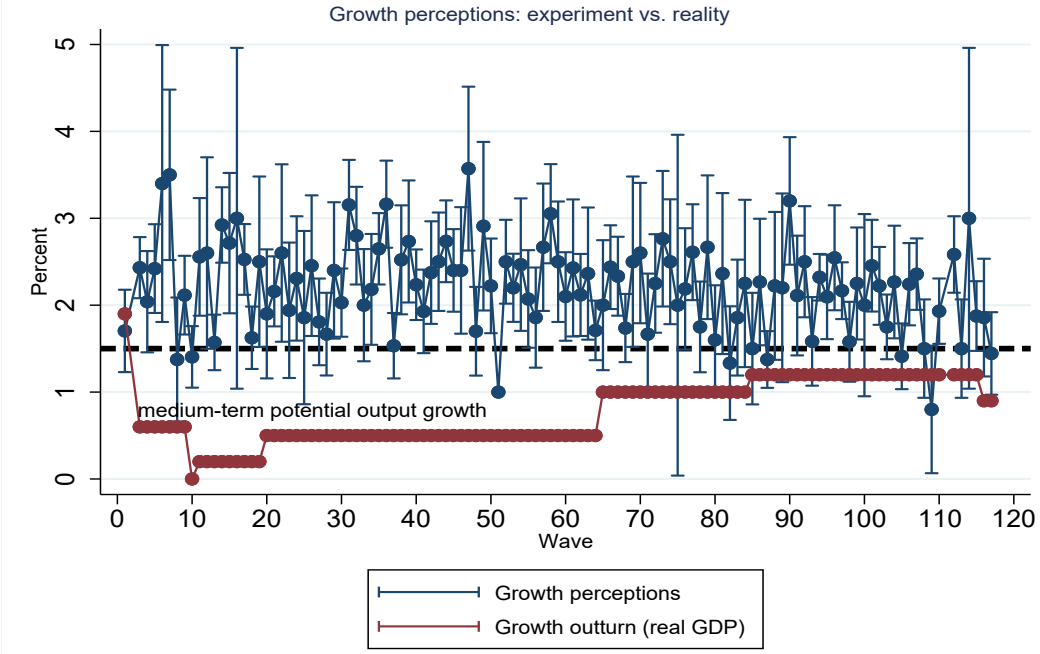
Table A.5. Average treatment effects based on stratification: Visitors' expectations

Variables	(1) Inflation	(2) Inflation	(3) Economic growth	(4) Economic growth
		Monetary policy sessions		
Treatment	0.12***	0.12***	0.01	0.00
	(0.03)	(0.03)	(0.03)	(0.03)
Pomean	0.30***	0.30***	0.51***	0.52***
	(0.02)	(0.02)	(0.02)	(0.02)
Demographics	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes
Prior knowledge	No	Yes	No	Yes
Observations	1,519	1,519	1,519	1,519
		Institutional framework sessions		
Treatment	0.22***	0.22***	0.06	0.06
	(0.04)	(0.04)	(0.04)	(0.04)
Pomean	0.32***	0.32***	0.50***	0.50***
	(0.02)	(0.01)	(0.02)	(0.02)
Demographics	Yes	Yes	Yes	Yes
Perceptions	Yes	Yes	Yes	Yes
Prior knowledge	No	Yes	No	Yes
Observations	1,219	1,219	1,219	1,219

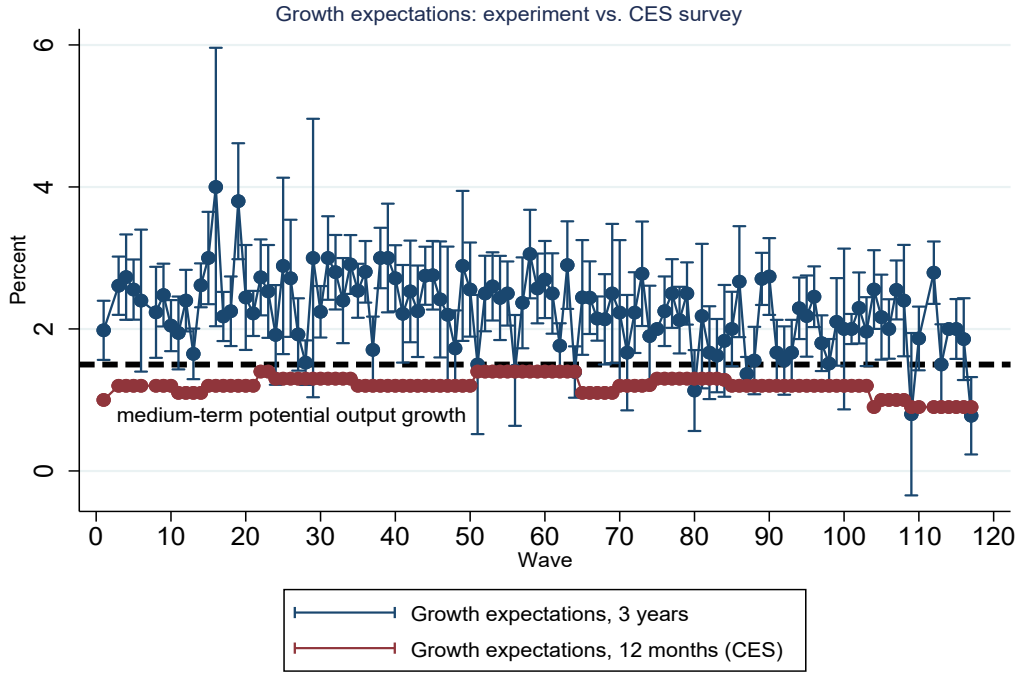
Notes: With regression adjustment. Robust standard errors are below the estimates. ***, **, and * refer to the 1%, 5%, and 10% significance levels, respectively. Demographics include the binary variables Young, Female, Euroarea, and Higheredu. Perceptions include those for euro area inflation and economic growth.

Figure A.1. Visitors' perceptions and expectations about (real) euro area growth

a) Growth perceptions



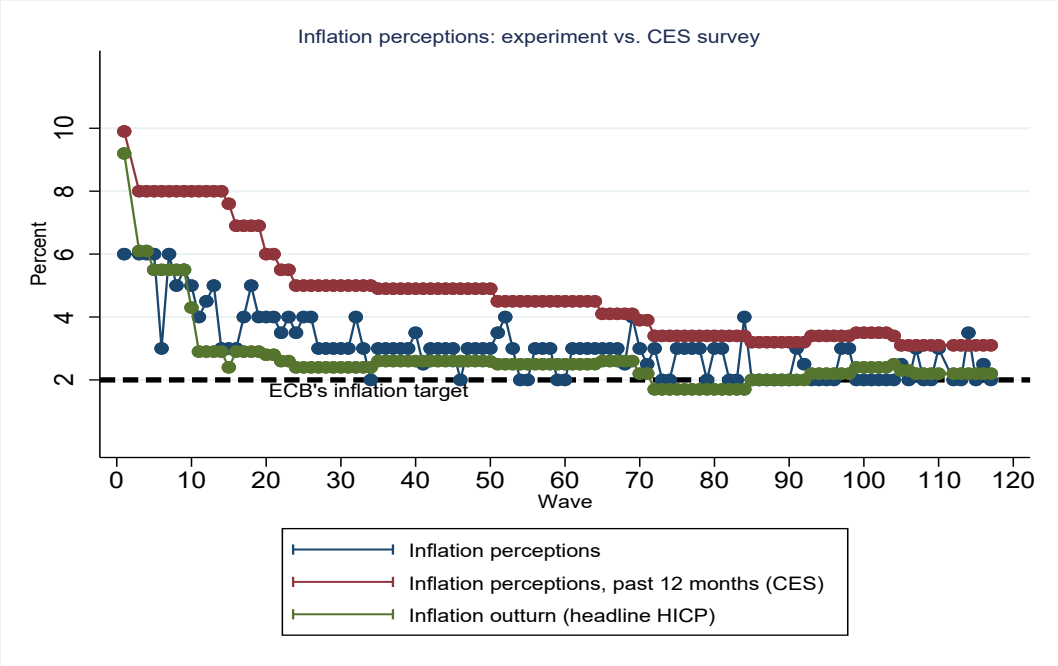
b) Medium-term growth expectations



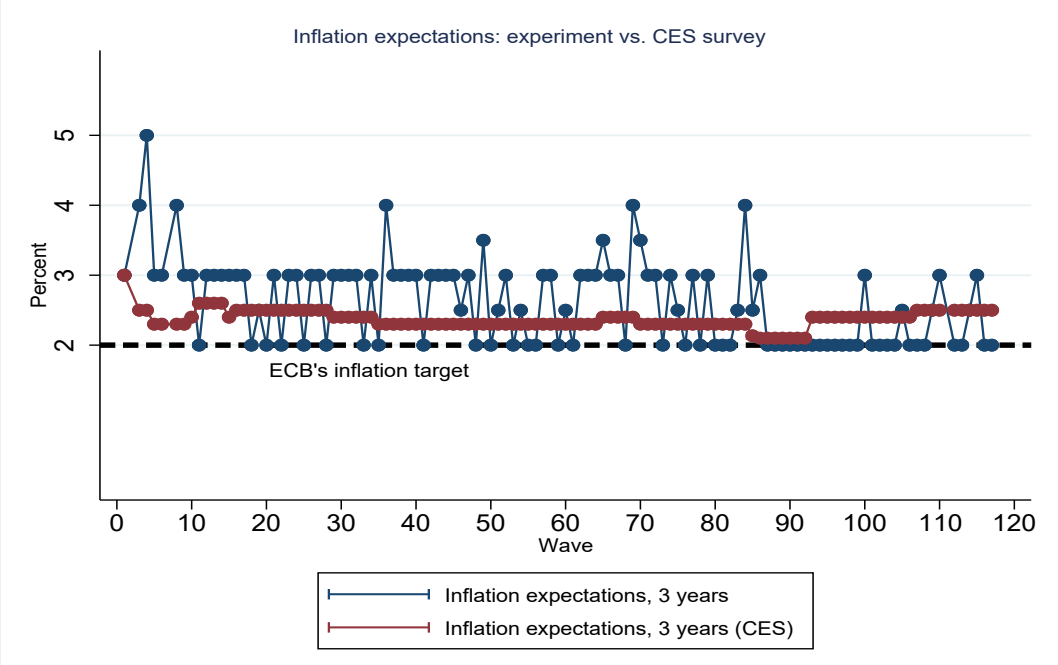
Notes: The figures show the distribution of (mean) perceptions and expectations for all participating ECB visitors and the the wider public from the CES. The blue vertical lines show the distribution (95% confidence interval around the mean). The x-axis shows the session number ordered by date of the group session. The black (dashed) line shows medium-term potential output growth at a value of 1.5%.

Figure A.2. Visitors' perceptions and expectations about headline inflation

a) Inflation perceptions



b) Medium-term inflation expectations



Notes: The figures show the distribution of (median) perceptions and expectations for all participating ECB visitors and the the wider public from the CES. The vertical lines show the distribution (95% confidence interval around the median). The x-axis shows the session number ordered by date of the group session. The black (dashed) line shows the ECB's symmetric, medium-term inflation target of 2%.

Appendix B: The Monetary Literacy Questionnaire

This is a survey of what you know and think about the ECB's monetary policy. The information you provide is confidential and is only shared at an aggregate (not individual) level.

First of all, please tell us about yourself. For each question please only select one answer.

I. Questions on personal demographics

Age
How old are you?
( ) 18 or younger
( ) 19-29
( ) 30-39
( ) 40-49
( ) 50-59
( ) 60-69
( ) 70 and over
( ) prefer not to answer

Gender
Which gender do you identify as?
( ) male
( ) female
( ) other
( ) prefer not to answer

Level of education
What is your highest level of education?
( ) middle school diploma
( ) high school diploma
( ) professional degree
( ) bachelor's degree
( ) master's degree
( ) doctorate/PhD
( ) prefer not to answer

Birthplace
Where were you born?
( ) Africa
( ) North America
( ) South America
( ) Asia
( ) Australia
( ) Europe: euro area country ("my currency is the euro")
( ) Europe: not a euro area country ("my currency is not the euro")
( ) prefer not to answer

II. Questions on institutional literacy and macroeconomic perceptions

For each question please only select one answer.

Q1: ECB's mandate
Which of the following do you think is the main objective of the ECB?
( ) promoting growth
( ) reducing unemployment
( ) maintaining price stability
( ) financing EU Member States
( ) stabilising the exchange rate
( ) addressing climate change
( ) don't know

Q2: Monetary policy instruments
Which of the following is not one of the ECB's monetary policy tools?
( ) interest rates
( ) asset purchase programme
( ) targeted longer-term refinancing operations
( ) exchange rates
( ) pandemic emergency purchase programme
( ) don't know

Q3: Monetary policy decision-making
Who is in charge of monetary policy decisions for the euro area?
( ) Governing Council of the ECB
( ) Heads of State
( ) Executive Board of the ECB
( ) European Commission
( ) President of the ECB
( ) don't know

Q4: Current inflation
Which of the following best describes the current level of the (annual) inflation rate in the euro area?
( ) clearly below 0%
( ) around 0%
( ) around 1%
( ) around 2%
( ) around 3%
( ) around 4%
( ) around 5%
( ) clearly above 5%
( ) don't know

Q5: Current economic growth

Which of the following best describes the current level of (annual) real economic growth in the euro area?

( ) clearly below 0%
( ) around 0%
( ) around 1%
( ) around 2%
( ) around 3%
( ) around 4%
( ) around 5%
( ) clearly above 5%
( ) don't know

Q6: Current drivers of inflation

Which of the following is the main factor that is currently influencing price developments?

( ) monetary policy
( ) fiscal policy
( ) exchange rates
( ) economic activity
( ) producer prices
( ) wages
( ) energy
( ) food
( ) other

III. Questions on quantitative literacy and macroeconomic expectations

For each question please only select one answer.

Q7: ECB's mandate

The primary objective of the ECB is price stability. Its medium-term inflation target for the euro area has been set at an annual rate of …

( ) … below 0%
( ) … 0%
( ) … 0 to 2%
( ) … 2%
( ) … 0 to 3%
( ) … 3%
( ) don't know

Q8: Monetary policy instruments

The ECB's main refinancing rate currently stands at …

( ) … below 0%
( ) … 0 to 1%
( ) … 1 to 2%
( ) … 2 to 3%
( ) … 3 to 4%
( ) … above 4%
( ) don't know

Q9: Monetary policy decision-making

The Governing Council of the ECB is in charge of monetary policy for the euro area. How often do they meet to take monetary policy decisions?

( ) 2 times a year
( ) 4 times a year
( ) 6 times a year
( ) 8 times a year
( ) 10 times a year
( ) 12 times a year
( ) don't know

Q10: Future inflation

What do you expect the average (annual) inflation rate in the euro area to be over the next three years?

( ) clearly below 0%
( ) around 0%
( ) around 1%
( ) around 2%
( ) around 3%
( ) around 4%
( ) around 5%
( ) clearly above 5%
( ) don't know

Q11: Future economic growth

What do you expect the average (annual) real economic growth rate in the euro area to be over the next three years?

( ) clearly below 0%
( ) around 0%
( ) around 1%
( ) around 2%
( ) around 3%
( ) around 4%
( ) around 5%
( ) clearly above 5%
( ) don't know

Q12: Future drivers of inflation

Which of the following is the main factor that will influence price developments in the future?

( ) monetary policy
( ) fiscal policy
( ) exchange rates
( ) economic activity
( ) producer prices
( ) wages
( ) energy
( ) food
( ) other

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