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Credibility gains from central bank communication with the public

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ABSTRACT

Enhancing central bank credibility among the general public is a challenging task, not least because it is difficult to reach out to this group: even the revision of the ECB's inflation target in 2021 went largely unnoticed by consumers. However, randomised information treatments conducted in a representative consumer survey in the six largest euro area countries reveal that communicating information about the target can enhance the perceived probability that price stability will be maintained in the medium-term. Especially if some explanation about the role of monetary policy is provided, credibility can be boosted also among the less financially literate, and the credibility gains are noticeable even in periods when inflation has increased.

1. Introduction

Central banks (and academics) have long understood the importance of central bank credibility for achieving their mandates. There is consensus that credibility is a major factor in keeping inflation stable or making disinflations less costly (Blinder 2000) - in particular, because it affects wage and price setting, i.e., the behaviour of households and firms (Taylor 1983; Moscarini 2007; Bordo et al., 2017). De Grauwe and Ji (2024) provide a modelling framework of this question and show that central bank credibility is an important initial condition when shocks hit the economy. They find that if credibility is low and large shocks arise, a further loss of credibility results, which in turn amplifies the negative effects of the initial shock. Effectively, credibility therefore is a key variable to ensure that the economy returns back to equilibrium smoothly also in the presence of large shocks.

In recent years, where inflation has been running above target for some time, this question has gained importance again. While a lot of research has been devoted to how central bank communication with expert audiences affects expectations, trust and credibility, the effects of central bank communication on consumers has only recently attracted more attention, resulting in a rapidly growing literature. It has been recognised that the general public is difficult to reach, has little knowledge about central banking issues and

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might not understand the rather complex language that central banks often use (Haldane et al. 2021). Hence, it cannot even be taken for granted that central banks get through to the public in order to raise the awareness about monetary policy issues (a necessary but not sufficient condition to build credibility). How such credibility is built among the general public and whether the recent efforts of central banks to enhance their communications with this target audience will pay off in that regard is not yet well understood.

The present paper aims to complement the earlier research in this area and to shed further empirical light on this issue. It exploits the outcome of a comprehensive strategic review by the European Central Bank (ECB) and in particular the announcement of a new inflation target in July 2021 to address three related questions. First, did this announcement (which was widely reported upon in the media, and certainly did not go unnoticed amongst experts) reach the attention of the wider public? Second, which elements of the strategy review decisions and their communication are likely to bring the highest credibility gains among the public, that also persist over time and even in a higher and more challenging inflation environment? Third, do credibility gains (if any) differ across population subgroups?

To address these questions, this paper reports results from the new ECB Consumer Expectations Survey (CES) that offers relatively high-frequency information on euro area households. The data are representative of the national adult populations in the six largest euro area countries. We show evidence that an overwhelming majority of respondents has not heard about the ECB over the summer 2021 when the outcome of its strategy review was announced via different media channels. Moreover, among those who *have* heard about the ECB over this period, when asked what they heard about, the majority does not recall what they heard, some provide implausible answers and only relatively few recall having heard about a new strategy.

To shed light on the other two questions, and in view of the limited public attention that the ECB's announcement received, we fielded an information experiment in September 2021. We provided random subsets of respondents with different pieces of information about the ECB's inflation target and the underlying decisions about the new monetary policy strategy, whereas another random subset (the control group) did not receive any information. This set-up allows us to identify causal effects from communicating the strategy review decisions on the perceived credibility of the target.

Based on a novel measure of credibility, we find that providing information about the inflation target implies important credibility gains. In particular, respondents who receive this information assign a higher likelihood that the ECB will maintain price stability over the medium term. Our measure of credibility increases by around 5% for this treatment group relative to the untreated control group. Providing additional information about other considerations that enter monetary policy deliberations and that consumers can easily relate to (such as climate change or plans to improve inflation measurement related to housing costs) implies no additional credibility gains, but does not negatively affect credibility either. In contrast, a considerable boost to credibility can be achieved by providing more background explanations about the rationale for the target and its implications for how monetary policy can stabilise the economy. For the group receiving this additional treatment, our measure of credibility increases by around 10%. Importantly, the credibility gains achieved with this treatment also show some persistence, even when inflation is above target.

We also present evidence on the effects of our information experiment on consumers' short- and medium-term inflation expectations. As with credibility, we find that providing an explanation about the functioning of monetary policy generates the largest effects. It sizeably and significantly increases the likelihood of anchored twelve-month and three-year ahead inflation expectations, and furthermore increases respondents' confidence about their forecast.

With regard to the third question, in line with earlier literature, we identify a key role of consumers' financial literacy. While the information treatments exert much stronger effects on the relatively *more* financially literate respondents, the *less* financially literate members of the public are only responsive to the treatment that provides additional explanations. These results are also in line with insights from psychology, whereby an attitude change in response to new information, and in particular a persistent change, requires an effortful processing of the new information, which in turn is more likely if the information is engaging for the recipient (Petty and Cacioppo 1985; Hastie and Park 1986). Thus, we provide further evidence on the benefits of promoting financial literacy for gaining credibility through central bank communication.

The paper thus provides direct empirical evidence on the challenges that central banks face in reaching consumers with their communications, on the importance of providing consumers with explanations rather than just factual information, and on the critical role of financial literacy in understanding central bank messages. Compared to earlier studies, the evidence reported in this paper is based on a considerably larger, population representative and multi-country survey for the euro area's six largest countries. The use of a Randomised Control Trial (RCT) allows for a clean causal identification. However, as with all RCTs our empirical results are subject to the caveat that survey respondents are guaranteed to receive the information treatment. Outside of this experimental setting, whether consumers actually receive and process this information in practice remains a challenging task for central banks. This is especially the case given the many demands on consumers' attention with which central banks must compete.

To develop the analysis, the remainder of the paper is organised as follows: Section 2 reviews the literature on central bank communication that relates to our study. Section 3 reports information about the ECB's strategy review and discusses the evidence on the extent to which respondents had noticed the strategy review announcement. In Section 4, we present the measure of credibility, explain the design of our RCT, and discuss the econometric results. Section 5 concludes and highlights the main policy implications.

2. Related literature

The present paper contributes to different strands of literature. A number of studies explore the communication challenges with the general public. In their literature review on the topic, Blinder et al. (2024) argue that the general public has relatively limited knowledge of central banking issues and shows a low desire to be informed about them. Given these challenges, Haldane et al. (2021) call for "explanation, engagement and education", or what they call the "3 E's of central bank communication with the public". Blinder

(2018) even predicts that "central banks will keep trying to communicate with the general public, as they should. But for the most part, they will fail." A first complication is that it seems difficult for central banks to reach the general public with its messages. Some salient messages, such as the "Whatever it takes" statement by former ECB president Mario Draghi, got noticed by non-experts, leading to a rather controversial and persistent discussion on Twitter that was characterised by a substantial amount of negativity especially among the German-speaking public (Ehrmann and Wabitsch 2022). This example shows how central bank communications can affect public perceptions about the central bank. Other salient messages, such as the announcement of the outcome of the 2020 strategy review by the Federal Reserve, in contrast, went largely unnoticed, with the little attention it had received fading after only a few days (Coibion et al. 2023b). Instead, Borraz and Mello (2020) document a reasonable level of awareness about a monetary policy change among firms in Uruguay.

But even if the central bank manages to get its message through to consumers, to be effective it would also need to succeed in influencing beliefs. To get at this question, a growing number of studies use RCTs to identify the effect of central bank communication on *inflation expectations*. Central banks can potentially affect inflation expectations, be it by communicating about the inflation target (Binder 2017; Binder and Rodrigue 2018; Coibion, Gorodnichenko, and Kumar 2018, Gorodnichenko and Weber 2022), by providing the central bank's inflation forecasts (Coibion, Gorodnichenko and Weber 2022), by explaining how policy rates are employed to conduct monetary policy (Brouwer and de Haan 2022), or by communicating about the future path of interest rates (Coibion et al. 2023a). However, typically the effects generated by such information treatments are not very persistent. Coibion, Gorodnichenko and Weber (2022) find that the initial effect of their treatment on inflation expectations has largely disappeared after six months. On the other hand, Caruso-Bloeck, Mello and Ponce (2023) estimate reasonably large and persistent effects of information about a change in the inflation target on firms' inflation expectations in Uruguay.

Whether the announcement of the ECB's new inflation target has affected inflation expectations is not clear. Hoffmann et al. (2022) find that inflation expectations increased moderately, whereas Galati, Moessner and van Rooij (2022) do not identify any announcement effect.

Our paper also relates to studies that examine *how* central banks should communicate in order to be understood. The literature provides a clear answer in that regard: through simple and relatable messages. This is found by Bholat et al. (2019), who report results from experiments using the Bank of England's Inflation Report, and corroborated by the evidence in Kryvtsov and Petersen (2021), Coibion, Gorodnichenko, and Weber (2022) and Haldane and McMahon (2018). At the same time, it is important to recognise that there are limits to simplification, given that the central bank inherently needs to discuss about complex issues. Providing a false sense of certainty about (future) economic developments, for instance, can ultimately lead to a loss of trust (Haldane, Macauly and McMahon 2021). But enhancing consumers' general knowledge about monetary policy and central banking already goes a long way, for instance because it helps them form better inflation expectations (van der Cruijsen et al. 2015).

In this paper, we move beyond the focus of the existing literature on inflation expectations and instead examine the effects of information provision on consumers' perceptions about the *credibility* that the central bank will achieve price stability over the medium term (i.e., will deliver on its mandate). Much of the related literature looks at questions of trust in the institution in general, a concept that is related (although not identical) to credibility.[1] Trust is important to central banks, as it contributes to their accountability, and furthermore has been found to help in anchoring inflation expectations (Christelis et al. 2020) and to enhance macroeconomic stabilisation (e.g. Bursian and Faia 2018; Park 2023; De Grauwe and Ji 2024). These papers provide macroeconomic models that endogenise central bank credibility and study its effects on the macroeconomy in general and the monetary transmission mechanism in particular.[2] They are based on different notions of credibility: In Bursian and Faia (2018), agents decide whether or not to believe that the central bank will stick to an anti-inflationary policy stance based on past policy outcomes. Park (2023) defines credibility as the time-varying relative weight that private agents attach to the central bank's published forecasts when they form their own expectations of future macroeconomic conditions. De Grauwe and Ji (2024) is the closest to our definition of credibility; in their paper, it is defined as the belief that the central bank can actually keep inflation close to the announced target. All three papers show that (although through different mechanisms), with higher central bank credibility, the macroeconomic environment within which the central bank operates becomes more stable.

3. Public knowledge and information acquisition about monetary policy

This paper exploits the announcement of the ECB's 2021 strategy review to better understand the credibility gains from central bank communication with the general public. The outcome of the review was announced on 8 July 2021, through a press release and a press conference with the ECB president and the ECB vice-president. The results were also explained in many subsequent interviews and speeches, and more material on the ECB website – in varying levels of detail, for the expert reader (such as 18 detailed background studies) and for non-experts (such as easy-to-understand explanations of key topics, accompanied by visual illustrations and short animated videos).[3]

[1] For instance, one might trust an institution that it will work towards the stated objective but could still lack confidence that it will achieve this objective. This lack of confidence could arise, for example, because of obstacles that are beyond the control of the institution.

[2] See also earlier work by Benhabib et al. (2001), Beechey et al. (2011) and Bodenstein et al. (2012). These papers show how under imperfect credibility, for instance following periods of exceptional macroeconomic volatility, it can be more challenging for the central bank to achieve its inflation target.

[3] All review-related material is available here: https://www.ecb.europa.eu/home/search/review/html/index.en.html.

The announcement contained several key decisions, all laid out in European Central Bank (2021a). For the purposes of this paper, we focus on four critical components of the announcement. First, the decision to change the ECB's inflation target, from an earlier target of "below but close to two percent" to a fully symmetric target of two per cent over the medium term.[4] Second, the announcement also contained several additional considerations aimed at explaining the stabilisation role of monetary policy, particularly during "bad" times such as the pandemic, and explicitly acknowledged how this may involve a transitory period in which inflation is moderately above target. The third component we focus on regards the clarification that, within its mandate, the ECB will take into account the implications of climate change and the carbon transition for monetary policy and central banking (an issue raised frequently by citizens in the outreach events conducted in the context of the strategy review). The fourth component refers to the ECB's plan to incorporate the cost of owner-occupied housing in inflation measurement in order to better represent an inflation rate that is relevant for households (another frequently-raised issue in the outreach events).

We start our investigation by first asking whether such a major announcement actually gets noticed by euro area consumers. To answer this question, we fielded a set of special-purpose questions in the CES. The CES is an online survey conducted by the ECB on a monthly basis among >10,000 consumers in the six largest euro area countries, i.e., Belgium, Germany, Spain, France, Italy and The Netherlands. The survey includes random probabilistic sampling and is representative of the national adult populations and covers a range of topics such as economic expectations, income and consumption, labour and housing markets as well as consumer finance. Further details about the CES are provided in ECB (2021d) and Georgarakos and Kenny (2022).

In September 2021, we asked respondents in the CES whether they had seen or heard information about the ECB in the preceding two months, and through which channels. As shown in Fig. 1, >50 % of respondents revealed that they had not received any information about the ECB over this period (which covers the period immediately following the strategy review announcement). This number is broadly comparable to results from earlier survey waves that were conducted before the strategy review announcement, implying that there was not any increased attention to the ECB in the summer of 2021. Those who reported to have received some information mentioned in particular the traditional media channels of television, radio, newspapers and magazines as their source, in line with the earlier evidence by Blinder and Krueger (2004) and Ter Ellen, Larsen and Thorsrud (2022), and consistently with results from another ECB survey (Gardt et al. 2022). Social and online media turned out to be considerably less relevant, and only very few respondents report to have received their information directly from the ECB. In a related vein, D'Acunto et al. (2024) highlight how different demographic groups in the CES receive information about monetary policy from different channels. For example, their results show that older consumers rely relatively more on traditional media (TV and newspapers) and younger consumers more on online channels like social media. Using an online pilot survey for Germany, Conrad et al. (2022) report very similar findings.

Next, all respondents who had reportedly heard about the ECB in the preceding two months were asked what they had heard. Respondents could pick among several topics, where multiple nominations were possible, or answer "don't know". Fig. 2 reports the corresponding results. A striking finding is that the largest group of respondents (nearly 25 %) opted for the "don't know" answer. Others opted for implausible answers, such as a "leadership change" or an "announcement of interest rate changes", neither of which has been announced in the time period under study. A non-trivial fraction reports that there was "a change in how the ECB views the future path for interest rates and of monetary policy". Some of those who noticed the strategy review announcement might have chosen this answer, yet there was no such reference in the ECB communication. At the same time, the most often-noticed topic was indeed related to "new strategies" (chosen by 22 % of respondents). Also, the "digital euro project launch" was frequently picked, likely reflecting the ECB's announcement on 14 July 2021 to launch the investigation phase of a digital euro project. Hence, the strategy review announcement has largely gone unnoticed among euro area consumers. Most of those who have heard about the ECB in the relevant time window do not recall the specific information they have received. Effectively, according to the results, the ECB's news might have reached only around 10 % of consumers.

To summarise, these results reinforce the view that central banks find it very hard to reach the general public through their communication. If they do manage, this is mainly achieved via intermediated channels, with television and radio still constituting the most important source – media channels that have traditionally been less in the focus of central banks' communication efforts.

As Fig. 3 shows, we also observe an interesting correlation in the data: respondents who report to have heard (any information) about the ECB are more knowledgeable about its inflation target. In this group, almost 60 % correctly identified that the statement "An inflation rate that is 2 % over the medium term in the euro area" is a true description of the main objectives or tasks of the ECB. In contrast, among the respondents who had not heard about the ECB, only 47 % answered that question correctly. This difference is economically large and statistically significant at the 1 % confidence level, and is present irrespective of consumers' financial literacy or educational attainment. However, this is only a correlation. In what follows, we provide a *causal* analysis about the potential effectiveness of central bank communication in influencing the public's beliefs about monetary policy.

4. Experimental evidence on the potential impact of central bank communication

Our evidence that most survey respondents had apparently not heard about the ECB's strategy review announcement provides a strong analytical basis to test for the potential credibility gains from communicating this information in an experimental set-up. In particular, we are able to address the following question: "If respondents had received certain parts of the announcement, how would their perceptions about the ECB's ability to deliver on its mandate have changed?" We do so by means of an information RCT which

[4] The previous formulation was often criticised as opaque and asymmetric (Reichlin et al. 2021).

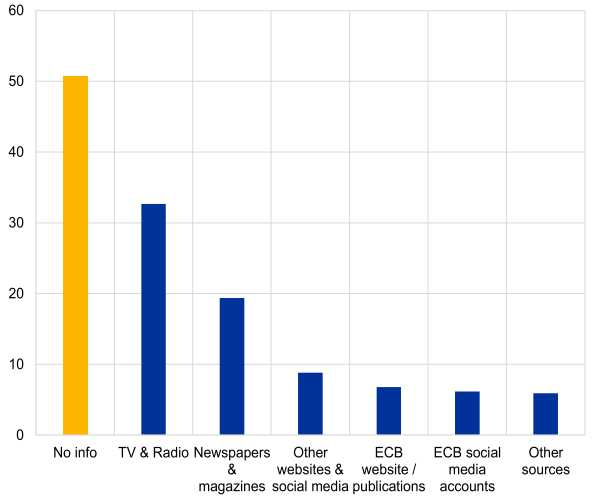


Fig. 1. Information about the ECB: channels.
Notes: Responses to the question "In the past two months, have you seen or heard information about the European Central Bank (ECB) from any of the following sources?". The figure reports the percentage share of all respondents, by answer category. Apart from "No info", all other options are not mutually exclusive, leading to a total sum higher than 100 % of the respondents. Weighted estimates.

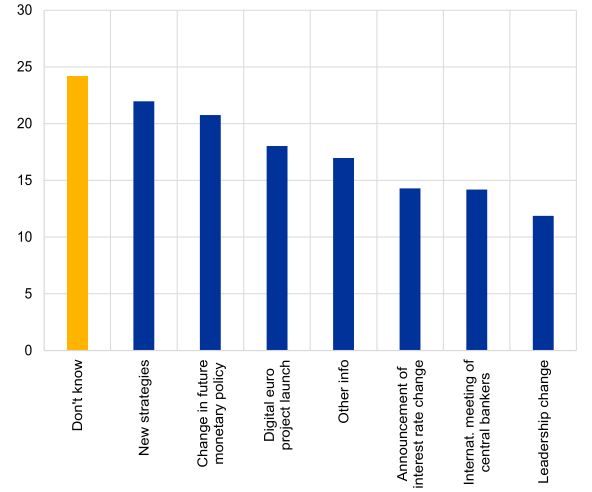


Fig. 2. Information about the ECB: topics.
Notes: Responses to the question "What were the main pieces of information about the European Central Bank (or its monetary policy) that you heard about in the past two months?" The figure reports the percentage share of respondents who have seen or heard information about the ECB, by answer category. Apart from "Don't know", all other options are not mutually exclusive, leading to a total sum higher than 100 % of the respondents. Weighted estimates.

exposes random subgroups of CES respondents to different information treatments, capturing key elements of the strategy review outcome.[5] This allows inference on the causal effects of communicating different elements of the strategy review outcome on the perceived credibility of the price stability objective.

4.1. Measuring central bank credibility

The key outcome that we are interested in relates to the credibility that the ECB will deliver on its primary legal mandate to maintain price stability in the euro area. To assess this, we asked respondents the following question:

[5] For recent reviews of the growing literature that implements RCTs in household and firm surveys, see Fuster and Zafar (2023) and Haaland et al. (2023).

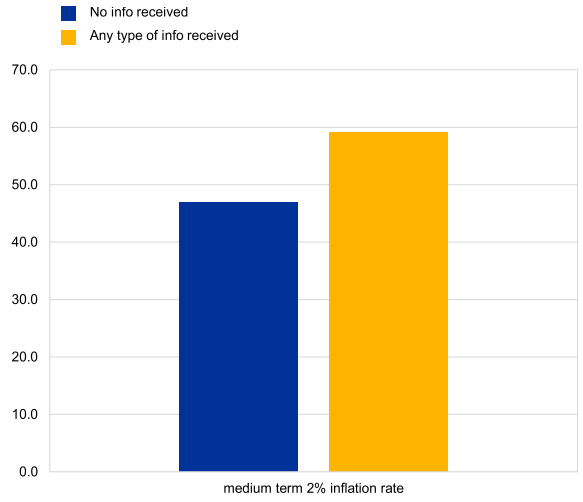


Fig. 3. Knowledge of ECB's price stability objective.
Notes: The chart plots the share of the respondents who answered the following question correctly: "Which of the statements below on the main objectives or tasks of the ECB do you think are true or false: An inflation rate that is 2 % over the medium term in the euro area". "Don't know" responses are classified as not correct. Weighted estimates. The blue bar denotes results for respondents who report not to have heard (any information) about the ECB, the yellow bar for those that report to have heard about the ECB.

"How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?"

Respondents could give any percentage between 0 % and 100 %. The question's formulation is closely aligned with the view that a central bank's ability to deliver on its mandate represents the most fundamental factor contributing to its credibility. For example, as ECB President Lagarde (2023a) has recently stressed: "*My definition of credibility is that we deliver on our mandate. Our credibility on the line is to reach the 2 % medium term in a timely manner and we will do everything we have to do in order to deliver on that. That's credibility. You have a mandate. You have to deliver against that mandate.*" In a related vein, Fed Chair Powell has emphasised that "*…credibility on inflation, and on sticking to your knitting, is everything because if people believe that you are, that you will accomplish your goals, and that you won't deviate from them for reasons like* [becoming more politicised], *then it'll be easier to do so.*"[6] In addition, the question aligns with the findings in Blinder (2000) that central bankers see a central bank's credibility and a central bank's dedication to price stability as very closely related, or possibly even virtually identical, and it is close to the definition of credibility applied in the macroeconomic model of De Grauwe and Ji (2024).

The formulation of the question deliberately differs from questions used in earlier studies. It does not ask about trust in the institution in general. Such a question would likely capture some broader notion of an institution's social capital (e.g., transparency in decision making) or may reflect respondents' culturally-driven views about institutional quality more generally. Also, the question does not infer credibility by asking respondents about their expected inflation.[7] Furthermore, it does not provide information about what price stability means or how it should be interpreted, as such information could risk having a significant framing effect on responses (in particular, a clear reference to a numerical anchor of 2 %). With this question, we aim to elicit respondents' perceptions of the likelihood that price stability will be achieved, which, in turn, should be the driver of their economic behaviour.

We fielded this question for the first time in September 2021, after providing the different information treatments. Subsequently, we test for the persistence of any identified effects by examining the responses to this question by the same consumers in December 2021 and March 2022. We provide summary statistics on the credibility question along with a number of other variables that we use in our econometric analysis in Table 1A of the Appendix. On average, euro area consumers assign a probability of 43.3 % to the chance that the ECB would achieve its primary mandate over the next 3 years (the median is 47 %). There is quite some heterogeneity in these views with an interquartile range of 39 percentage points. The entire distribution of responses from the raw data is shown in Appendix Fig. 1A. Responses spread the full spectrum of probabilities with the usual heaping in multiples of 10 and a higher concentration at 50 %. As the latter may indicate respondent indecisiveness, we conduct additional empirical checks to ensure that our findings are robust. Over time, there is relatively little variation in beliefs: the mean and median show some decrease in December 2021 (to 41.8 % and 45 %, respectively) and remain broadly unchanged in March 2022.

Moreover, using all monthly surveys between January 2022 to May 2024, we examine the association between our credibility

[6] See interview to Marketplace (March 2024): https://www.marketplace.org/2024/03/29/fed-chair-powell-inflation-economy-interest-rates-monetary-policy-federal-reserve/.

[7] For instance, Coleman and Nautz (2023) define a measure of the credibility of the ECB's earlier inflation target as the share of respondents expecting inflation over the medium term to be below but close to 2%, plus 0.5 times the share of respondents expecting inflation over the medium term to be slightly above 2%.

measure and three-year ahead inflation expectations. This period has been marked by considerable inflation volatility, where inflation was on a strong upward trajectory reaching 10.6 % in October 2022 (more than doubling compared to January 2022) before falling to 2.6 % in May 2024. We show the relationship between perceived credibility and three-year ahead inflation expectations from the raw data in a non-parametric way (Appendix Fig. 2A). The figure clearly suggests a much higher concentration of the three-year ahead inflation expectations in the vicinity of 2 % among respondents with high perceived credibility relative to their counterparts with low perceived credibility.

In addition, we use background information on respondents' knowledge about ECB's definition of price stability that was collected in August 2021, one month prior to our information experiment . More specifically, our measure of central bank knowledge is based on the following question: "*Which of the statements below regarding the ECB do you think are true or false? The main objectives/tasks of the ECB include i) an unemployment rate of 5 % or below in the euro area, ii) setting income tax rates in the country you currently live in, iii) an inflation rate that is 2 % in the euro area over the medium term, iv) an economic growth rate of at least 3 % in the euro area, v) keeping interest rates constant across time, vi) supervision of large European banks, vii) deciding on the government's budget and spending in the country you currently live in*". Using this question, respondents can then be categorised according to their overall degree of knowledge with a score of 7 (0) indicating the highest (lowest) level of knowledge. Using statement iii), we show (Appendix Fig. 3A) a strong positive association between perceived credibility and knowledge of the target: the fraction of consumers who answer the relevant question correctly is 8 percentage points higher among those with high perceived credibility. Furthermore, using all seven knowledge questions, we can calculate an overall knowledge score and associate this with perceived credibility. Appendix Fig. 4A is a scatterplot that shows a strong positive association between knowledge about the ECB's roles and objectives and perceived credibility that the ECB will deliver price stability.

4.2. RCT design

In our RCT, we randomly split the sample into five groups, stratified by country. The information treatment effects are identified relative to a control group that completes the special-purpose survey without receiving any information about the ECB's strategy review. In contrast, the four treatment groups got to read different parts of the strategy review-related communication that is available on the ECB's website (ECB 2021a).[8] The first type of information, which was provided to all four treatment groups, describes the ECB's new inflation target as follows:

> *"The ECB aims for a 2 % inflation target over the medium term as the best way to maintain price stability. The target is symmetric: inflation may sometimes be slightly above it or below. The ECB looks through short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable."*

The baseline information provided emphasises the core of the ECB's new inflation objective: its quantification, its symmetry and its medium-term orientation. In the subsequent presentation of the results, we label this first information treatment (T1) as "Inflation Target". With this baseline information treatment, we can thus provide direct evidence on how information about the inflation target impacts perceived credibility relative to that of the control group

The other three treatment groups all received the above baseline information about the inflation target, plus one additional element each. These additional elements had also been emphasised in the new framework. The second treatment group is additionally provided with a description of the function of the target that had been provided as a further explanation in the accompanying ECB press release (ECB 2021c):

> *"A target of 2 % has an important function: it creates space so that monetary policy can have its stabilising effect. In bad times, such as during the pandemic, monetary policy stimulates the economy through low interest rates and so has significant favourable effects on economic growth and employment. This may also imply a transitory period in which inflation is moderately above the target of 2 %."*

This second information treatment on the functioning of monetary policy emphasises aspects that may be particularly important to households and consumers, such as the support for economic growth and employment especially in the context of the COVID-19 pandemic - a time where deflationary risks continued to persist in the euro area economy. The communication also emphasises explicitly that monetary policy has a stabilising role.[9] We label this second information treatment (T2) "Target + Explanation".

A third treatment group (T3; "Target + Climate") received the baseline description of the target, and in addition a statement on the ECB's perspective on climate change:

[8] Prior to routing the treatment groups into the information screens we give them a 'heads up': "*On the next screen, we provide information on some key elements of the ECB's new monetary policy strategy, which is a strong foundation that will guide the ECB in the conduct of monetary policy in the years to come. Please read this information carefully. It will be shown only once and you will not be able to go back to it.*"

[9] The explanation of the functioning of the new target in T2 can also be understood as a recognition of the deflationary bias that is associated with a binding lower-bound constraint on nominal interest rates in new Keynesian models of the business cycle (e.g., Eggertsson and Woodford 2003). In particular, when monetary policy is constrained in its ability to lower nominal rates below their lower bound, it can become optimal for monetary policy to use more forceful measures such as keeping interest rates lower for longer and/or to use unconventional measures in a way that it would imply a subsequent transitory overshoot of inflation above its target.

> *"In addition, the ECB has acknowledged that climate change is an existential challenge for the world, and it is of strategic importance for the ECB's mandate. As a result, the ECB has decided on a number of measures to account explicitly for the implications of climate change and the carbon transition in its new monetary policy strategy."*

Environmental concerns were, next to price stability, among the most frequently raised issues in the ECB's listening events (ECB 2021b), suggesting that most households can easily relate to this topic. However, the effects of such a signal on the perceived credibility that the ECB will maintain price stability is a priori unclear. On the one hand, climate change has implications for inflation and monetary transmission. A more prominent role for climate considerations might therefore be interpreted as a signal that the ECB takes into account all relevant information, thereby delivering better policy decisions. This, in turn, could boost its overall credibility. On the other hand, questions arise to what extent monetary policy can or should look through higher energy prices to support the green transition, and how this will affect inflation developments (Schnabel, 2022). Some critics have argued that the ECB's climate change action plan distracts it from its primary mandate resulting in a form of mission creep, which could compromise its ability to achieve price stability (Reuters 2022). One could argue that the information provided in the statement is somewhat abstract, as the text refers to "a number of measures" but provides no detailed explanation about what they could be. This level of abstraction might limit any positive effects on perceived credibility.

Finally, the fourth treatment group received the baseline description of the target and additionally a statement on the ECB's intention to include housing costs in the measurement of inflation, another topic that had frequently been raised in the ECB's listening events (ECB 2021b):

> *"In addition, the ECB has heard the calls of European citizens for a broader coverage of housing costs in the measurement of inflation and it will work towards making this possible."*

An important aspect of this decision and its communication (T4; "Target + Housing") is that it makes reference to a "call of European citizens". The treatment of housing in official inflation statistics has been a long-standing challenge. Over recent years, with many housing markets being quite buoyant, it has also been seen to contribute to higher consumer perceptions about inflation (Arioli et al. 2017) and being a potential source of possible downward bias in official inflation statistics. Like climate change, housing costs is a concept that most households can easily relate to, but the effect on credibility of the information is a priori unclear. In principle, responsiveness to public feedback about housing could have a strong positive impact on credibility. At the same time, the ECB announcement only represents a promise to 'work towards' this broader coverage, leaving open the eventual outcome or its timing. It also does not provide any specific explanation on how housing-related costs will be more accurately accounted for in inflation measurement.

For treatments T2, T3 and T4, the marginal impact of the additional information provision can be identified by directly comparing effects with those of T1.

In light of the above, one should note two key features of our experiment: First, it is implemented in a population-representative survey. This implies that respondents' beliefs represent those of the general population (which faces real-life situations) and not those of a specific group (such as college students in lab experiments). Second, our experiment uses an actual central bank announcement. Using this realistic set-up, we are able to examine how certain elements contained in central bank communication can influence perceived credibility. Despite the use of a realistic setting, there may still be doubts about the external validity of RCTs more broadly. Weber et al. (2025) take a closer look at this issue by conducting a large-scale metanalysis study to compare results from multiple RCTs on inflation expectations fielded across different countries, times, and economic agents. In particular, Weber et al. (2025) document that similar RCTs implemented in different countries at different times, but experiencing similar economic environments and inflation settings, yield results that are broadly aligned. Thus, RCTs can be viewed as having some external validity.

One should also note that RCTs have several advantages over studies that utilize observational data. RCTs allow to estimate causal effects and thus assess the effectiveness of different communication strategies. Instead, it is hard to estimate the effect of, e.g., central bank communication on consumer expectations when using observational data. The effect of interest is typically confounded by several observed and unobserved factors such as the propensity to search for central bank news. This results in inconsistent estimates, even when panel data techniques are applied. Moreover, RCTs provide consistent treatment effects even in the presence of the measurement error inherent in surveys. For these reasons, many recent studies apply RCTs in surveys of households and firms to identify causal effects in macroeconomics (for a review see, e.g., Coibion and Gorodnichenko 2024; D'Acunto et al. 2024; Stantcheva 2023).

4.3. Effects on perceived credibility

To test whether the various treatments affect perceived credibility, we estimate the following linear regression:

$$y_i = \alpha_c + \alpha_1 D_{1,i} + \alpha_2 D_{2,i} + \alpha_3 D_{3,i} + \alpha_4 D_{4,i} + \alpha_X X_i + \varepsilon_i \quad (1)$$

Where y_i denotes the dependent variable (in this instance, the reported likelihood that varies between 0 and 100) for respondent i,

α_c are country-fixed effects and X_i are covariates that we control for in order to increase the efficiency of our estimates. These are: age, level of educational attainment, household size, the log of household net income and a dummy variable that equals one for liquidity-constrained households.[10] The variables of interest are $D_{1,i}$ to $D_{4,i}$, dummy variables for the different treatment groups. For instance, if a specific respondent receives the information in T1, $D_{1,i}$ is set to one for this respondent, whereas $D_{2,i}$ to $D_{4,i}$ are set to zero. The random assignment of respondents across the control and treatment groups implies that the distribution of pre-determined covariates, like those comprising X_i, should be similar across these groups. This is evident in Appendix Table 2A, where means and standard deviations of these variables are quite comparable across the control and the four treatment groups. Regression (1) is estimated by ordinary least squares, allowing for robust standard errors.

The results are reported in the first column of Table 1. To make sense of the estimated magnitudes, recall that respondents in the control group, on average, assessed the likelihood that the ECB will deliver on its mandate at 43 %. The estimated treatment effects represent how much more (or less) probability respondents in the various treatment groups assign to the delivery of price stability, relative to the control group. As all estimated coefficients are positive, the first implication is that all information treatments raise perceived credibility – and they do so in a statistically significant manner. This points to the potential benefits from communicating a monetary policy strategy to the wider public, provided that such communication reaches consumers.

T1, the description of the target, raises the likelihood by around 2 percentage points, a non-negligible increase of about 5 % relative to the baseline. Providing additional explanations on the functioning of the target and the stabilising role of monetary policy in T2 generates an additional credibility gain by another 2.7 percentage points, bringing the total gain to around 10 % of the baseline level, with the difference between T1 and T2 being statistically significant. In contrast, the estimated effects for T3 and T4 are similar to those of T1, and the relative differences across these treatments are not statistically significant.

Communicating the core information about the ECB's new strategy thus seems to be a powerful message, especially when additional explanations about the functioning of monetary policy are provided. The absence of any incremental credibility gains for T3 and T4 compared with T1 might be more surprising. After all, the ECB's listening events showed very clearly that consumers would like the ECB to take into account climate change and housing prices. Moreover, these are concepts that most consumers typically relate to. Against this background, one might expect that a signal from the ECB that it has heard these views would enhance credibility. However, as discussed above, the implications for the pursuit of price stability might be ambiguous. Overall, our results suggest that consumers, on average, do not share the concern about mission creep because adding references to climate change considerations does not affect the credibility of the inflation objective, neither to the better nor to the worse. A similar conclusion can be derived from the result related to T4. While the importance of housing costs for consumers might lead one to anticipate a positive credibility gain, the lack of any net gain from this announcement suggests that consumers adopt more a 'wait and see' perspective, perhaps holding off judgement till later when they can observe how or whether the promise is fulfilled. The above regression estimates of the average treatment effects are corroborated by histograms of raw data that compare the distribution of the credibility measure between the control and each treatment group (Appendix Fig. 5A).

The results discussed so far relate to the immediate or impact effects of our information treatments on perceived credibility as observed in September 2021. For similar RCTs, the effects have found to dissipate rapidly in subsequent months (see, e.g., Coibion, Gorodnichenko and Weber 2022). Hence, to examine the persistence of our effects, we collected data on the ECB's perceived credibility also in December 2021 and in March 2022, using the identical question as in September 2021. For these later survey waves, we use the panel structure of the survey to link them with our earlier RCT. Thus, we use perceived credibility, reported 3 and 6 months after our information treatments, as the dependent variable in Eq. (1). The results are reported in Table 1, columns 2 and 3.

We find some persistence in the effect of T2, while the effects of the other treatments fade over time. For example, in the December 2021 wave, the impact of T2 remains economically non-trivial (around half the September 2021 effect) and it is significant at the 5 % level. T4 remains significant at the 10 % level, whereas the effects of the other two treatment arms are already indistinguishable from zero. Moreover, in March 2022, 6 months after our information experiment, we still estimate a positive impact of T2 on the credibility of delivering price stability that is comparable to the effect estimated in December 2021, albeit less precisely estimated (significant at 10 %). Notably, by March 2022, inflation had increased substantially: HICP in the euro area increased from 3.4 % in September to 5 % in December 2021 and further to 7.4 % in March 2022. Furthermore, the survey in March 2022 took place shortly after the Russian invasion of Ukraine and recorded a dramatic deterioration in euro area consumers' economic outlook. The persistence of the effect triggered by T2 is in line with the idea that more relatable messages are more likely to lead to an effortful processing of information and to be stored in longer-term memory.

We also test whether there are any remaining effects up to one year after the experiment. In line with our evidence above that the effects fade away with time, after one year, also T2 no longer exerts any significant effect.

We perform a number of checks to ensure the robustness of our main finding. First, we re-produce the baseline results (Table 1) for the balanced panel of respondents who completed the survey in all three waves (i.e., September 2021, December 2021 and March 2022). This way, we can check whether panel attrition and non-response patterns more generally correlate with our experiment. Results, shown in Panel A of Appendix Table 3A, are highly comparable to the baseline ones and thus suggest no indication that the information treatments correlate with the panel structure and composition.

As discussed, our outcome variable shows some heaping at 50 %. Earlier research has argued that such responses may be chosen by

[10] The original question wording and definition of various variables used in the analysis are provided in the Annex. Some of these covariates correlate with the outcome variable in levels. For example, older and more educated respondents assign a higher level of credibility, as do respondent from larger, high-income and liquidity-constrained households.

Table 1
Treatment effects on perceived credibility.

	Likelihood that the ECB will deliver price stability		
	September 2021 (post-treatment) (1)	December 2021 (3 months post-treatment) (2)	March 2022 (6 months post-treatment) (3)
Inflation Target	2.087***	1.316	−0.354
	(0.794)	(0.885)	(0.991)
Target + Explanation	4.720***	1.890**	1.765*
	(0.778)	(0.863)	(0.970)
Target + Climate	2.629***	0.832	0.453
	(0.778)	(0.870)	(0.976)
Target + Housing	2.342***	1.530*	1.349
	(0.775)	(0.869)	(0.980)
Education: secondary	0.175	−1.794*	−1.665
	(0.836)	(0.945)	(1.075)
Education: tertiary	2.421***	0.800	−0.921
	(0.802)	(0.908)	(1.051)
Age	0.044**	0.038*	0.051**
	(0.018)	(0.021)	(0.023)
Household size	0.488**	0.164	0.066
	(0.223)	(0.242)	(0.281)
log(household income)	3.883***	2.577***	1.665***
	(0.494)	(0.545)	(0.615)
Liquidity constrained	4.937***	4.669***	3.462***
	(0.604)	(0.671)	(0.769)
Constant	−8.829*	8.007	15.182**
	(4.883)	(5.361)	(6.073)
Observations	10,174	8,991	6,792
R-squared	0.034	0.018	0.019

Notes: The table reports regression coefficients based on Eq. (1). Dependent variable: responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?". ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

respondents who are very uncertain (e.g., Fischhoff and Bruine De Bruin 1999) or just wish to skip the question. While the random assignment of such respondents across the control and treatment groups ensures that the results should be resilient to such noise in the data, we undertake two additional robustness checks. First, we drop respondents that answered 50 % from the estimation. Results are shown in panel B of Appendix Table 3A and are essentially unaffected compared to the baseline results. Second, we examine whether our information treatments systematically prompt respondents to report 50 %, e.g., because they confuse them. To this end, we estimate a probit model where the outcome variable is an indicator that takes the value 1 if the response is 50 % and 0 otherwise. We find no evidence of such a relationship in eleven out of the twelve estimates of interest (i.e., four treatment groups over three survey waves, see Panel C of Appendix Table 3A).

Overall, these results suggest some credibility gains from communication with the wider public that provides explanations about monetary policy, and that this effect persists even in an environment characterised by rising inflation and adverse economic conditions. The finding that the effects fade quickly for other information treatments also highlights the need for repeated communication efforts with the wider public if the associated credibility improvements are to be sustained.

In addition, we examine the robustness of our findings by excluding respondents who report that they have heard about the Strategy review announcement (about 11 % of the entire sample). As the RCT randomly assigns respondents, the fact that some respondents had heard about the strategy review announcement before the information treatments (or they follow more closely the ECB announcements more generally) should not make a material difference for our baseline inference. And indeed, results shown in Appendix Table 4A are comparable in terms of statistical significance and estimated magnitudes to those presented in our benchmark results.

As a last robustness check, we re-estimate two versions of our baseline regression shown in Table 1, column (1). The first (shown in column (1) of Appendix Table 5A) is a very parsimonious specification of our baseline model that does not take into account any demographic controls. The second version (shown in column (3)) is a richer specification compared to the baseline one. This specification takes into account additional covariates such as economic sentiment, trust in other people (as a proxy for political trust), and expected own household income growth and uncertainty. We find that the estimated treatment effects are virtually unchanged across the three different specifications. This corroborates the fact that RCT methods produce consistent estimates that should be broadly invariant to the inclusion of other covariates in the regression.

Another relevant question relates to the possible impact of our information treatments on consumers' attention to ECB news and announcements. In particular, we investigate whether the information provided in our experiment made it more or less likely that consumers would pay greater attention to central banking topics in the follow up months. To this end, we asked CES respondents in each of the survey waves between October 2021 and March 2022 to report whether they received any information about the ECB over the month preceding each survey. We then construct a dummy variable which takes a value of 1 if a respondent received any

information about the ECB over a particular period and zero if she did not. Using an analogous specification to Eq. (1), this variable is then regressed on the different information treatments about the ECB's strategy review that were provided in September 2021 to test whether they made respondents more attentive towards ECB news.

The results from these probit models, reported in Table 2, suggest virtually no effects of our information treatments on the likelihood that respondents would subsequently become more informed about the ECB. This suggests that communication that reaches the public can be successful in boosting perceived credibility, but reaching the public or triggering changes in the public's attention to central banking issues is more challenging. In view of these results, it remains an open question how central bank messages can most effectively reach the wider public (for example, by implementing a pro-active communications policy, repeat interactions and accessible communication channels).

Given that inflation was relatively low in the period when we fielded the experiment, our findings are also aligned with recent evidence on the varying degree of attention in different inflation environments. Weber et al. (2025) have conducted a large-scale meta-analysis study of several RCTs fielded across different countries and inflation settings. The study, using also evidence from the CES, concludes that consumers (and firms) become more attentive and informed about inflation news in high inflation environments and, as a result, they tend to respond less to exogenously provided information about inflation and monetary policy. Instead, when inflation is low, consumers are more inattentive to price developments. These results broadly support models in which inattention is an endogenous outcome that depends on the economic environment. Thus, in a low inflation environment, it is rational from the consumer perspective to be inattentive and central banks face the challenge to successfully reach out to the general public. Yet, there is still scope for an effective communication (e.g., via the additional explanations added to a main policy intervention as our information experiment has showcased) that can build trust and anchor inflation expectations. Such high trust and well anchored inflation expectations can in turn be crucial in times of rising prices (like those prevailing in the aftermath of our experiment) helping the central bank to bring inflation back to its price stability objective.

4.4. *Heterogenous effects: the role of financial literacy and gender*

In the context of our RCT, it is also instructive to examine possible heterogeneities in the treatment effects across consumers with different levels of financial literacy. As discussed in Section 2, less financially literate respondents have been shown to trust the central bank less and to have less accurate inflation expectations (Rumler and Valderrama 2020; Mellina and Schmidt 2018). In that sense, the marginal benefits of communicating with the less financially literate might be larger – at the same time, they might generally be less responsive to the information that they receive, or respond differently to some of the information treatments. We examine such possible heterogeneous effects by splitting the sample of respondents into a group with relatively high financial literacy and another group with relatively low financial literacy. Financial literacy is measured using a set of three basic questions aimed at assessing financial knowledge (often labelled as 'big 3'; see Lusardi and Mitchell (2014)) plus one more knowledge-intensive question about mortgage borrowing (see the Appendix for the precise wording of these questions). We distinguish two, roughly equally-sized groups;

Table 2
Treatment effects on having received information about the ECB over different periods.

	No information about the ECB received in…		
	October 2021 (1)	October-December 2021 (2)	October 2021-March 2022 (3)
Inflation Target	0.024	0.019	0.034*
	(0.016)	(0.017)	(0.018)
Target + Explanation	0.005	−0.019	−0.007
	(0.016)	(0.017)	(0.018)
Target + Climate	0.024	−0.006	0.004
	(0.016)	(0.017)	(0.018)
Target + Housing	0.008	−0.004	0.009
	(0.016)	(0.017)	(0.018)
Education: secondary	−0.027	−0.004	0.022
	(0.018)	(0.018)	(0.019)
Education: tertiary	−0.095***	−0.081***	−0.057***
	(0.017)	(0.017)	(0.018)
Age	−0.003***	−0.003***	−0.003***
	(0.000)	(0.000)	(0.000)
Household size	−0.006	−0.009*	−0.002
	(0.005)	(0.005)	(0.005)
log(household income)	−0.054***	−0.053***	−0.066***
	(0.010)	(0.010)	(0.011)
Liquidity constrained	−0.051***	−0.040***	−0.015
	(0.013)	(0.013)	(0.014)
Observations	8,667	8,033	6,408

Notes: The table reports average marginal effects from a probit model. Dependent variable: takes the value one if the respondent has received any information about the ECB over the time period preceding each survey that is indicated in the column headers and zero otherwise. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

the first comprises respondents who answer three or all four questions correctly, the second those who provide a correct answer for at most two questions. Moreover, the distribution of these groups across the control and treatment groups is similar due to randomisation, as it also happens with the other pre-determined covariates (Appendix Table 2A).

Results for the more financially literate respondents (who report a higher level of credibility to start with) are shown in the first column of Table 3. It is apparent that these are generally more responsive to the information treatments. For them, all treatment effects are positive and statistically significant, and the coefficients are often substantially larger than those estimated for the less financially literate. The perceived likelihood that the ECB will deliver price stability increases by >3 percentage points for the respondents with high literacy when they receive the core information about the new inflation target. The effect increases to 4.9 percentage points when the additional explanations on the functioning of the target (T2) are provided and to around 4 percentage points if respondents receive information about the ECB's considerations regarding climate change. The estimates for T2 and T3 are statistically and economically significant, and larger than the effect generated by T4.

In contrast, treatment effects are generally small and insignificant for the less financially literate (reported in the second column of Table 3). There is one notable exception, however, namely T2, where the functioning of the target and the stabilising role of monetary policy are more fully explained. The inclusion of such explanation thus seems to be an important requirement to induce improved perceptions in this group – in line with insights from psychology that messages are more likely to lead to an attitude change if they are relatable to the recipient, and therefore trigger an effortful processing of the information. More generally, our results point to another important benefit that investment in financial literacy can have, beyond those emphasised in extant literature. In particular, such investments can help enhance the credibility gains of central bank communication.[11]

Last, motivated by recent research that has pointed to a gender gap in forming inflation expectations, we also examine possible differences of the information treatments on perceived credibility via gender. As argued by D'Acunto et al. (2024), females are typically exposed more to price changes via more frequent shopping, and as a result tend to hold higher inflation expectations than men. Appendix Table 6A shows results splitting our sample into males and females. We find that our main result (i.e., the beneficial role of providing explanations about a policy for increasing credibility) applies to both genders. Instead, references to environmental concerns and housing costs (i.e., two concepts that consumers can easily relate to) appear to boost credibility for females, but not for males.

4.5. Effects on short- and medium-term inflation expectations

As mentioned in the Introduction, a growing number of studies utilise household and firm surveys to examine the effects of various information treatments on economic agents' *inflation expectations*. While the present paper focuses on the credibility gains among the wider public from communicating key elements of the ECB's new monetary policy strategy, we also present evidence on the effects of our information experiment on consumers' short- and medium-term inflation expectations. In particular, we investigate the effects of the different communication treatment arms on anchoring twelve-month and three-year ahead inflation expectations around the inflation target of 2 % and on respondents' confidence about their medium-term point forecast.

To this end, we estimate a probit model:

$$A_i^{post} = \alpha_c + \alpha_0 A_i^{pre} + \alpha_1 D_{1,i} + \alpha_2 D_{2,i} + \alpha_3 D_{3,i} + \alpha_4 D_{4,i} + \alpha_X X_i + \varepsilon_i \quad (2)$$

Where A_i^{post} is a binary indicator that takes the value 1 if post-treatment inflation expectations (twelve-month or three-year ahead) lie between 1 and 3 % (i.e., they are at the vicinity of the new inflation target). A_i^{pre} is the counterpart pre-treatment binary indicator that, together with other socio-economic covariates (X_i), serves to reduce estimation noise. The estimates of interest are α_j (where $j = 1 \ldots 4$) and represent the (de-)anchoring effects, if any, of each of the information treatments on inflation expectations.

Results from these probit models are shown in Tables 4 and 5, respectively. Communication under T2 increases the likelihood of anchored twelve-month and three-year ahead inflation expectations by 2.6 percentage points and 3.5 percentage points, respectively. These effects are also economically sizeable, as the fraction of those with anchored short and medium-term inflation expectations is 17 % and 22 %, respectively.[12] T4 implies similar anchoring effects. On the other hand, we do not estimate any anchoring effects for any of the other information treatments on short- or medium-term inflation expectations. Moreover, the anchoring effects of T2 and T4 for both inflation horizons dissipate fast and are no longer statistically or economically significant three- or six-months following the information experiment. This corroborates the evidence of many earlier studies which estimate only short-lived effects of inflation-related information treatments on inflation expectations.

We also examine the effects of our information treatments with reference to another margin, namely respondents' confidence about their medium-term forecast. In particular, following the implementation of our RCT, respondents are asked to report their medium-term inflation expectations and in addition to indicate their confidence about their point forecast on a scale from 1 ('not confident at all') to 5 ('very confident'). Using this information, we construct a binary confidence indicator that takes the value 1 if respondents report some confidence (i.e., answer 'confident' or 'very confident') about their medium-term inflation forecast and 0 otherwise. Roughly 17 % of respondents display such confidence. Using this as a dependent variable, we estimate a probit model using the

[11] A number of studies has emphasised the benefits of financial literacy for retirement planning; profitable portfolio investing, efficient borrowing choices, and ability to cope with financial emergencies (see Lusardi and Mitchell 2014 for a review).

[12] The relevant summary statistics related to the anchoring measures for inflation expectations are provided in Table 1A in the Appendix.

Table 3
Treatment effects on perceived credibility, by financial literacy.

	Likelihood that the ECB will deliver price stability (September 2021)	
	High Financial Literacy (1)	Low Financial Literacy (2)
Inflation Target	3.345***	0.640
	(1.093)	(1.162)
Target + Explanation	4.854***	4.104***
	(1.076)	(1.136)
Target + Climate	4.097***	0.700
	(1.058)	(1.151)
Target + Housing	2.398**	2.068*
	(1.074)	(1.131)
Education: secondary	1.052	−0.847
	(1.353)	(1.086)
Education: tertiary	3.282**	0.948
	(1.287)	(1.059)
Age	0.053**	0.029
	(0.026)	(0.027)
Household size	0.339	0.807**
	(0.311)	(0.324)
log(household income)	4.441***	2.458***
	(0.685)	(0.740)
Liquidity constrained	4.872***	4.367***
	(0.944)	(0.800)
Constant	−16.362**	8.130
	(6.807)	(7.330)
Observations	5,436	4,637
R-squared	0.039	0.023

Notes: The table reports regression coefficients based on Eq. (1). Dependent variable: responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?". Column (1) reports coefficient estimates for respondents with high levels of financial literacy, column (2) for respondents with low levels of financial literacy ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Table 4
Treatment effects on anchoring of 12-month ahead inflation expectations.

Likelihood that twelve-month ahead inflation expectations are between 1 and 3 %			
	September 2021 (post treatment) (1)	December 2021 (3 months post-treatment) (2)	March 2022 (6 months post-treatment) (3)
Inflation Target	0.010	0.017	0.006
	(0.011)	(0.013)	(0.011)
Target + Explanation	0.028**	−0.017	0.013
	(0.011)	(0.013)	(0.011)
Target + Climate	0.014	−0.006	−0.002
	(0.011)	(0.013)	(0.011)
Target + Housing	0.023**	0.004	−0.004
	(0.011)	(0.013)	(0.011)
Pre-treatment inflation expectations $\epsilon_{(1,3)}$	0.194***	0.210***	0.077***
	(0.007)	(0.008)	(0.007)
Education: secondary	0.024*	0.024*	−0.005
	(0.013)	(0.013)	(0.012)
Education: tertiary	0.022*	0.022*	−0.017
	(0.012)	(0.012)	(0.012)
Age	0.001**	0.000	−0.001***
	(0.000)	(0.000)	(0.000)
Household size	−0.003	−0.002	−0.006*
	(0.003)	(0.004)	(0.003)
log(household income)	0.006	0.026***	−0.007
	(0.007)	(0.008)	(0.007)
Liquidity	0.042***	0.016	0.004
	(0.009)	(0.010)	(0.009)
Observations	10,177	9,001	6,792

Notes: The table reports average marginal effects from a probit model based on Eq. (2). Dependent variable: takes the value one if 12-month ahead inflation expectations are between 1 and 3 %, and zero otherwise. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Table 5
Treatment effects on anchoring of 3-year ahead inflation expectations.

Likelihood that three-year ahead inflation expectations are between 1 and 3 %			
	September 2021 (post treatment) (1)	December 2021 (3 months post-treatment) (2)	March 2022 (6 months post-treatment) (3)
Inflation Target	0.012	−0.007	−0.004
	(0.012)	(0.013)	(0.014)
Target + Explanation	0.034***	−0.023*	0.010
	(0.012)	(0.013)	(0.014)
Target + Climate	0.015	−0.012	−0.008
	(0.012)	(0.013)	(0.014)
Target + Housing	0.030**	−0.008	0.007
	(0.012)	(0.013)	(0.014)
Pre-treatment inflation expectations $\epsilon_{(1,3)}$	0.227***	0.253***	0.157***
	(0.007)	(0.008)	(0.009)
Education: secondary	0.013	0.013	0.033**
	(0.013)	(0.013)	(0.016)
Education: tertiary	0.011	0.011	0.022
	(0.013)	(0.013)	(0.016)
Age	0.000	0.001***	0.000
	(0.000)	(0.000)	(0.000)
Household size	−0.005	−0.013***	−0.015***
	(0.003)	(0.004)	(0.004)
log(household income)	0.029***	0.047***	0.039***
	(0.007)	(0.008)	(0.009)
Liquidity	0.032***	0.038***	0.026**
	(0.010)	(0.011)	(0.011)
Observations	10,176	9,001	6,792

Notes: The table reports average marginal effects from a probit model based on Eq. (2). Dependent variable: takes the value one if 3-year ahead inflation expectations are between 1 and 3 %, and zero otherwise. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Table 6
Treatment effects on confidence about 3-year ahead inflation expectations.

Confident about 3-year ahead inflation forecast	
Inflation Target	−0.013
	(0.012)
Target + Explanation	0.027**
	(0.011)
Target + Climate	0.005
	(0.011)
Target + Housing	0.002
	(0.012)
Education: secondary	−0.027**
	(0.012)
Education: tertiary	−0.021*
	(0.011)
Age	−0.001***
	(0.000)
Household size	0.015***
	(0.003)
log(household income)	−0.007
	(0.007)
Liquidity constrained	0.016*
	(0.009)
Observations	10,176

Notes: The table reports average marginal effects from a probit model using the covariates of Eq. (1). Dependent variable: takes the value one if a respondent is confident/ very confident about her estimate of 3-year ahead inflation expectations, and zero otherwise. Dependent variable:. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

covariates of regression (1) to examine whether our information treatments influence respondents' confidence about their medium-term inflation expectations. Results, shown in Table 6, suggest that only T2 has a sizeable and statistically significant effect.

Moreover, we estimate the effects of our information treatments on one- and three-year ahead inflation expectations while taking into account pre-treatment expectations as well as interactions of the pre-treatment expectations with each treatment arm:

$$IE_i^{post} = \alpha_c + b_0 IE_i^{pre} + \sum_{j=1}^{4} \alpha_j D_{j,i} + \sum_{j=1}^{4} b_j D_{j,i} * IE_i^{pre} + u_i \quad (3)$$

This way we examine the extent to which each information treatment induces updating in inflation expectation posteriors relative to the priors. Results are shown in Appendix Table 7A. Consistent with our main finding in the paper, we find that all treatments imply a revision, and that T2 induces a relatively stronger revision, in particular in the medium-term inflation expectations.

Last, we study the effects of our information treatments on other expectations such as expectations about economic growth and unemployment, for which we collect post-treatment information in October 2021. We do not identify any significant effects of our information treatments on any of these expectations. This is not surprising, and in some way, is even desirable. The content of our information treatments aims to clarify the inflation target as a way to achieve price stability. Our RCT was successful at moving expectations that are immediately linked to the provided information such as perceived credibility in delivering price stability as well as short- and medium-term inflation expectations. That other, non-immediately related, expectations are affected by an RCT can of course not be excluded ex ante. However, such a result would have complicated the interpretation of the underlying mechanism (in our set up, significant treatment effects on economic growth expectations could imply that credibility gains come partly from a more optimistic outlook about economic prospects).

Taken together, results from this section suggest that providing explanations helps anchoring both short- and medium-term inflation expectations and also increases the confidence about medium-term forecasts. In contrast, we also find that expectations for other economic variables such as growth and unemployment are relatively unaffected. These results are qualitatively aligned with our baseline results about the credibility benefits of communication that provides additional explanations. However, the effects of such communication on inflation expectations dissipate fast, unlike the effects of additional explanations which had some persistence in their effect on perceived credibility. The latter highlights how providing information has more persistent effects on credibility than it does on the precise level of inflation expectations. Such longer-lasting credibility gains are likely to help central banks delivering on their mandate, especially during episodes of high inflation.

5. Conclusions and policy implications

Central banks have increased their efforts to communicate with the wider public. However, it is challenging to reach out to this group – so much that some even have argued that the central bank efforts will fail. In this paper, we report evidence that confirms the magnitude of the communication challenge confronting central banks. Despite the ECB's efforts to communicate about the outcome of its strategy review via various traditional and social media outlets, we demonstrate how these efforts went largely unnoticed by the majority of euro area citizens. Only around 10 % of consumers have been reached by this announcement, many of them through television and radio, media channels that have traditionally been less in the focus of central banks' communication efforts and should therefore gain in importance going forward.

In this paper, we conduct an information experiment that directly delivers to consumers different pieces of information related to key decisions in the ECB's strategy review, allowing an assessment of the causal effects of such communication on credibility. Our concept of credibility measures the perceived likelihood that the central bank will deliver on its primary mandate to maintain price stability. Our empirical evidence draws on data that are representative of the national adult populations in the six largest euro area countries.

We find that once the central bank message reaches consumers (a strong assumption given widespread inattention), it can affect their perceptions about the ECB's credibility in a significant manner. Consumers are more likely to believe that the ECB will deliver price stability in particular if they receive information about the new inflation target accompanied by some background explanation of its function and monetary policy's stabilising role for the economy. Providing explanations and thereby possibly enhancing understanding of how the economy works is particularly beneficial for those with low financial literacy. Also, our results demonstrate that such explanations can generate persistent credibility gains, even in an environment characterised by higher inflation. This is in contrast to the effects of information treatments on inflation expectations, which are shown to dissipate rather quickly.

Referring to considerations that consumers can easily relate to, such as commitments to take better account of climate risks and a promise to better capture housing costs in inflation measurement, without an accompanying explanation of how these will contribute to central bank objectives, do not yield additional credibility gains. Our results suggest that to enhance credibility, the central bank should not only ensure that the message reaches the wider public, but also provide additional background information and explanations about its policy.

These results add to a large and rapidly expanding literature on the effectiveness and design of central bank communication with the general public. Looking forward, our results suggest a number of important avenues for future research. For example, it would be particularly important to understand how central banks could better take into account the heterogeneity in the responsiveness of different agents to their communication and whether more tailored communication could lead to more effective and persistent aggregate outcomes. In this respect, our study has also shown very significant differences across the population in their reliance on different communication channels and media, i.e., traditional media versus online or web-based communication channels, including social media. Hence, an important priority for future work will be to identify whether or not these different channels play a specific role

in potentially shaping the public's responsiveness to central bank communication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix

Table 1A, Table 2A, Table 3A, Table 4A, Table 5A, Table 6A, Table 7A, Fig. 1A, Fig. A2, Fig. 3A, Fig. 4A, Fig. 5A

Appendix-Table 1A
Descriptive statistics.

Variable	Mean	p25	p50	p75	SD	N
Perceived ECB credibility (September 2021; range:0–100)	43.3	21	47	60	25.6	10,142
Perceived ECB credibility (December 2021; range:0–100)	41.8	20	45	60	26.4	8983
Perceived ECB credibility (March 2022; range:0–100)	41.3	20	44	58	25.7	6786
Education: secondary (dummy)	0.334	0	0	1	0.472	10,142
Education: tertiary (dummy)	0.532	0	1	1	0.499	10,142
Age (years)	49.6	36	50	62	16.2	10,142
Household size (persons)	2.58	2	2	3	1.24	10,142
Household net income (annual in EUR)	34,304	19,200	30,000	43,444	21,802	10,142
Liquidity-constrained household (dummy)	0.728	0	1	1	0.445	10,142
High financial literacy (dummy)	0.541	0	1	1	0.498	10,042
No information received about the ECB (October 2021; dummy)	0.552	0	1	1	0.497	8661
No information received about the ECB (October-December 2021; dummy)	0.368	0	0	1	0.482	8030
No information received about the ECB (Oct. 2021-March 2022; dummy)	0.290	0	0	1	0.454	6405
12-month ahead inflation expectations ϵ (1,3) (September 2021; dummy)	0.174	0	0	0	0.379	9470
12-month ahead inflation expectations ϵ (1,3) (December 2021; dummy)	0.199	0	0	0	0.399	8993
12-month ahead inflation expectations ϵ (1,3) (March 2022; dummy)	0.091	0	0	0	0.287	6786
3-year ahead inflation expectations ϵ (1,3) (September 2021; dummy)	0.217	0	0	0	0.412	9536
3-year ahead inflation expectations ϵ (1,3) (December 2021; dummy)	0.237	0	0	0	0.425	8993
3-year ahead inflation expectations ϵ (1,3) (March 2022; dummy)	0.179	0	0	0	0.383	6786
Confident about 3-year ahead inflation expectations; dummy	0.167	0	0	0	0.373	10,142

Notes: The table reports summary statistics for the variables used in the analysis. p25, p50 and p75 denote the corresponding percentiles of the distribution. SD denotes standard deviation. N denotes the number of observations.

Appendix-Table 2A
Descriptive statistics of covariates per control and treatment groups.

	Control group		Inflation target		Target + Explanation		Target + Climate		Target + Housing	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Education: secondary	0.32	0.47	0.36	0.48	0.32	0.47	0.34	0.47	0.33	0.47
Education: tertiary	0.54	0.5	0.51	0.5	0.55	0.5	0.53	0.5	0.53	0.5
Age	50	16	49	16	50	16	50	17	49	16
Household size	2.6	1.2	2.6	1.3	2.5	1.2	2.6	1.3	2.6	1.2
log(HH income)	10	0.59	10	0.62	10	0.62	10	0.6	10	0.61
Liquidity constrained	0.74	0.44	0.72	0.45	0.74	0.44	0.74	0.44	0.71	0.45
High financial literacy	0.56	0.5	0.54	0.5	0.53	0.5	0.54	0.5	0.53	0.5

Notes: The table reports summary statistics for the covariates used in the analysis, by treatment group. SD denotes standard deviation.

Appendix-Table 3A
Treatment effects on perceived credibility – Robustness checks.

Panel A: Likelihood that the ECB will deliver price stability, balanced panel only			
	September 2021 (1)	December 2021 (2)	March 2022 (3)
Inflation Target	2.203**	0.804	−0.331
	(0.987)	(1.024)	(0.999)
Target + Explanation	5.042***	1.991**	1.857*
	(0.964)	(1.002)	(0.980)
Target + Climate	3.132***	1.040	0.543
	(0.964)	(1.013)	(0.984)
Target + Housing	2.702***	1.430	1.423
	(0.956)	(1.012)	(0.987)

(continued on next page)

Appendix-Table 3A (*continued*)

Panel A: Likelihood that the ECB will deliver price stability, balanced panel only			
	September 2021 (1)	December 2021 (2)	March 2022 (3)
Observations	6,674	6,674	6,674
R-squared	0.034	0.020	0.018
Panel B: Likelihood that the ECB will deliver price stability, excluding 50 %			
	September 2021 (1)	December 2021 (2)	March 2022 (3)
Inflation Target	2.289**	1.316	−0.787
	(0.893)	(0.983)	(1.128)
Target + Explanation	5.411***	2.050**	1.937*
	(0.871)	(0.956)	(1.093)
Target + Climate	2.929***	0.754	0.355
	(0.877)	(0.970)	(1.100)
Target + Housing	2.563***	1.569	1.504
	(0.875)	(0.966)	(1.102)
Observations	8,984	8,007	5,930
R-squared	0.038	0.020	0.020
Panel C: Likelihood that the ECB will deliver price stability is 50 %			
	September 2021 (1)	December 2021 (2)	March 2022 (3)
Inflation Target	−0.003	0.012	0.036***
	(0.010)	(0.010)	(0.013)
Target + Explanation	−0.015	0.006	0.014
	(0.010)	(0.010)	(0.013)
Target + Climate	−0.001	0.017*	0.019
	(0.010)	(0.010)	(0.013)
Target + Housing	0.004	0.013	0.013
	(0.010)	(0.010)	(0.013)
Observations	10,174	8,991	6,792

Notes: For panels A, B see note in Table 2. Panel A reproduces the baseline results of Table 1 for the balanced panel of respondents who completed the survey in all three waves (i.e., September 2021, December 2021 and March 2022). Panel B reproduces the baseline results, but eliminates respondents that answered 50 % to the credibility question, in order to test whether the heaping of responses at 50 % influences our results. Panel C examines whether our information treatments systematically prompt respondents to report 50 %, e.g., because they confuse them. The dependent variable in panel C is a binary indicator that is 1 if the answer to the perceived credibility question is 50 % and 0 otherwise. The reported estimates in panel C are average marginal effects from a probit model. In all panels, for brevity, we show the estimates of the treatment effects and not of the entire set of covariates. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Appendix-Table 4A
Treatment effects on perceived credibility (excl. those who heard about ECB's strategy review).

	Likelihood that the ECB will deliver price stability		
	September 2021 (post-treatment) (1)	December 2021 (3 months post-treatment) (2)	March 2022 (6 months post-treatment) (3)
Inflation Target	1.545*	1.483	−0.449
	(0.838)	(0.933)	(1.043)
Target + Explanation	4.793***	2.159**	1.832*
	(0.823)	(0.908)	(1.028)
Target + Climate	2.863***	1.472	0.458
	(0.816)	(0.919)	(1.029)
Target + Housing	2.734***	2.072**	1.244
	(0.821)	(0.918)	(1.033)
Education: secondary	0.457	−1.638*	−1.348
	(0.862)	(0.984)	(1.113)
Education: tertiary	2.545***	1.188	−0.651
	(0.828)	(0.948)	(1.092)
Age	0.046**	0.043**	0.055**
	(0.019)	(0.022)	(0.025)
Household size	0.323	0.159	0.076
	(0.233)	(0.257)	(0.298)
log(household income)	3.615***	2.431***	1.639**
	(0.524)	(0.576)	(0.653)

(*continued on next page*)

Appendix-Table 4A (*continued*)

	Likelihood that the ECB will deliver price stability		
	September 2021 (post-treatment) (1)	December 2021 (3 months post-treatment) (2)	March 2022 (6 months post-treatment) (3)
Liquidity constrained	5.046***	4.435***	3.528***
	(0.630)	(0.703)	(0.804)
Constant	−6.592	8.510	14.670**
	(5.182)	(5.667)	(6.449)
Observations	9,067	7,999	6,054
R-squared	0.033	0.018	0.020

Notes: The table reports regression coefficients based on Eq. (1) excluding respondents who report that they heard about ECB's strategy review. Dependent variable: responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?". ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Appendix-Table 5A
Treatment effects on perceived credibility (different specifications).

	Likelihood that the ECB will deliver price stability (September 2021)		
	Parsimonious Specification (1)	Baseline Specification (2)	Extended Specification (3)
Inflation Target	1.799***	2.087***	2.229***
	(0.802)	(0.794)	(0.799)
Target + Explanation	4.656***	4.720***	4.644***
	(0.790)	(0.778)	(0.787)
Target + Climate	2.499***	2.629***	2.868***
	(0.785)	(0.778)	(0.784)
Target + Housing	2.136***	2.342***	2.435***
	(0.786)	(0.775)	(0.789)
Education: secondary		0.175	0.616
		(0.836)	(1.075)
Education: tertiary		2.421***	2.607
		(0.802)	(1.051)
Age		0.044**	0.081***
		(0.018)	(0.019)
Household size		0.488**	0.360
		(0.223)	(0.229)
log(household income)		3.883***	3.344***
		(0.494)	(0.502)
Liquidity constrained		4.937***	4.032***
		(0.604)	(0.617)
Trust in others			1.055***
			(0.111)
Economic sentiment			2.643***
			(0.382)
Exp income growth			0.057
			(0.076)
Income uncertainty			0.465
			(0.156)
Constant	40.119***	−8.829*	−18.763***
	(0.749)	(4.883)	(5.006)
Observations	10,174	10,174	9,658
R-squared	0.005	0.034	0.056

Notes: The table reports regression coefficients based on Eq. (1). Dependent variable: responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?". ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Appendix-Table 6A
Treatment effects on perceived credibility, by gender.

	Likelihood that the ECB will deliver price stability (September 2021)	
	Males (1)	Females (2)
Inflation Target	1.722	2.725**
	(1.180)	(1.059)
Target + Explanation	5.470***	4.083***
	(1.118)	(1.069)
Target + Climate	1.838	3.540***
	(1.137)	(1.054)
Target + Housing	1.215	3.553***
	(1.146)	(1.040)
Observations	5,015	5,150
R-squared	0.040	0.025

Notes: The table reports estimated treatment effects based on Eq. (1). The specification also takes into account socioeconomic characteristics shown in Table 3. Dependent variable: responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?". Column (1) reports coefficient estimates for male respondents and column (2) for female respondents. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

Appendix-Table 7A
Treatment effects on 12-month and 3-year ahead inflation expectations, allowing for interactions with priors.

	Likelihood that the ECB will deliver price stability	
	12-month ahead inflation expectations (1)	3-year ahead inflation expectations (2)
Inflation Target	0.063	0.054
	(0.082)	(0.073)
Target + Explanation	0.186**	0.146**
	(0.079)	(0.072)
Target + Climate	0.082	0.026
	(0.078)	(0.074)
Target + Housing	0.240***	0.060
	(0.082)	(0.073)
Inflation Target*pre-treatment IE	−0.078***	−0.049**
	(0.021)	(0.019)
Target + Explanation*pre-treatment IE	−0.124***	−0.138***
	(0.020)	(0.019)
Target + Climate*pre-treatment IE	−0.057***	−0.077***
	(0.019)	(0.019)
Target + Housing*pre-treatment IE	−0.099***	−0.084***
	(0.020)	(0.019)
Pre-treatment inflation expectations	0.744***	0.744***
	(0.014)	(0.014)
Constant	1.248***	−1.059***
	(0.367)	(0.346)
Observations	9,383	9,575
R-squared	0.645	0.697

Notes: The table reports estimated treatment effects and interactions with inflation expectation priors based on Eq. (3). The specification also takes into account socioeconomic characteristics shown in Tables 4 and 5. Column (1) reports coefficient estimates for 12-month ahead inflation expectations and column (2) for three-year ahead inflation expectations. Both inflation expectations distributions have been truncated for values below −5 % and above 25 % to remove outliers. ***/**/* denote statistical significance at the 1 %/5 %/10 % level. Numbers in brackets are standard errors.

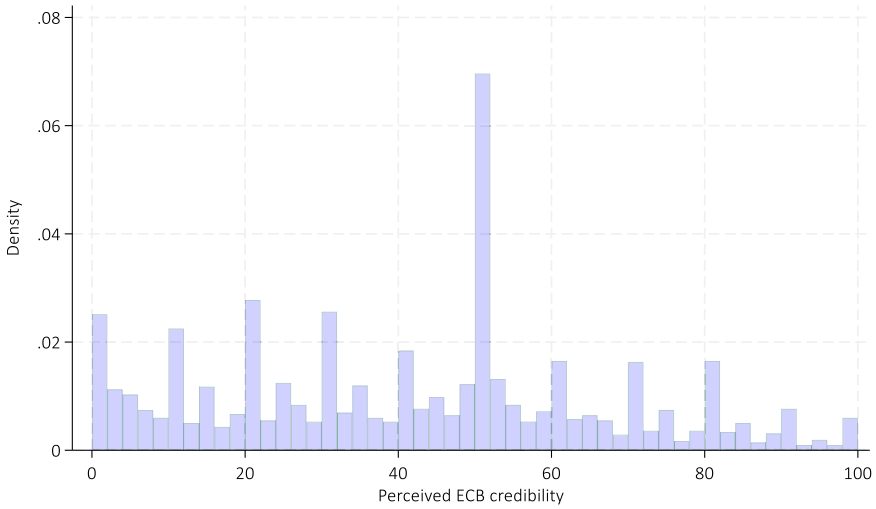


Fig. 1A. Distribution of responses to credibility question.
Notes: The chart plots the distribution of responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?" for the control group.

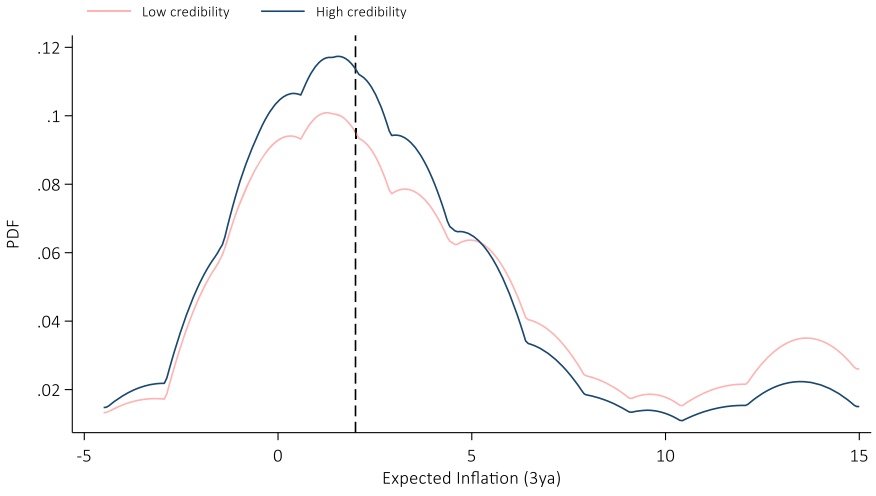


Fig. 2A. Perceived ECB credibility and medium-term inflation expectations.
Notes: Population weighted, and pooled data from January 2022 to May 2024 waves. The chart plots the distribution of three-year ahead inflation expectations by the degree of credibility ('high credibility': answer 50 % or more to credibility question). The data for continuous point forecasts has been binned in the range −5 to 15 by first rounding to the nearest digit and then taking the mid-point in pre-specified intervals before fitting a kernel density with a bandwidth of 1.3 to the data.

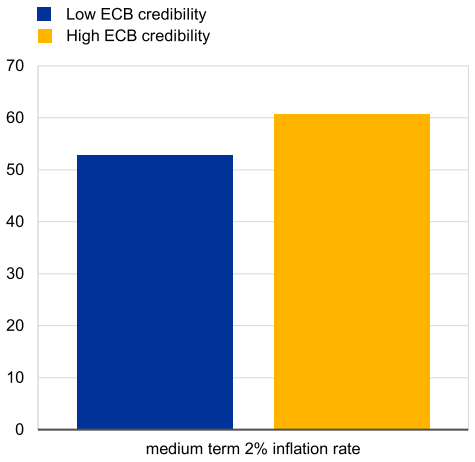


Fig. 3A. Perceived ECB credibility and knowledge of ECB's price stability objective.
Notes: The chart plots the share of respondents who answered the following question correctly: "Which of the statements below on the main objectives or tasks of the ECB do you think are true or false: An inflation rate that is 2 % over the medium term in the euro area". "Don't know" responses are classified as not correct. Weighted estimates. The blue bar denotes results for respondents with low perceived ECB credibility (<50 %), the yellow bar for those with high perceived ECB credibility (≥50 %).

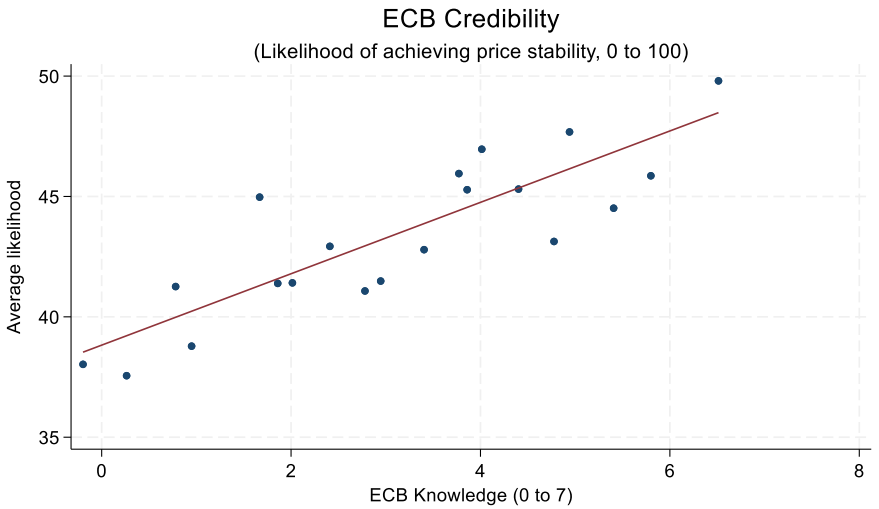


Fig. 4A. Perceived ECB credibility and knowledge of ECB's objectives.
Notes: The chart is a scatterplot associating an ECB knowledge score 0–7 with the perceived likelihood that the ECB will deliver price stability. The knowledge score represents the number of correct responses to the following question: "*Which of the statements below regarding the ECB do you think are true or false? The main objectives/tasks of the ECB include (i) an unemployment rate of 5 % or below in the euro area, (ii) setting income tax rates in the country you currently live in, (iii) an inflation rate that is 2 % in the euro area over the medium term, (iv) an economic growth rate of at least 3 % in the euro area, (v) keeping interest rates constant across time, (vi) supervision of large European banks, (vii) deciding on the government's budget and spending in the country you currently live in.*" Pooled data from several CES waves; the scatterplot and fitted line account for country and wave fixed effects.

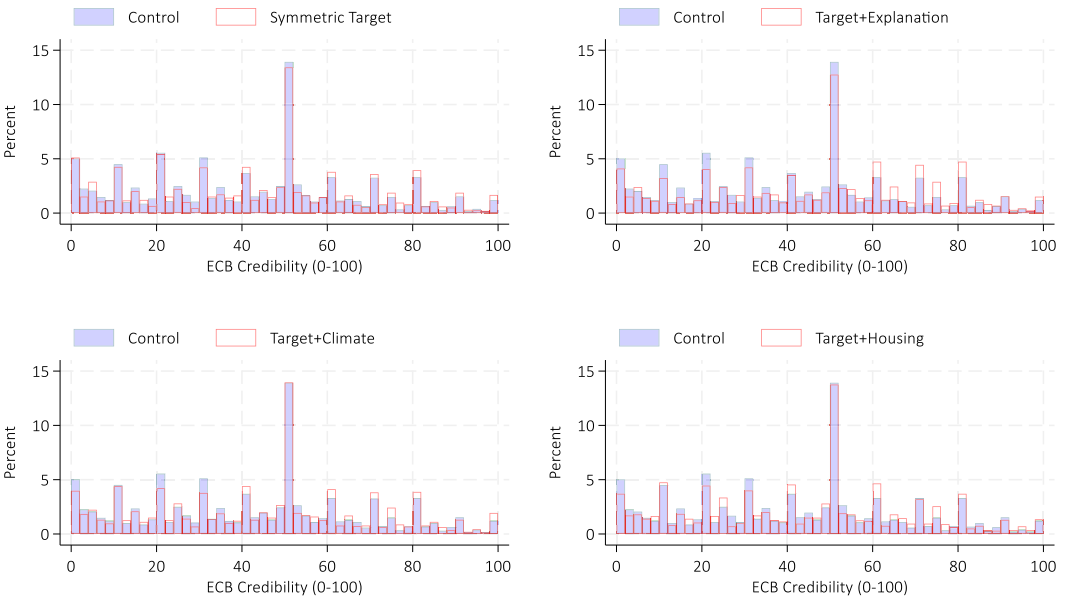


Fig. 5A. Distribution of responses to credibility question by control and treatment groups.
Notes: The charts plot the distribution of responses to the question "How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?" for the control group and each of the treatment groups.

Appendix – Survey Questions

Q1. **Expectation for prices in general next 12 months - qualitative**

The next few questions are about future changes in prices in general in the country you currently live in.

Looking ahead to 12 months from now, what do you think will happen to prices in general? We are interested in even very small changes.

Coding:

[Single response]

1	Prices will **increase** a lot
2	Prices will **decrease** a lot
3	Prices will **increase** a little
4	Prices will **decrease** a little
5	Prices will be **exactly the same** (that is 0 % change)

Q2. **Expectation for prices in general next 12 months - open-ended**

{IF Q1=1 or Q1=2 or Q1=3 or Q1=4

How much [SCRIPTER: if Q1=1 or Q1=3 show: higher if Q1=2 or Q1=4, show: lower] do you think prices in general will be **12 months from now** in the country you currently live in? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place.

Translation instruction: replace "the country you currently live in" by the actual country name (Belgium for BE FR/NL, France for FR, Germany for DE, Italy for IT, Netherlands for NL, Spain for ES).

Q3. Expectation for prices in general next 3 years - qualitative

Please think further ahead to September 2023. What do you think will happen to prices in general in the country you currently live in over the 12-month period **between September 2023 and September 2024**?

Coding:

[Single response]

1	Prices will **increase** a lot
2	Prices will **decrease** a lot
3	Prices will **increase** a little
4	Prices will **decrease** a little
5	Prices will be **exactly the same** (that is 0 % change)

Translation instruction: replace "the country you currently live in" by the actual country name (Belgium for BE FR/NL, France for

FR, Germany for DE, Italy for IT, Netherlands for NL, Spain for ES).

Q4. Expectation for prices in general next 3 years - open-ended

{IF Q3=1 or Q3=2 or Q3=3 or Q3=4

By about what percentage do you expect prices in general in the country you currently live in to [if Q3=1 or Q3=3 show: increase if Q3=2 or Q3=4, show: decrease] over the 12-month period **between September 2023 and September 2024**? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place.

Translation instruction: replace "the country you currently live in" by the actual country name (Belgium for BE FR/NL, France for FR, Germany for DE, Italy for IT, Netherlands for NL, Spain for ES).

Q5. ECB – information

In the past two months, have you seen or heard information about the European Central Bank (ECB) from any of the following sources?

Coding: [Multiple response] For each item [1 = Yes; 0 = No]

1	Newspapers and magazines
2	TV and radio
3	The ECB's websites and publications
4	The ECB's social media accounts, e.g. Twitter and LinkedIn
5	Websites and social media accounts not run by the ECB
6	Other sources not listed above
7	No, I didn't get any information

Q6. ECB – information pieces

What were the main pieces of information about the European Central Bank (or its monetary policy) that you heard about in the past two months? Please select all that apply.

Coding: [Multiple response] For each item [1 = Yes; 0 = No]

1	There was an international meeting of central bankers and academics in Frankfurt
2	A change in interest rates was announced
3	There was a change in how the ECB views the future path for interest rates and of monetary policy
4	There was a change in the leadership of the ECB
5	There was an announcement about new strategies at the ECB
6	The ECB launched a project to prepare for the possibility of issuing a digital euro
7	I heard about some other piece of information not listed above
8	I do not know

Q7. ECB – Objectives/tasks

Which of the statements below on the main objectives or tasks of the ECB do you think are true or false?

For each item [1 = True; 0 = False; 3 = Don't know]

The main objectives/tasks of the ECB are…

		True	False	Don't know
1	An unemployment rate of at most 5 % in the euro area			
2	Setting income tax rates in the country you currently live in			
3	An inflation rate that is 2 % over the medium term in the euro area			
4	An economic growth rate of at least 3 % in the euro area			
5	To keep interest rates constant across time			
6	Supervision of large European banks			
7	To decide on the government budget and spending in the country you currently live in			

Random assignment of groups, with equal groups for country (DE, FR, IT, ES, NL, BE).

Show statements for groups B, C, D and E by groups on 2 separate screens. For group A there appears no additional screen. Subsequently, all questions will be identical among groups.

Group	Statement for screen:
A	No additional screen
B	Info about 2 % symmetric target only Screen 1: On the next screen, we provide information on some *key elements of the ECB's new monetary policy strategy, which is a strong foundation that will guide the ECB in the conduct of monetary policy in the years to come. Please* **read this information carefully**. *It* will be shown only once and you will not be able to go back to it. Screen 2: The ECB aims for a 2 % inflation target over the medium term as the best way to maintain price stability. The target is symmetric: inflation may sometimes be slightly above it or below. The ECB overlooks short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable.
C	Info about 2 % symmetric target plus explanation Screen 1: On the next screen, we provide information on some *key elements of the ECB's new monetary policy strategy, which is a strong foundation that will guide the ECB in the conduct of monetary policy in the years to come. Please* **read this information carefully**. *It* will be shown only once and you will not be able to go back to it. Screen 2: The ECB aims for a 2 % inflation target over the medium term as the best way to maintain price stability. The target is symmetric: inflation may sometimes be slightly above it or below. The ECB overlooks short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable. A target of 2 % has an important function: it creates space so that monetary policy can have its stabilising effect. In bad times, such as during the pandemic, monetary policy stimulates the economy through low interest rates and so has significant favourable effects on economic growth and employment. This may also imply a transitory period in which inflation is moderately above the target of 2 %.
D	Info about 2 % symmetric target plus climate considerations Screen 1: On the next screen, we provide information on some *key elements of the ECB's new monetary policy strategy, which is a strong foundation that will guide the ECB in the conduct of monetary policy in the years to come. Please* **read this information carefully**. *It* will be shown only once and you will not be able to go back to it. Screen 2: The ECB aims for 2 % inflation over the medium term as the best way to maintain price stability. The target is symmetric: inflation may sometimes be slightly above it or below. The ECB overlooks short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable. In addition, the ECB has acknowledged that climate change is an existential challenge for the world, and it is of strategic importance for the ECB's mandate. As a result, the ECB has decided on a number of measures to account explicitly for the implications of climate change and the carbon transition in its new monetary policy strategy.
E	Info about 2 % symmetric target plus housing costs in HICP Screen 1: On the next screen, we provide information on some *key elements of the ECB's new monetary policy strategy, which is a strong foundation that will guide the ECB in the conduct of monetary policy in the years to come. Please* **read this information carefully**. *It* will be shown only once and you will not be able to go back to it. Screen 2: The ECB aims for a 2 % inflation target over the medium term as the best way to maintain price stability. The target is symmetric: inflation may sometimes be slightly above it or below. The ECB overlooks short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable. In addition, the ECB has heard the calls of European citizens for a broader coverage of housing costs in the measurement of inflation and it will work towards making this possible.

Post-Treatment expectations

Q8. Expectations about inflation over the next 12 months – open-ended

How much higher or lower do you think prices in general will be **12 months from now** in the country you currently live in?

Instruction: *Use the slider below to indicate the increase or decrease in prices in percentage terms. If you think prices will decrease rather than increase you can provide a negative percentage.*

Slider from −20 % to +20 % (valid range: −20 to +20) - show anchor labels −20 %, 0 % and 20 %; the percent chosen should be displayed in a small window below the slider. (only show dot when response selected and keep slider grey)

Q9. Expectation for prices in general over the next 3 years – qualitative

Looking ahead over the next 3 years, what do you think will happen to prices in general in the country where you currently live? We are interested in even very small changes.

Coding:

1	Prices will increase a lot
2	Prices will decrease a lot
3	Prices will increase a little
4	Prices will decrease a little
5	Prices will be exactly the same (that is 0 % change)

Translation instruction: Replace "the country where you currently live" with the actual country name (Belgium for BE FR/NL, France for FR, Germany for DE, Italy for IT, Netherlands for NL, Spain for ES).

Skipped notification: Please provide an answer to this question. Please be assured that there is no right or wrong answer.

Hard check: Respondent cannot proceed without answering.

Q10. Expectation for prices in general over the next 3 years – open-ended

{IF Q9=1 or Q9=2 or Q9=3 or Q9=4

By about what percentage do you expect prices in general in the country you currently live in to [if Q9=1 or Q9=3 show: increase if Q9=2 or Q9=4, show: decrease] **on average over the next 3 years**? Please give your best guess of the change in percentage terms. You can provide a number up to one decimal place.

}

Translation instruction: Replace "the country you currently live in" with the actual country name (Belgium for BE FR/NL, France for FR, Germany for DE, Italy for IT, Netherlands for NL, Spain for ES).

Q10. Confidence prediction changes in prices in general – next 3 years

How confident are you of your prediction about changes in prices in general on average over the next 3 years?

Coding:

[Single response]

1	Not confident at all
2	Not confident
3	Somewhat confident
4	Confident
5	Very confident

Scripting instruction: Randomize order of item 1–5 version 1: not confident at all/not confident/somewhat confident/confident/very confident; version 2: very confident/confident/somewhat confident/not confident/not confident at all

Q11. Expectation for ECB objective

How likely do you think it is that the ECB will maintain price stability in the euro area economy over the next 3 years?

Instruction: *Use the slider below to indicate your response.*

[slider] – show a slider without anchoring. Range: 0–100.

Q12. ECB – information (asked every month since October 2021)

In the past one month, have you seen or heard information about the European Central Bank (ECB) from any of the following sources?

Coding: [Multiple response] For each item [1 = Yes; 0 = No]

1	Newspapers and magazines
2	TV and radio
3	The ECB's websites and publications
4	The ECB's social media accounts, e.g. Twitter and LinkedIn
5	Websites and social media accounts not run by the ECB
6	Other sources not listed above
7	No, I didn't get any information

Financial literary

Respondents are asked the three standard literacy questions ('big 3') and a more advanced one (correct answers out of possible response options in **bold**):

(i) Suppose you had €100 in a savings account and the interest rate was 2 % per year. After five years, how much do you think you would have in the account if you left the money to grow? (>**102€**; exactly 102€; <102€; DK);

(ii) Imagine that the interest rate on your savings account was 1 % per year and inflation was 2 % per year. After 1 year, how much would you be able to buy with the money in this account? (more than today; exactly the same; **less than today**; DK);

(iii) Do you think the following statement is true or false? Buying shares in a single company usually provides a safer return than buying shares in a mutual fund. (T; **F**; DK);

(iv) Suppose you owe €1000 on a loan and the interest rate you are charged is 20 % per year, compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double? (years: <2; **[2,5)**, [5,10), ≥10; DK).

Liquidity

We distinguish between liquid and illiquid households based on responses to the following question:

Please think about your available financial resources, including access to credit, savings, loans from relatives or friends, etc. Suppose that you had to make an unexpected payment equal to one month of your household income. Would you have sufficient financial resources to pay for the entire amount?

References

Arioli, R., Bates, C., Dieden, H., Duca, I., Friz, R., Gayer, C., Kenny, G., Meyler, A., Pavlova, I., 2017. EU Consumers' Quantitative Inflation Perceptions and Expectations: An Evaluation. European Central Bank. Occasional Paper No. 186.

Benhabib, J., Schmitt-Grohé, S., Uribe, M., 2001. Monetary policy and multiple equilibria. Am. Econ. Rev. 91, 167–186.

Beechey, M.J., Johannsen, B.K., Levin, A.T., 2011. Are long-run inflation expectations anchored more firmly in the euro area than in the United States? Am. Econ. J. Macroecon. 3, 104–129.

Bholat, D., Broughton, N., Ter Meer, J., Walczak, E., 2019. Enhancing central bank communications using simple and relatable information. J. Monet. Econ. 108, 1–15.

Binder, C., 2017. Fed speak on main street: central bank communication and household expectations. J. Macroecon. 52, 238–251.

Binder, C., Rodrigue, A., 2018. Household informedness and long-run inflation expectations: experimental evidence. South. Econ. J. 85 (2), 580–598.

Blinder, A., 2000. Central bank credibility: why do we care? How do we build it? Am. Econ. Rev. 90, 1421–1431.

Blinder, A., 2018. Through a crystal ball darkly: the future of monetary policy communication. In: Proceedings of the American Economic Association Papers and Proceedings, 108, pp. 567–571.

Blinder, A., Ehrmann, M., de Haan, J., Jansen, D.J., 2024. Central bank communication with the general public: promise or false hope? J. Econ. Lit. 62 (2), 425–457.

Blinder, A., Krueger, A., 2004. What does the public know about economic policy, and how does it know it? Brook. Pap. Econ. Act. 2004 (1), 327–396.

Bodenstein, M., Hebden, J., Nunes, R., 2012. Imperfect credibility and the effective lower bound. J. Monet. Econ. 59 (2), 135–149.

Bordo, M., Erceg, C., Levin, A., Michaels, R., 2017. Policy credibility and alternative approaches to disinflation. Res. Econ. 71 (3), 422–440.

F. Borraz and M. Mello (2020). Communication, information and inflation expectations. Technical report, Banco Central del Uruguay.

Brouwer, N., de Haan, J., 2022. The impact of providing information about the ECB's instruments on inflation expectations and trust in the ECB: experimental evidence. J. Macroecon. 73 (103430).

Bursian, D., Faia, E., 2018. Trust in the monetary authority. J. Monet. Econ. 98, 66–79.

Caruso-Bloeck, M., Mello, M., Ponce, J., 2023. News of disinflation and firms' expectations: new causal evidence. J. Int. Money. Finance 137, 102914.

Christelis, D., Georgarakos, D., Jappelli, T., van Rooij, M., 2020. Trust in the central bank and inflation expectations. Int. J. Cent. Bank. 16 (6), 1–37.

Coibion, O., Gorodnichenko, Y., 2024. The Causal Effects of Inflation Expectations On households' Beliefs and Actions. Mimeo.

Coibion, O., Georgarakos, D., Gorodnichenko, Y., Weber, M., 2023a. Forward guidance and household expectations. J. Eur. Econ. Assoc. 21 (5), 2131–2171.

Coibion, O., Gorodnichenko, Y., Knotek II, E.S., Schoenle, R., 2023b. Average inflation targeting and household expectations. J. Political Econ. Macroecon. 1 (2), 403–446.

Coibion, O., Gorodnichenko, Y., Kumar, S., 2018. How do firms form their expectations? New survey evidence. Am. Econ. Rev. 108, 2671–2713.

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

Coleman, W., Nautz, D., 2023. Inflation expectations, inflation target credibility and the COVID-19 pandemic: new evidence from Germany. J. Money Credit Bank. 55 (7), 1937–1953.

Conrad, C., Enders, Z., Glas, A., 2022. The role of information and experience for households' inflation expectations. Eur. Econ. Rev. 143, 104015.

F. D'Acunto, E. Charalambakis, D. Georgarakos, G. Kenny, J. Meyer and M. Weber (2024). Household inflation expectations: an overview of recent insights for monetary policy. ECB Discussion Paper No. 24.

De Grauwe, P., Ji, Y., 2024. Trust and monetary policy. J. Forecast. 43 (4), 903–931.

Eggertsson, G., Woodford, M., 2003. The zero interest-bound and optimal monetary policy. Brook. Pap. Econ. Act. 1, 139–211.

Ehrmann, M., Wabitsch, A., 2022. Central bank communication with non-experts – a road to nowhere? J. Monet. Econ. 127, 69–85.

European Central Bank (2021a). An Overview of the ECB's Monetary Policy Strategy. https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview_monpol_strategy_overview.en.html.

European Central Bank (2021b). ECB listens – summary report of the ECB Listens portal responses. https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview002.en.html.

ECB (2021c). ECB's governing council approves its new monetary policy strategy. Press Release, July. https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708~dc78cc4b0d.en.html.

ECB, 2021d. ECB Consumer Expectations Survey: An overview and First Evaluation. ECB. Occasional Paper No. 287.

Fischhoff, B., Bruine de Bruin, W., 1999. Fifty–fifty=50%? J. Behav. Decis. Mak. 12, 149–163.

Fuster, A., Zafar, B., 2023. Survey experiments on economic expectations. In: Bachmann, R., Topa, G., van der Klaauw, W. (Eds.), Handbook of Economic Expectations. Academic Press, pp. 107–130.

G. Galati, R. Moessner and M. van Rooij (2022). Reactions of household inflation expectations to a symmetric inflation target and high inflation. DNB Working Paper No. 743.

Gardt, M., Angino, S., Mee, S., Glöckler, G., 2022. ECB Communication with the Wider Public. European Central Bank Economic Bulletin, 8/2021, January 2022.

Georgarakos, D., Kenny, G., 2022. Household spending and government support during the COVID-19 pandemic: insights from a new consumer survey. J. Monet. Econ. 129, S1–S14.

Haaland, I.K., Roth, C., Wohlfart, J., 2023. Designing information provision experiments. J. Econ. Lit. 61 (1), 3–40.

Haldane, A., Macauly, A., McMahon, M., 2021. The 3 E's of central bank communication with the public. In: Pastén, E., Reis, R. (Eds.), Independence, credibility, and Communication of Central Banking. Banco Central de Chile, Santiago, pp. 279–342.

Haldane, A., McMahon, M., 2018. Central bank communications and the general public. In: Proceedings of the American Economic Association Papers and Proceedings, 108, pp. 578–583.

Hastie, R., Park, B., 1986. The relationship between memory and judgment depends on whether the judgment task is memory-based or online. Psychol. Rev. 93, 258.

Hoffmann, M., Moench, E., Pavlova, L., Schultefrankenfeld, G., 2022. Would households understand average inflation targeting? J. Monet. Econ. 129, S52–S66.

Kryvtsov, O., Petersen, L., 2021. Central bank communication that works: lessons from lab experiments. J. Monet. Econ. 117, 760–780.

C. Lagarde (2023a). Statement made during an ECB press conference, available at https://www.ecb.europa.eu/press/pressconf/2023/html/ecb.is230914~686786984a.en.html.

Lusardi, A., Mitchell, O.S., 2014. The economic importance of financial literacy: theory and evidence. J. Econ. Lit. 52 (1), 5–44.

Mellina, S., Schmidt, T., 2018. The Role of Central Bank Knowledge and Trust For the Public's Inflation Expectations. Deutsche Bundesbank. Discussion Paper No. 32/2018.

Moscarini, G., 2007. Competence implies credibility. Am. Econ. Rev. 97 (1), 37–63.

Park, K., 2023. Central bank credibility and monetary policy. Int. J. Cent. Bank. 19 (2), 145–197.

Petty, R.E., Cacioppo, J.T., 1985. Communication and Persuasion: Central and Peripheral Routes to Persuasion. Springer-Verlag, New York, NY.

Reichlin, L., Adam, K., McKibbin, W., McMahon, M., Reis, R., Ricco, G., Weder di Mauro, B., 2021. The ECB Strategy: The 2021 Review and Its Future. CEPR Press. https://voxeu.org/content/ecb-strategy-2021-review-and-its-future.

Reuters (2022). ECB Faces Backlash Over Green Strategy 'distraction' from Inflation Fight. Available at https://www.reuters.com/markets/rates-bonds/ecb-faces-backlash-against-green-distraction-fighting-inflation-2022-02-14/ #:~:text=%22The%20ECB's%20primary%20mandate%20is,from%20achieving%20that%20primary%20mandate.%22.

Rumler, F., Valderrama, M.T., 2020. Inflation literacy and inflation expectations: evidence from Austrian household survey data. Econ. Model. 87, 8–23.

Schnabel, I., 2022. Looking through higher energy prices? Monetary policy and the green transition. In: Proceedings of the Remarks at American Finance Association 2022 Annual Meeting available at https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220108~0425a24eb7.en.html.

Stantcheva, S., 2023. How to run surveys: a guide to creating your own identifying variation and revealing the invisible. Annu. Rev. Econom. 15, 205–234.

Taylor, J.B., 1983. Union wage settlements during a disinflation. Am. Econ. Rev. 73 (5), 981–993.
Ter Ellen, S., Larsen, V., Thorsrud, L., 2022. Narrative monetary policy surprises and the media. J. Money Credit Bank. 54 (5), 1525–1549.
van der Cruijsen, C., Jansen, D.J., de Haan, J., 2015. How much does the public know about the ECB's monetary policy? Evidence from a survey of Dutch households. Int. J. Cent. Bank. 11 (4), 169–218.
Weber, M., Candia, B., Afrouzi, H., Ropele, T., Lluberas, R., Frache, S., Meyer, B.H., Kumar, S., Gorodnichenko, Y., Georgarakos, D., Coibion, O., Kenny, G., Ponce, J., 2025. Tell me something i don't already know: learning in low and high-inflation settings. Econometrica 93 (1), 229–264.