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Credibility gains from communicating
with the public: evidence from the
ECB's new monetary policy strategy

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Abstract

We show that the announcement of the ECB's Strategy Review and the revision of its inflation target in summer 2021 went largely unnoticed by the wider public. Although it is hard to reach out to this group, we find evidence that communicating key elements of the strategy can enhance the perceived credibility that price stability will be maintained in the medium-term. Randomised information treatments reveal that providing additional explanations about monetary policy's stabilising role has the strongest positive impact on credibility, boosting credibility also among the less financially literate and generating more persistent credibility gains, even after inflation increased.

JEL Codes: E52, E58, E31.

Keywords: central bank communication, credibility, financial literacy, randomised control trial, Consumer Expectations Survey

Non-technical summary

Central banks have intensified their efforts to communicate with the wider public. In contrast to the traditional target audience of central bank communication, financial markets and experts, reaching out to the wider public raises substantial challenges. Against this background, this paper studies the outcome of the ECB's recent strategic review in July 2021, including the announcement of a new symmetric inflation target of 2%, to address three questions. First, did this major central bank announcement reach the attention of the wider public? Second, which elements of the underlying policy decisions and their communication are likely to bring the highest credibility gains among the public that also persist over time and even in a high-inflation environment? Third, do credibility gains (if any) differ across population subgroups?

The outcome of the ECB's strategy review was communicated on 9 July 2021 via the ECB's website and social media outlets and it was widely reported upon via economic and financial media outlets. To understand whether euro area households have noticed the announcement, the paper draws on results from the ECB's Consumer Expectations Survey (CES) showing that an overwhelming majority of respondents did not hear about the ECB over the summer 2021. Moreover, among those who have heard about the ECB over this period, when asked what they heard about, the majority did not recall what they heard, some provide implausible answers, and only relatively few recall having heard about the new strategy.

To answer the other two questions, we fielded an information experiment in September 2021. In particular, 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 the causal effects from communicating the strategy review decisions on the perceived credibility of the ECB's target.

We find that providing some baseline information about the ECB's symmetric inflation target gives rise to some credibility gains as respondents in this treatment group assign a higher likelihood that the ECB will maintain price stability over the medium term. Providing additional information about other considerations that enter the ECB's deliberations and that consumers can easily relate to (such as climate change consideration or plans to improve inflation measurement related to housing costs) implies no additional credibility gains, but does not negatively affect credibility either.

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 during the pandemic. The credibility gains for this treatment group show some persistence, even in an environment characterised by higher inflation.

With regard to the third question, we identify a key role of consumers' financial literacy for the credibility gains that different communication elements imply. While the information treatments exert much stronger effects on the relatively more financially literate respondents, the additional explanation of the target and the stabilising role of monetary policy is particularly important for the less financially literate.

Taken together, our evidence shows that the general public is difficult to reach even when there is a major policy announcement that receives considerable attention in the financial press. However, there is scope for central banks to invest in communicating with the wider public by focusing on elements that boost credibility. In particular, providing background explanation on the central bank objective and its relevance in the current economic context can have sizeable credibility gains that can also last longer, and even under subsequent adverse economic conditions. Credibility gains from such communication and broader explanations can be particularly important for the less financially literate. On the other hand, reference to considerations that consumers easily relate to, such as the environment and housing costs does not imply additional credibility gains.

1. Introduction

Central banks have traditionally focused their communication on expert audiences, and in particular on financial markets. Communication with non-experts, in contrast, has long been considered as less relevant. Only recently has this changed. Following the global financial crisis and the extensive deployment of unconventional monetary policy tools, central banks and their policies became the subject of an often-controversial debate that saw the involvement of larger parts of the general public (Blinder et al. 2017). Against this background, many central banks have strengthened their efforts to communicate with the general public. The European Central Bank (ECB), for instance, has evaluated its communication policies in the context of its recent strategy review (Assenmacher et al. 2021), and has *inter alia* decided to complement its monetary policy communication by statements that are geared towards the wider public, and to regularly conduct outreach events with the public. This is done in order to ensure “public understanding of and trust in the actions of the ECB” (European Central Bank 2021a).

In this context, the present paper exploits the outcome of the ECB’s recent strategic review and in particular the announcement of a new symmetric inflation target of 2% in July 2021 to address three questions. First, did this major central bank announcement reach the attention of the wider public? Second, which elements of the underlying policy decisions and their communication are likely to bring the highest credibility gains among the public that also persist over time and even in a high-inflation environment? Third, do credibility gains (if any) differ across population subgroups?

On 8 July 2021, the ECB announced its new strategy that adopts a symmetric inflation target of 2% over the medium term.¹ This announcement was widely reported upon in the media, and certainly did not go unnoticed with the ECB watchers’ community. To understand whether also consumers have noticed the announcement, this paper reports results from the new Consumer Expectations Survey (CES) that offers relatively high-frequency information on euro area households. We show evidence that an overwhelming majority of respondents has not heard about the ECB over the summer 2021 when the outcome of the strategy review was announced. Moreover, among those who *have* heard about the ECB over this period,

¹ The previous formulation was that price stability is best served by maintaining inflation below but close to two percent.

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 the new strategy.

To answer 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. In particular, 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 the causal effects from communicating the strategy review decisions on the perceived credibility of the ECB's target. We find that providing some baseline information about the ECB's symmetric inflation target implies some credibility gains as respondents in this treatment group assign a higher likelihood that the ECB will maintain price stability over the medium term. Providing additional information about other considerations that enter the ECB's deliberations and that consumers can easily relate to (such as climate change consideration 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. Importantly, the credibility gains for this treatment group show some persistence, even in an environment characterised by higher inflation. With regard to the third question, we identify a key role of consumers' financial literacy for the credibility gains that different communication elements imply. While the information treatments exert much stronger effects on the relatively *more* financially literate respondents, the additional explanation of the target and the stabilising role of monetary policy is, in particular, important for the *less* financially literate.

Taken together, our evidence shows that the general public is difficult to reach even when there is a major policy announcement that receives considerable attention in the financial press. However, there is scope for central banks to invest in communicating with the wider public by focusing on elements that boost credibility. In particular, providing background explanation on the central bank objective and its relevance in the current economic context can have sizeable credibility gains that can also last longer, and even under subsequent adverse economic conditions. Credibility gains from such communication can be particularly important for the less financially literate. On the other hand, reference to considerations that

consumers easily relate to, such as the environment and housing costs, does not imply additional credibility gains.

To develop the analysis, the remainder of the paper is organised as follows: Section 2 reviews some of the literature on central bank communication that relates to our study. Section 3 reports some information about the ECB’s strategy review decisions and the associated media announcement. This section also discusses the evidence from the Consumer Expectations Survey on the extent to which respondents have noticed the announcement. In Section 4, we present the measure of credibility, explain the design of our Randomised Control Trial (RCT), and discuss the econometric results. Section 5 concludes and highlights some of 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 public. In their literature review on the topic, Blinder et al. (2022) argue that the general public has relatively limited knowledge and shows a low desire to be informed about central banking issues. A recent survey among former members of the ECB’s Governing Council has identified substantial room for improvement in the ECB’s communication with the general public (Ehrmann et al. 2022). 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.” Our paper contributes to this literature by quantifying the importance of the 3 E’s for central bank credibility and showing how communication efforts can be more effective.

Studies also show that households are less attentive to inflation developments if they do not understand the central bank objective or how monetary policy affects the economy or their personal situation (Binder 2017; van der Crujisen, Jansen, and de Haan 2015). Furthermore, if a central bank is successful in taming inflation, this breeds inattention among the general public (Cavallo, Cruces and Perez-Truglia 2017; Coibion et al. 2020). However, once there are signs that inflation starts increasing, agents might quickly return their attention to central

banking matters.² A point in case is the considerable increase in inflation in many advanced economies in late 2021, which very quickly led to intense discussions in the (social) media. A pertinent question in that regard was whether these developments would contribute to an un-anchoring of inflation expectations, which, in turn, could destabilise actual inflation. Hence, it is crucial for a central bank to ensure that the public is aware of its objective, and that it has confidence that the central bank will deliver price stability. The current paper studies this issue, shedding light on how different types of communication can impact the public's faith in a central bank's ability to deliver on its price stability mandate.

Prior to the ECB announcement, Hoffmann et al. (2022) fielded a randomised controlled trial (RCT) in the Bundesbank household survey providing respondents with information about possible monetary policy strategies. They find that under a hypothetical average inflation targeting (AIT), similar to the one adopted by the Federal Reserve, respondents report higher inflation expectations, in particular if they are also told that the strategy entails the possibility of inflation exceeding the target. Brouwer and de Haan (2022), in their RCT, show that providing respondents with information not only about the ECB's inflation target but also on how monetary policy is conducted by changing policy rates brings inflation expectations closer to target, while not affecting trust in the ECB as an institution. Regarding the effect of the announcement of the new ECB target on inflation expectations, Hoffmann et al. (2021) and Galati, Moessner and van Rooij (2022) report different results. The former find that inflation expectations increased moderately, whereas the latter do not identify an announcement effect. In this paper, we pose a different question; we do not study whether informing consumers about the *change* in the inflation target affects short-term inflation expectations immediately after the experiment. Instead, we examine the effects of information provision about the inflation target and the underlying strategy on agents' perceived credibility that the ECB will achieve price stability over the medium term (i.e., will deliver on its mandate).

Another strand of literature examines whether central banks reach the general public and if so whether they can influence beliefs. The evidence on the first question is mixed. What seems clear is central bank messages, if at all, reach the broader public via the media, in particular via television and newspapers (Blinder and Krueger 2004, Ter Ellen, Larsen and

² There is evidence that households take a stagflationary view of inflation and interpret higher inflation as bad news about their real incomes (Candia, Coibion and Gorodnichenko 2020; Coibion et al. 2022) – attention is therefore more likely to pick up if inflation is relatively high than when it is relatively low.

Thorsrud 2022). Lamla and Vinogradov (2019, 2021) report that U.S. and U.K. consumers are more likely to have heard news about their respective central bank following their monetary policy announcements (even though there is barely any effect on expectations), and Ehrmann and Wabitsch (2022) show that some salient central bank communications, such as the “Whatever it takes” statement by former ECB president Mario Draghi, led to substantial reactions on Twitter, also by non-experts. In contrast, Coibion et al. (2020b) find that the announcement of the outcome of the Federal Reserve’s Strategy Review went largely unnoticed, and that the little attention it had created started to fade after a few days. We contribute to this literature by providing additional evidence on how a major central bank announcement about a crucial aspect of monetary policy struggles to reach non-experts and which communication elements can boost central bank credibility.

With reference to the second question, whether central banks can influence beliefs, a growing number of studies use RCTs. 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; Coibion, Gorodnichenko and Weber 2022), by providing the central bank’s inflation forecasts (Coibion, Gorodnichenko and Weber 2022) or by communicating about the future path of interest rates (Coibion et al. 2020a). However, an open question remains to what extent the effects generated by such information treatments are persistent. To test this, the same respondents need to be surveyed with some time distance. Coibion, Gorodnichenko and Weber (2022), for instance, do so and find that the initial effect of their treatment on inflation expectations has largely disappeared after six months.

A related question is whether the central bank can generate confidence that it will deliver on its mandate and thus boost its credibility. 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.³ Trust is important to central banks, as it contributes to their accountability, and furthermore has been found to help anchoring inflation expectations (Christelis et al. 2020) and to enhance macroeconomic stabilisation (Bursian and Faia 2018). Not surprisingly, it is therefore often referenced by policy makers as an objective of central bank communication with the general public. For instance, Lagarde (2019) argued that: “Central banks have to be understood by the people whom they ultimately serve. This is a key to rebuilding trust.” This

³ 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, for instance because of obstacles that are beyond the control of the institution.

statement is in line with evidence that better knowledge about the central bank helps enhancing trust (Hayo and Neuenkirch 2014; Mellina and Schmidt 2018; Haldane and McMahon 2018; Hayo and Neumeier 2020; van der Crujisen and Samarina 2021). Consumers who trust the central bank more are also more responsive to central bank communication (Hoffmann et al. 2022). What has remained largely unexplored, however, is to what extent central bank communication can enhance credibility that central banks will deliver on their mandate – a question that we address in this paper.

How should the central bank 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 Mochhoury (2021). 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, Macaulay and McMahon 2021).

An important factor in that regard is financial literacy. More financially literate agents tend to have more realistic inflation expectations that are also more in line with the central bank’s target and tend to have more trust in the central bank (Rumler and Valderrama 2020; Mellina and Schmidt 2018). We contribute to this literature by showing that central bank communication has very different effects depending on how financially literate the recipient is. Providing information about the ECB’s target and strategy enhances credibility that the ECB will deliver on its mandate primarily among those that are financially literate, i.e., that presumably trust more and have better anchored inflation expectations. The less financially literate respondents can be reached, but for them, credibility is only enhanced once they are provided with more background information and the information is related to the current economic context.

3. Public knowledge and information acquisition about monetary policy

This paper exploits the context of the announcement of the ECB’s 2021 Strategy Review to better understand the credibility gains from central bank communication with the general public. The start of the review had been announced to the public in January 2020. It was

stressed that the review would be a comprehensive exercise whereby the ECB’s Governing Council would consider whether any elements of its monetary policy strategy needed to be adjusted. The review also involved a process of reaching out to the public, to better understand the views, suggestions and concerns of euro area citizens on a range of topics, and to study what the public expects from their central bank. Frequently noted issues in the outreach events related to the role of the ECB in addressing climate change and the consideration that the ECB should give to price developments in the housing market (European Central Bank 2021b).

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).⁴

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 new fully symmetric target of two per cent over the medium term.⁵ Second, and related to the adoption of the symmetric target, 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. 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. In Section 4.2 we provide details on the information we communicated to random subgroups of survey respondents in relation to each of these components. To summarise, the ECB communicated relevant news

⁴ All review-related material is available here: <https://www.ecb.europa.eu/home/search/review/html/index.en.html>.

⁵ The previous formulation was often criticised as opaque and asymmetric (Reichlin et al. 2021).

about its new monetary policy strategy and did so through many channels, and with a view to reach not only the experts, but also the wider public.

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 new Consumer Expectations Survey (CES). The CES is an online survey conducted by the ECB on a monthly basis among more than 10,000 consumers in the six largest euro area countries, i.e., Belgium, Germany, Spain, France, Italy and the Netherlands. The survey is representative of the national adult populations and covers a range of topics including 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 Figure 1, more than 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 an 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.

Next, all respondents who had reportedly heard about the ECB in the preceding two months were asked about the main pieces of information they had heard about. For that question, respondents could answer “don’t know” or pick among several topics, where multiple nominations were possible. Figure 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 listened to 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 and the ECB’s news did reach around 10% of respondents.

To summarise, these results reinforce the view that central banks find it 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 – precisely the media channels that have traditionally been less in the focus of central banks’ communication efforts.

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 not only economically large, but also statistically significant. Moreover, this difference persists irrespective of consumers’ financial literacy or educational attainment. This pattern and the persistent differences could either suggest that it is easier for the ECB to reach out to consumers who are better informed about its objectives, or it could imply that the message of the ECB did get through and improved the information of some consumers, or both. In what follows, we provide a more 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: “What if respondents had received

certain parts of the announcement, how would that have changed their perceptions about the ECB’s ability to deliver on its mandate?” We do so by means of an information RCT which exposes random subgroups of CES respondents to different information treatments, capturing key elements of the strategy review outcome.⁶ This allows inference on the casual effects on perceived credibility of the price stability objective from communicating different elements of the strategy review outcome.

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:

“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%. Note that this question specifically asks for credibility of the ECB to achieve price stability over the medium-term, and is therefore different from questions that have often been used in related studies. The question does not ask about trust in the institution in general – such a question would likely capture some broader notion of trust. Also, the question does not ask respondents about their expected inflation. Furthermore, it does not provide any further information about what price stability means or how it should be interpreted, as such information could risk having a significant framing effect on responses. Instead, respondents are able to provide their perception of the likelihood that price stability will be achieved, consistent with their own subjective understanding of price stability. Hence, with this question we aim to elicit the perception that should be the driver of their economic behaviour. This approach has the distinct virtue that the responses are unlikely to be impacted by any mechanical framing effect associated with elements of our information treatments (in particular, a clear reference to a numerical anchor of 2%). In addition, measures of (perceived) credibility are typically slow moving over time compared to economic expectations that are often quite responsive to prevailing economic conditions.

⁶ For recent reviews of the growing literature that implements RCTs in household and firm surveys, see Fuster and Zafar (2022) and Haaland et al. (2022)

We fielded this question for the first time in September 2021 after providing different information treatments (that we discuss below) related to the outcome of the strategy review. Subsequently, we also test for the persistence of any identified effects, by examining the responses to this question by the same consumers in subsequent survey waves 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 Appendix Table 1A. 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 corresponding median is 47%). There is quite some heterogeneity in these views with the interquartile range being 39 percentage points. On the other hand, there is relatively little variation in these beliefs over time with a mean and median showing some decrease in December 2021 (to 41.8% and 45%, respectively) and remaining broadly unchanged in March 2022.

4.2 RCT design

In our RCT, we randomly split the sample into five groups, stratified by country. The information treatment effects of interest 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).⁷ 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. The scope of the RCT design is not to separately identify effects for each of these features of the ECB's inflation objective. Rather, the experiment examines whether this core information alone and/or when

⁷ 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.”*

combined with additional elements can change public perceptions about central bank credibility. In the subsequent presentation of the results, we label this first information treatment (T1) as “Symmetric Target”. In testing for effects of this baseline information treatment, we can thus provide direct evidence on how the choice and communication of a quantitative symmetric point inflation target to be achieved over the medium-term impacts perceived credibility relative to that of the control group that does not receive any information.

The other three treatment groups all received the above baseline information about the new symmetric 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 the stabilising role it can play, in particular highlighting how in “bad times” it can provide support for economic growth and employment – aspects that may be particularly important to households and consumers. The explanation also highlights the “space” created by a 2% target and refers explicitly to the context of the COVID-19 pandemic - a time where deflationary risks continued to persist in the euro area economy. Although the ECB had explicitly not adopted average inflation targeting or the adoption of make-up-strategies, another interesting dimension to the communication is that it emphasises explicitly how the stabilising role of monetary policy may imply transitory but moderate overshoots of inflation above the target. Such overshoots, while not intended as part of an explicit make-up strategy, can thus be seen as being tolerated as part of monetary policy playing its stabilizing role.⁸

⁸ 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.

We label this second information treatment (T2) “Symmetric + Explanation”. Importantly, it is useful to compare the effects of T2 with T1 and thus gain insights on whether communication that provides a further explanation on the functioning of the new policy (including the stabilising role of the target for monetary policy) yields any additional marginal credibility benefits compared with simply communicating about the target.

A third treatment group (T3; “Symmetric + Climate”) received the baseline description of the symmetric target, and in addition a statement on the ECB’s perspective on climate change:

“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). Additionally, views about climate change and climate risks are known to vary widely across households. As a result, such a strategic re-orientation of monetary policy may impact households in very different ways. Finally, it could be argued that the information provided in the ECB statement on climate is somewhat abstract. In particular, 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. As with T2, it is interesting to compare the effects of T3 with the effects of T1 to identify any marginal impact on credibility from the introduction of climate considerations into the ECB’s monetary framework.

Finally, the fourth treatment group received 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; “Symmetric + 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 be contributing to higher consumer perceptions about inflation (Arioli et al. 2017) and being a potential source of possible downward bias in official inflation statistics. Like the reference to environment, a reference to housing costs is also a concept that most households can easily relate to, but the effect on credibility is a priori unclear. In principle, such responsiveness to public feedback about housing might be expected to have a strong impact on consumer expectations. 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 and it does not provide any specific explanation on how housing-related costs will be more accurately accounted for in inflation measurement. As with T2 and T3, the marginal impact of this housing related decision and communication can be identified by directly comparing any effects of T4 with the effects of T1.

4.3 Effects on perceived credibility

To test whether the various treatments affect perceived credibility, we estimate the following 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) for respondent i , α_c are country fixed effects and X_i are few 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.⁹ The variables of interest are $D_{1,i}$ to $D_{4,i}$, dummy variables for the different treatment groups (i.e., 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 regression 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 is assigned to the delivery of price stability by the respondents in the various treatment groups relative to the control group. As all estimated coefficients are positive, the first implication is that all information treatments raise the probability that price stability will be achieved compared with the case where no information is received – 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.

Treatment 1, the description of the target, raises the likelihood by around 2 percentage points (i.e., a non-negligible increase relative to the baseline). Providing additional explanations on the functioning of the symmetric target and the stabilising role of monetary policy (T2) generates an additional credibility gain by another 2.7 percentage points, with the difference between treatment groups 1 and 2 also being statistically significant. In contrast, the estimated effects for treatment groups 3 and 4 are similar to those of treatment group 1 (the magnitude of the coefficients remains in the order of 2) and the relative differences across these treatments are not statistically significant.

Communicating the core information regarding ECB's new strategy seems to be a powerful message that the ECB will deliver price stability over the medium term. Recall that communication under T2 provides in addition an explanation about the functioning of monetary policy under the new inflation target and emphasises the stabilising role it can play, especially during periods of weak economic growth and employment. Importantly, providing such additional explanation has discernible credibility gains among consumers.

⁹The 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. For example, older and more educated respondents assign a higher level of credibility, as do respondent from larger, high-income and liquidity-constrained households.

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, unlike some complex economic arguments that many consumers usually find hard to follow. 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, and the lack of any incremental credibility gains from the commitment to climate change considerations may also reflect heterogeneous views across the population related to the importance of climate risks or to the appropriate role of the ECB on climate issues. 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 on better inflation measurement and housing costs. 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 the promise is fulfilled.

The results discussed so far relate to the immediate or impact effects of our information treatments on perceived credibility as observed in September 2021. It is instructive, however, to run a similar analysis that provides insights on the persistence of the estimated effects. One should note that the effects of information provided in surveys in the context of similar RCTs, tend, in general, to dissipate rapidly in subsequent months (see, e.g., Coibion, Gorodnichenko and Weber 2022). This may reflect that economic agents are no longer attentive to the particular information and/ or blend this with other pieces of information they receive following the survey experiment.

We have collected data on the perceived credibility that the ECB will deliver price stability also in December 2021 and again 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 RCT. Thus, we use perceived credibility reported three- and six- months past our information treatments as the dependent variable in equation (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 is significant at the 10% level and the effects of the other two treatment arms are already indistinguishable from zero. Moreover, in March 2022, six months post 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, this period has been marked by rising inflationary pressures (HICP in the euro area increased from 3.4% in September to 5% in December 2021 and further to 7.4% in March 2022). Moreover, the survey in March 2022 took place shortly after the Russian invasion in Ukraine and recorded a dramatic deterioration in euro area consumers' economic outlook. Overall, these results suggest some persistence in 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. Given that these effects fade quickly for other information treatments also highlights the benefits from repeated communication efforts with the wider public if the associated credibility improvements are to be sustained.

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 equation (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 this linear probability model, reported in Table 2, suggest virtually no effects of our information treatments on the likelihood that respondents would become more informed about the ECB subsequently. 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 challenging. In view of these results, it remains an open research question how central bank messages can most

effectively reach the wider public (including the need for a pro-active communications policy, repeat interactions and accessible communication channels).

4.4 Heterogenous effects: The role of financial literacy

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 can then estimate the treatment effects on perceived credibility for each subgroup based on their correct responses to these four questions (we distinguish two, roughly equally-sized groups; the first one comprises respondents who answer three or all four questions correctly, the second one those who answer correctly at most two questions).

Results are shown in Table 3. It is apparent that the more financially literate (who already assigned a higher level of credibility to start with) 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. Hence, the perceived likelihood that the ECB will deliver price stability increases by more than 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. These estimates for T2 and T3 are statistically and economically significantly larger than the effect generated by T4. Comparing

the effects of T4 and T1 for the financially literate again confirms the baseline result that adding a reference to a future improvement in the coverage of housing costs yields no incremental credibility gain for the central bank.

In contrast, treatment effects are generally small and insignificant for the less financially literate. 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. More generally, our results point to another important benefit that investment in financial literacy can have, beyond those emphasised in extant literature, namely the credibility gains of central bank communication.¹⁰

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 new inflation target of 2% and on respondents' confidence about their medium-term point forecast.

To this end, we estimate:

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

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) serve to reduce estimation noise. The

¹⁰ 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).

estimates of interest are α_j (where $j=1..4$) and represent the (de-)anchoring effects, if any, of each of the information treatments on inflation expectations.

Results of the treatments on the likelihood of anchoring short- and medium-term inflation expectations across different survey waves from these linear models are shown in Tables 4 and 5, respectively. Communication under T2, that provides an explanation about the functioning of monetary policy under the new inflation target, increases the likelihood of anchored twelve-month and three-year ahead inflation expectations by 2.6 percentage points and by 3.5 percentage points, respectively. These effects are also economically sizeable as the fraction of those with short and medium-term inflation expectations between 1% and 3% is 17% and 22%, respectively.¹¹ T4, which refers to the plans to include housing in official inflation statistics, 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 1 ('not confident at all') to 5 ('very confident') scale. 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 linear probability model similar to (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 on increasing respondents' confidence.

¹¹ The relevant summary statistics related to the anchoring measures for inflation expectations are provided in Table 1A in the Appendix.

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. These results are qualitatively aligned with our baseline results about the beneficial role of additional explanations for credibility. However, the effects of T2 (as those of T4) on inflation expectations dissipate fast, unlike the effects of additional information 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. But the results also show that around 10% of consumers have been reached by this announcement, i.e., a non-negligible number. Many of these were reached 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 have studied the potential credibility gains from communication with the public using 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 their causal effects on credibility. Our concept of credibility measures the perceived likelihood that the central bank will deliver on its primary mandate to maintain price stability.

The results clearly show that once the central bank message reaches consumers, it can affect their perceptions about credibility in a significant manner. Consumers are more likely to believe that the ECB will deliver price stability if they receive information about the new inflation target accompanied by some background explanation of its function and monetary policy’s stabilising role. Providing explanations is particularly beneficial for those with low financial literacy and generates more persistent credibility gains, even in an environment

characterised by higher inflation. On the other hand, 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 imply additional credibility gains. To further enhance credibility, our results suggest that the central bank should not only ensure that the message will reach the wider public, but also provide some more background information about its policy and to relate the message to the current economic situation.

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Table 1: Treatment effects on perceived credibility

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

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

| | No information about the ECB received in... | | |
|-------------------------|---|-----------------------|-------------------------|
| | October 2021 | October-December 2021 | October 2021-March 2022 |
| | (1) | (2) | (3) |
| Symmetric Target | 0.024 (0.016) | 0.019 (0.017) | 0.034* (0.018) |
| Symmetric + Explanation | 0.005 (0.016) | -0.019 (0.017) | -0.007 (0.018) |
| Symmetric + Climate | 0.024 (0.016) | -0.005 (0.017) | 0.006 (0.018) |
| Symmetric + Housing | 0.007 (0.016) | -0.003 (0.017) | 0.010 (0.018) |
| Education: secondary | -0.026 (0.018) | -0.005 (0.019) | 0.021 (0.020) |
| Education: tertiary | -0.094*** (0.017) | -0.081*** (0.018) | -0.056*** (0.019) |
| Age | -0.003*** (0.000) | -0.003*** (0.000) | -0.003*** (0.000) |
| Household size | -0.006 (0.005) | -0.009* (0.005) | -0.002 (0.005) |
| log(household income) | -0.055*** (0.010) | -0.053*** (0.010) | -0.065*** (0.011) |
| Liquidity constrained | -0.050*** (0.013) | -0.041*** (0.013) | -0.016 (0.015) |
| Constant | 1.337*** (0.100) | 1.108*** (0.101) | 1.121*** (0.107) |
| Observations | 8,667 | 8,033 | 6,408 |
| R-squared | 0.052 | 0.059 | 0.057 |

Notes: The table reports regression coefficients based on equation (1). Dependent variable: responses to the question whether the respondent has received any information about the ECB over the time period preceding each survey that is indicated in the column headers. ***/**/* denote statistical significance at the 1%/5%/10% level. Numbers in brackets are standard errors.

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

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

Notes: The table reports regression coefficients based on equation (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) | December 2021 (3-months post- treatment) | March 2022 (6- months post- treatment) |
| | (1) | (2) | (3) |
| Symmetric Target | 0.009 (0.011) | 0.017 (0.013) | 0.006 (0.011) |
| Symmetric + Explanation | 0.026** (0.011) | -0.018 (0.013) | 0.014 (0.011) |
| Symmetric + Climate | 0.014 (0.011) | -0.007 (0.013) | -0.002 (0.011) |
| Symmetric + Housing | 0.023** (0.011) | 0.004 (0.013) | -0.002 (0.011) |
| Pre-treatment inflation expectations \in (1,3) | 0.243*** (0.010) | 0.255*** (0.011) | 0.089*** (0.009) |
| Education: secondary | 0.019* (0.011) | 0.019* (0.011) | -0.003 (0.012) |
| Education: tertiary | 0.019* (0.011) | 0.019* (0.011) | -0.015 (0.012) |
| Age | 0.001*** (0.000) | 0.000 (0.000) | -0.001*** (0.000) |
| Household size | -0.003 (0.003) | -0.001 (0.004) | -0.005* (0.003) |
| log(household income) | 0.006 (0.007) | 0.026*** (0.008) | -0.007 (0.007) |
| Liquidity | 0.041*** (0.008) | 0.014 (0.010) | 0.003 (0.009) |
| Constant | -0.069 (0.068) | -0.165** (0.077) | 0.206*** (0.068) |
| Observations | 10,177 | 9,001 | 6,792 |
| R-squared | 0.095 | 0.098 | 0.029 |

Notes: The table reports regression coefficients based on equation (1). Dependent variable: Likelihood that 12-month ahead inflation expectations are between 1 and 3%. ***/**/* 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

| | September 2021 (post treatment) | December 2021 (3-months post- treatment) | March 2022 (6- months post- treatment) |
|--|---------------------------------------|--|--|
| | (1) | (2) | (3) |
| Symmetric Target | 0.012 (0.012) | -0.008 (0.013) | -0.003 (0.014) |
| Symmetric + Explanation | 0.035*** (0.012) | -0.023* (0.013) | 0.011 (0.014) |
| Symmetric + Climate | 0.017 (0.012) | -0.012 (0.013) | -0.005 (0.014) |
| Symmetric + Housing | 0.030** (0.012) | -0.008 (0.013) | 0.009 (0.014) |
| Pre-treatment inflation expectations ϵ (1,3) | 0.282*** (0.011) | 0.316*** (0.011) | 0.189*** (0.012) |
| Education: secondary | 0.011 (0.012) | 0.011 (0.012) | 0.031** (0.014) |
| Education: tertiary | 0.010 (0.012) | 0.010 (0.012) | 0.023* (0.014) |
| Age | 0.000 (0.000) | 0.001*** (0.000) | 0.000 (0.000) |
| Household size | -0.004 (0.003) | -0.012*** (0.004) | -0.014*** (0.004) |
| log(household income) | 0.028*** (0.007) | 0.045*** (0.008) | 0.036*** (0.009) |
| Liquidity | 0.029*** (0.009) | 0.036*** (0.010) | 0.022** (0.010) |
| Constant | -0.204*** (0.071) | -0.377*** (0.080) | -0.243*** (0.085) |
| Observations | 10,176 | 9,001 | 6,792 |
| R-squared | 0.111 | 0.148 | 0.088 |

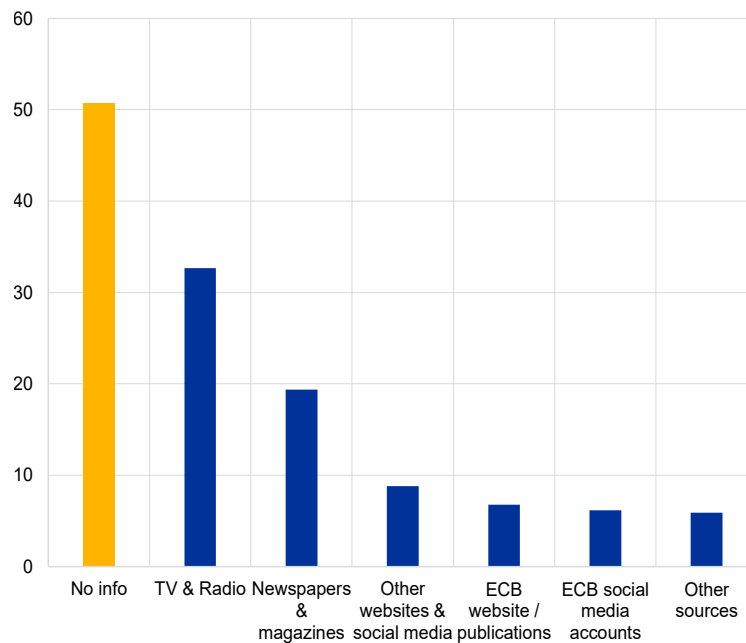
Notes: The table reports regression coefficients based on equation (1). Dependent variable: Likelihood that 3-year ahead inflation expectations are between 1 and 3%. ***/**/* denote statistical significance at the 1%/5%/10% level. Numbers in brackets are standard errors.

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

| Confident about 3-year ahead inflation forecast | |
|---|----------------------|
| Symmetric Target | -0.011 (0.011) |
| Symmetric + Explanation | 0.028** (0.012) |
| Symmetric + Climate | 0.005 (0.011) |
| Symmetric + Housing | 0.002 (0.011) |
| Education: secondary | -0.029** (0.013) |
| Education: tertiary | -0.023* (0.013) |
| Age | -0.001*** (0.000) |
| Household size | 0.016*** (0.003) |
| log(household income) | -0.006 (0.007) |
| Liquidity constrained | 0.017* (0.009) |
| Constant | 0.301*** (0.071) |
| Observations | 10,176 |
| R-squared | 0.027 |

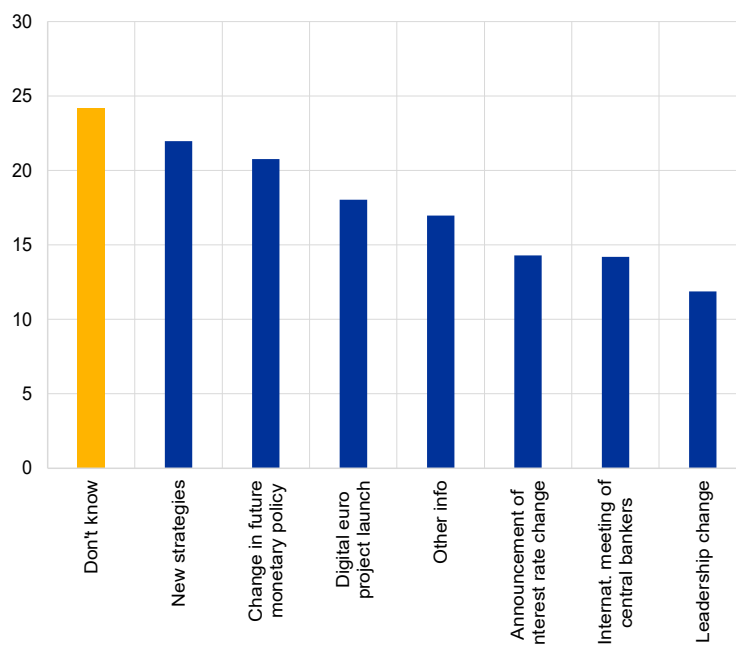
Notes: The table reports regression coefficients based on equation (1). Dependent variable: confidence about 3-year ahead inflation expectations. ***/**/* denote statistical significance at the 1%/5%/10% level. Numbers in brackets are standard errors.

Figure 1: Information about the ECB: channels



Notes: “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.

Figure 2: Information about the ECB: topics



Notes: “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.

Appendix – Table 1A. Descriptive statistics

| Variable | Mean | p25 | p50 | p75 | SD | N |
|--|--------|--------|--------|--------|--------|--------|
| Perceived ECB credibility (September 2021) | 43.3 | 21 | 47 | 60 | 25.6 | 10,142 |
| Perceived ECB credibility (December 2021) | 41.8 | 20 | 45 | 60 | 26.4 | 8,983 |
| Perceived ECB credibility (March 2022) | 41.3 | 20 | 44 | 58 | 25.7 | 6,786 |
| Education: secondary | 0.334 | 0 | 0 | 1 | 0.472 | 10,142 |
| Education: tertiary | 0.532 | 0 | 1 | 1 | 0.499 | 10,142 |
| Age | 49.6 | 36 | 50 | 62 | 16.2 | 10,142 |
| Household size | 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 | 0.728 | 0 | 1 | 1 | 0.445 | 10,142 |
| High financial literacy | 0.541 | 0 | 1 | 1 | 0.498 | 10,042 |
| Low financial literacy | 0.459 | 0 | 0 | 1 | 0.498 | 10,042 |
| No information received about the ECB (October 2021) | 0.552 | 0 | 1 | 1 | 0.497 | 8,661 |
| No information received about the ECB (October-December 2021) | 0.368 | 0 | 0 | 1 | 0.482 | 8,030 |
| No information received about the ECB (Oct. 2021-March 2022) | 0.290 | 0 | 0 | 1 | 0.454 | 6,405 |
| 12-month ahead inflation expectations € (1,3) (September 2021) | 0.174 | 0 | 0 | 0 | 0.379 | 9,470 |
| 12-month ahead inflation expectations € (1,3) (December 2021) | 0.199 | 0 | 0 | 0 | 0.399 | 8,993 |
| 12-month ahead inflation expectations € (1,3) (March 2022) | 0.091 | 0 | 0 | 0 | 0.287 | 6,786 |
| 3-year ahead inflation expectations € (1,3) (September 2021) | 0.217 | 0 | 0 | 0 | 0.412 | 9,536 |
| 3-year ahead inflation expectations € (1,3) (December 2021) | 0.237 | 0 | 0 | 0 | 0.425 | 8,993 |
| 3-year ahead inflation expectations € (1,3) (March 2022) | 0.179 | 0 | 0 | 0 | 0.383 | 6,786 |
| Confident about 3-year ahead inflation expectations | 0.167 | 0 | 0 | 0 | 0.373 | 10,142 |

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.

}

Coding:

[Numeric] – Show 2 boxes with a comma in between. Range for 1st box: 0-100 ; range for 2nd box: 0-9

Scripting instruction:

IF Q1 = 1 or Q1 = 3 display a '+' before __%

IF Q1 = 2 or Q1 = 4 display a '-' before __%

IF Q1 = 5 -> autofill with value 0

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.

} **Coding:**

[Numeric] – Show 2 boxes with a comma in between. Range for 1st box: 0-100 ; range for 2nd box: 0-9

Scripting instruction:

IF C1210 = 1 or C1210 = 3 display a ‘+’ before __%

IF C1210 = 2 or C1210 = 4 display a ‘-’ before __%

IF C1210 = 5 -> autofill with value 0

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

If Q5 != 7

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) x recruitment method (CATI/CAWI).

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 | <p>Info about 2% symmetric target only</p> <p>Screen 1: <i>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.</i></p> <p>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.</p> |

| | |
|---|--|
| C | <p>Info about 2% symmetric target plus explanation</p> <p>Screen 1: On the next screen, we provide information on some <i>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.</i> It will be shown only once and you will not be able to go back to it.</p> <p>Screen 2: The ECB aims for a 2% inflation target over the medium term <i>as the best way to maintain price stability.</i> The target is symmetric: inflation may sometimes be slightly above it or below. The ECB <i>overlooks</i> short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable.</p> <p>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%.</p> |
| D | <p>Info about 2% symmetric target plus climate considerations</p> <p>Screen 1: On the next screen, we provide information on some <i>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.</i> It will be shown only once and you will not be able to go back to it.</p> <p>Screen 2: The ECB aims for 2% inflation over the medium term <i>as the best way to maintain price stability.</i> The target is symmetric: inflation may sometimes be slightly above it or below. The ECB <i>overlooks</i> short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable.</p> <p>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.</p> |
| E | <p>Info about 2% symmetric target plus housing costs in HICP</p> <p>Screen 1: On the next screen, we provide information on some <i>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.</i> It will be shown only once and you will not be able to go back to it.</p> <p>Screen 2: The ECB aims for a 2% inflation target over the medium term <i>as the best way to maintain price stability.</i> The target is symmetric: inflation may sometimes be slightly above it or below. The ECB <i>overlooks</i> short-term deviations. Persistent negative and positive deviations are regarded as equally undesirable.</p> |

| | |
|--|--|
| | 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.

}

Coding:

[Numeric] – Show 2 boxes with a comma in between. Range for 1st box: 0-100 ; range for 2nd box: 0-9

Scripting instruction:

IF Q9 = 1 or Q9 = 3 display a '+' before ___%

IF Q9 = 2 or Q9 = 4 display a '-' before ___%

IF Q9 = 5 -> autofill with value 0

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 literacy

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? (**more than 102€**; exactly 102€; less than 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 €1,000 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?

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