

Discussion Paper

Deutsche Bundesbank
No 27/2023

Forceful or persistent: How the ECB's new inflation target affects households' inflation expectations

Mathias Hoffmann

(Deutsche Bundesbank)

Emanuel Moench

(Frankfurt School of Finance & Management
and CEPR)

Lora Pavlova

(Deutsche Bundesbank and
Karlsruhe Institute of Technology)

Guido Schulte frankenfeld

(Deutsche Bundesbank)

Editorial Board:

Daniel Foos
Stephan Jank
Thomas Kick
Martin Kliem
Malte Knüppel
Christoph Memmel
Hannah Paule-Paludkiewicz

Deutsche Bundesbank, Wilhelm-Epstein-Straße 14, 60431 Frankfurt am Main,
Postfach 10 06 02, 60006 Frankfurt am Main

Tel +49 69 9566-0

Please address all orders in writing to: Deutsche Bundesbank,
Press and Public Relations Division, at the above address or via fax +49 69 9566-3077

Internet <http://www.bundesbank.de>

Reproduction permitted only if source is stated.

ISBN 978-3-95729-958-1

ISSN 2941-7503

Non-technical summary

Research Question

The European Central Bank (ECB) has updated its monetary policy strategy. Under its new strategy, the ECB now describes price stability as best maintained by aiming for a symmetric 2% inflation target over the medium term, with positive and negative deviations from the target being equally undesirable. In addition, the ECB explicitly noted that to account for the zero lower bound and its implications, it requires especially forceful or persistent monetary policy action to avoid negative deviations from the inflation target becoming entrenched. This may also imply a transitory period in which inflation is moderately above target. We attempt to answer the question, how households adjust their medium-term inflation expectations under the new ECB strategy.

Contribution

We identify the effects of the new aspects of the revised strategy on households' medium-term inflation expectations. Thereby, a central part of our analysis focuses on the overshooting clause, which explicitly states that the ECB would tolerate above-target rates of inflation under certain conditions. Based on a randomized information provision experiment, embedded in the Bundesbank Online Panel Households (BOP-HH), we induce exogenous variation in households' expectations. We elicit their probabilistic medium-term inflation expectations and compare them to those made under the assumption that the ECB followed its previous strategy.

Results

We find that survey respondents make little difference between the previous strategy of targeting inflation rates close to but below 2% and the new strategy with a symmetric 2% target. Yet, participants informed that the ECB might tolerate rates exceeding the target for some time, expect somewhat higher medium-term inflation. Respondents asked to assume inflation currently running below target place a significantly higher probability on outcomes above 2% in the medium term. Participants do not expect an undershooting when inflation is currently running above target. Higher levels of trust in the ECB and knowledge about the new strategy prior to the survey amplify these effects.

Nichttechnische Zusammenfassung

Fragestellung

Die Europäische Zentralbank (EZB) hat ihre geldpolitische Strategie aktualisiert. Der neuen Strategie zufolge kann Preisstabilität am besten gewährleistet werden, wenn mittelfristig ein symmetrisches Inflationsziel von 2% angestrebt wird. Dabei sind negative Abweichungen von diesem Zielwert ebenso unerwünscht wie positive. Darüber hinaus hat die EZB explizit festgehalten, dass in Anbetracht der Nullzinsgrenze und deren Implikationen besonders kraftvolle oder langanhaltende geldpolitische Maßnahmen nötig sind, um zu verhindern, dass sich negative Abweichungen vom Inflationsziel verfestigen. Dies geht unter Umständen damit einher, dass die Inflation vorübergehend moderat über dem Zielwert liegt. Wir gehen der Frage nach, wie die privaten Haushalte ihre mittelfristigen Inflationserwartungen an die neue EZB-Strategie anpassen.

Beitrag

Wir analysieren die Auswirkungen der neuen Strategieaspekte auf die mittelfristigen Inflationserwartungen der privaten Haushalte. Ein wesentlicher Teil der Analyse konzentriert sich dabei auf die Formulierung der EZB zum Überschießen der Inflationsrate, wonach eine über dem Zielwert liegende Inflation unter bestimmten Bedingungen hinnehmbar sei. Auf der Grundlage eines randomisierten Informationsexperimentes im Rahmen des Bundesbank Online Panel – Haushalte (BOP-HH), werden exogene Veränderungen der Erwartungen der privaten Haushalte induziert. Wir ermitteln die probalistischen mittelfristigen Inflationserwartungen der Haushalte und vergleichen sie mit den Inflationserwartungen unter der Annahme einer Beibehaltung der vorherigen EZB-Strategie.

Ergebnisse

Aus der Analyse geht hervor, dass es für die Umfrageteilnehmer keinen großen Unterschied macht, ob die zuvor gültige Strategie (Inflationsziel von nahe, aber unter 2%) oder die neue Strategie (symmetrisches 2%-Ziel) Anwendung findet. Haushalte, die darüber informiert sind, dass die EZB es möglicherweise tolerieren würde, wenn die Inflation eine Zeit lang über dem Zielwert liegt, erwarten allerdings auf mittlere Sicht etwas höhere Inflationsraten. Wenn die Befragten die Annahme voraussetzen, dass die aktuelle Inflation unterhalb des Zielwerts liegt, messen sie Teuerungsraten von mehr als 2% auf mittlere Sicht eine wesentlich höhere Wahrscheinlichkeit bei. Unter der Annahme, dass die Inflation aktuell oberhalb des Zielwerts liegt, rechnen die Teilnehmer nicht mit einer Unterschreitung des Inflationsziels. Bei Teilnehmern, die ein höheres Vertrauen in die EZB haben bzw. denen die neue Strategie bereits vor der Befragung bekannt ist, fallen diese Effekte stärker aus.

Forceful or Persistent: How the ECB's New Inflation Target Affects Households' Inflation Expectations*

Mathias Hoffmann
Deutsche Bundesbank

Emanuel Moench
Frankfurt School of Finance & Management, CEPR

Lora Pavlova
Deutsche Bundesbank, Karlsruhe Institute of Technology

Guido Schulte Frankenfeld
Deutsche Bundesbank

Abstract

We study how households adjust their medium-term inflation expectations under the new ECB strategy. We find that survey respondents make little difference between the previous strategy of targeting inflation rates close to but below 2% and the new strategy with a symmetric 2% target. Yet, participants informed that the ECB might tolerate rates exceeding the target for some time, expect somewhat higher medium-term inflation. Respondents asked to assume inflation currently running below target place a significantly higher probability on outcomes above 2% in the medium term. Participants do not expect an undershooting when inflation is currently running above target.

Keywords: Monetary Policy Strategy, Household Inflation Expectations, Randomized Control Trial, Survey Data.

JEL classification: F33, E31, E32.

*Contact address: Deutsche Bundesbank Research Centre, Mainzer Landstr. 46, D-60325 Frankfurt am Main, Germany. Corresponding author: Mathias Hoffmann; email: mathias.hoffmann@bundesbank.de. The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Deutsche Bundesbank or the Eurosystem. Lora Pavlova gratefully acknowledges the financial support received from the German Science Foundation (DFG) under grant KR5214/1-1.

1 Introduction

Two major central banks, the US Federal Reserve (Fed) and the European Central Bank (ECB) have updated their monetary policy strategies in recent years. In August 2020, the Fed introduced flexible average inflation targeting (AIT), aiming at inflation averaging 2% over the medium term. In addition, it embedded an asymmetry. Under its new strategy, the Fed intends to make up for past misses by letting inflation temporarily overshoot the target after it has previously been running below target for some time. After an extensive review, in July 2021 the Governing Council of the European Central Bank (ECB) announced its new monetary policy strategy. While it had previously considered medium-term inflation of close to but below 2% in accordance with its primary objective, it now describes price stability as best maintained [...] *by aiming for a symmetric 2% inflation target over the medium term, with positive and negative deviations from the target being equally undesirable*. In addition, the ECB explicitly noted that to account for the effective lower bound and its implications, it [...] *requires especially forceful or persistent monetary policy action to avoid negative deviations from the inflation target becoming entrenched. This may also imply a transitory period in which inflation is moderately above target*.¹ Hence, the possibility of inflation overshooting the target is embedded in both strategies, albeit in an arguably somewhat more nuanced way in the case of the ECB.

Given the new strategic element of potential inflation overshooting, policymakers seek to understand whether and how the public's inflation expectations will respond to the introduction of the new monetary policy strategies. It is of particular interest whether households incorporate the asymmetry inherent in the strategies into their inflation expectations. Only if economic agents understand this asymmetry and form their expectations accordingly, can the new strategies unfold their desired potential to act as an automatic stabilizer by raising inflation expectations and lowering real rate expectations in times when the effective lower bound is binding. Indeed, in its statement the ECB particularly emphasized the importance of communicating the strategy and its aspects toward the wider public to ensure its [...] *understanding of and trust in the actions of the ECB*.²

In this paper, we study how households adjust their medium-term inflation expectations under the ECB's new monetary policy strategy. A central part of our analysis focuses on the overshooting clause, which explicitly states that the ECB would tolerate

¹See the ECB's press release of 8 July 2021 on the occasion of the introduction of the new monetary policy strategy at <https://www.ecb.europa.eu/press/pr/date/2021/html/ecb.pr210708-dc78cc4b0d.en.html>. Further strategic details are provided in the 'monetary policy strategy statement' of the ECB at https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview_monpol_strategy_statement.en.html.

²See paragraph 11 of the ECB's monetary policy strategy statement available at https://www.ecb.europa.eu/home/search/review/html/ecb.strategyreview_monpol_strategy_statement.en.html.

above-target rates of inflation under certain conditions. We identify the effects of the new aspects of the revised strategy on households' medium-term inflation expectations using a randomized information provision experiment embedded in the Bundesbank Online Panel Households (BOP-HH). Our experimental setup is as follows. We first inform all survey participants of the change in the ECB's monetary policy strategy in simple terms, without any mentioning of the potential asymmetry. We then ask them to assume that the previous 'close-to-but-below-2%' strategy is still in place and elicit their probabilistic expectations about medium-term inflation. In the next step, we randomly assign households to several groups which we provide with different pieces of information about the new strategy. While some groups receive a short text about the symmetric inflation target that does not explicitly mention the overshooting clause, others are given a longer passage from the ECB's statement that explains the mechanism of and conditions for a potential overshooting.

We induce exogenous variation in expectations by asking some groups to assume that inflation will average 1% and others that inflation will average 3% over the next twelve months. Next, we again elicit respondents' probabilistic medium-term inflation expectations and compare them to those made under the assumption that the ECB followed its previous strategy. We find that households asked to assume the previous 'close to but below 2%' strategy do not expect inflation to be significantly different than rates expected under the new 'symmetric 2%' strategy. However, participants informed that the ECB might for some time tolerate rates exceeding the target do expect somewhat higher medium-term inflation. In particular respondents who are asked to assume that inflation is currently running below target place a higher probability on outcomes above 2% in the medium term.

Higher levels of trust in the ECB and knowledge about the new strategy prior to the survey amplify these effects. Our results thus show that households who are explicitly informed about the new ECB strategy and, in particular, about the embedded asymmetry, incorporate this information into their inflation expectations. Despite the observed shift in expected inflation, we do not find evidence that individuals' quantitative inflation expectations have a significant bearing on their reported consumption plans.

Our paper contributes to a growing strand of literature that seeks to understand the effects of monetary policy communication on households' inflation expectations. Despite its importance for monetary policy effectiveness, however, only a few papers have studied how households perceive central bank communication about changes in monetary policy strategies so far. [Coibion et al. \(2021\)](#) document that US households significantly *lower* their inflation expectations when learning about AIT and, hence, do not fully incorporate the new strategy into their expectation formation process. For Germany, [Hoffmann et al.](#)

(2022) provide evidence that households significantly *raise* their inflation expectations when provided with information about a hypothetical new ECB strategy akin to AIT. This is particularly true for individuals with higher levels of trust in the ECB to deliver on its price stability mandate. Households with low trust instead tend to reduce their inflation expectations, in line with the US evidence.

Trust in the central bank thus affects the extent to which households adjust their expectations in response to information about monetary policy. However, central bank communication about its strategy can also be used to shape the public’s trust. [Ehrmann et al. \(2023\)](#) show that providing households with information about the inflation target increases the perceived credibility of the central bank. Using data from a representative panel of Dutch households, [Galati et al. \(2022\)](#) report that median long-term inflation expectations are largely unaffected by the introduction of the ECB’s new target. Instead, Dutch survey participants respond strongly to hikes in realized inflation since October 2021. However, this effect seems to be less pronounced among respondents who are informed about the ECB’s new strategy. In laboratory experiments, [Petersen et al. \(2022\)](#) find that participants consider rate-targeting regimes such as IT or AIT to deliver more stable economic outcomes than price-level targeting. To summarize, relative to the extant literature our paper documents that households understand the new ECB monetary policy strategy and incorporate the embedded asymmetry in their medium-term inflation expectations.

The remainder of the paper is organized as follows. Section 2 explains the experimental design. Section 3 presents our main results based on the reported inflation expectations before and after the information treatments. Section 4 concludes.

2 Data and Experimental Design

In this section, we describe our data and experimental design. In Section 2.1, we provide information about the Bundesbank Online Panel Households and describe the randomized control trial that we conduct as part of this survey. We explain the differences between the individual information treatments and the elicitation of probabilistic inflation expectations in Section 2.2. Furthermore, we provide details of additional questions about knowledge of the new strategy and trust in the ECB in Section 2.3.

2.1 Data

Our survey experiment was performed within the Bundesbank Online Panel Households (BOP-HH). BOP-HH is conducted at a monthly frequency to elicit consumer expectations

about both macroeconomic and household-specific outcomes. We apply survey weighting to the sample data, such that our results are representative for the German online population age 16 and above.³ The BOP-HH contains a core set of general interest questions and typically includes a set of additional questions to investigate specific policy-relevant topics.

We used the BOP-HH Waves 20 and 22 from August and October 2021, respectively, to implement randomized control trials (RCTs) among a total of 7,500 respondents. There are two distinct advantages of these two waves. The August wave (Wave 20) with a nominal sample size of 2,500 respondents enables us to survey households' inflation expectations immediately after the introduction of the ECB's new strategy in July 2021. In turn, the October 2021 wave with a sample size of 5,000 respondents allowed for a richer experimental setup. Appendix A.1 provides a detailed description of the questions included in both waves.⁴

2.2 Information provision experiment

Our experimental setup relies on a simple three-step procedure. First, all participants are shown a short introductory text about the ECB's change of strategy from the previous 'close to but below 2%' to the new 'symmetric 2%' target definition. In what follows, we refer to these strategies as 'IT then' and 'IT now'.

The European Central Bank (ECB) has adopted a new monetary policy strategy. As before, the primary objective of the ECB is to maintain price stability.

The ECB **previously** considered this target to be achieved if the annual rate of inflation was **close to but below 2%** over the medium run.

It now considers that price stability is best maintained by aiming for a **2% inflation target over the medium term**. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable.

Next, we elicit households' probabilistic inflation expectations under the assumption that the former ECB strategy is still in place. To match the horizon over which the ECB seeks to stabilize inflation, we survey inflation expectations for the medium term. Specifically, respondents are asked to assign probabilities that inflation two to three years ahead will fall into the four intervals shown in Table 1. In the online survey design, we enforce that the responses sum up to 100%.

As participants face multiple questions on inflation expectations and to prevent survey fatigue, we depart from the standard response scale used in many probabilistic expecta-

³A more detailed overview of the sample composition is provided in Table 5 in the Appendix.

⁴The original questionnaires in German and their English translations are also provided online at <https://www.bundesbank.de/en/bundesbank/research/survey-on-consumer-expectations/>.

Table 1: Randomized Control Trial Setup

Stage 1	<p>Infobox for all participants:</p> <p>The European Central Bank (ECB) has adopted a new monetary policy strategy. As before, the primary objective of the ECB is to maintain price stability.</p> <p>The ECB previously considered this target to be achieved if the annual rate of inflation was below but close to 2% in the medium term.</p> <p>It now considers that price stability is best maintained by aiming for a 2% inflation target over the medium term. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable.</p>
Stage 2	<p>All participants — assuming ECB is continuing to pursue ‘close to but below 2%’ — are asked to assign probabilities for inflation 2-3 years ahead being</p> <p>... less or equal than 1% ... greater than 1%, but at most 2% ... greater than 2%, but at most 3% ... greater than 3%</p> <p>such that they sum up to 100%</p>
Stage 3	<p>Participants are randomly sampled into one of eight subgroups, facing different assumptions about monetary policy and current inflation. Then, participants are asked again to assign probabilities to bins shown in Stage 2:</p> <p>‘IT now’ — ECB’s new strategy, incomplete information ‘IT now full’ — ECB’s new strategy, full information w.r.t. to overshooting</p> <p>ECB’s previous strategy, current inflation at 1% ECB’s new strategy, incomplete information, current inflation at 1% ECB’s new strategy, full information w.r.t. to overshooting, current inflation at 1%</p> <p>ECB’s previous strategy, current inflation at 3% ECB’s new strategy, incomplete information, current inflation at 3% ECB’s new strategy, full information w.r.t. to overshooting, current inflation at 3%</p>

tions questions (Armantier et al., 2017). Instead, we define intervals narrowly around 2%, since we are primarily interested in the re-distribution of probability mass above and below the target in response to our information treatments. Furthermore, in contrast to common practice, we explicitly define that the inflation target of 2% falls into the second interval provided to the participants.⁵

One might be worried that our choice of response scale biases reported inflation expectations towards the ECB target rate of 2%. We present several arguments alleviating such a concern. First, compared to the probabilistic question about one-year ahead inflation

⁵The standard response scale, used e.g. in Armantier et al. (2017), asks respondents for their expectation that inflation falls ‘between 0% and 2%’ or ‘between 2% and 4%’, such that it is unclear which bin contains the 2% inflation target.

in the core module of BOP-HH, respondents assign essentially the same probabilities of inflation exceeding the target (21% against 22% in the core, see Figure 8 in Appendix A.2). The differences in the probabilities assigned to inflation above 3% are somewhat lower (35% against 60% in the core). However, it is important to keep in mind that the forecast horizon is two to three years in our RCT module while it is 12 months in the core module of the survey, making it difficult to compare these distributions. Commonly, subjective inflation distributions at medium- and longer-term horizons are somewhat more concentrated around the target rate than short-term forecasts are.⁶

We seek to investigate potential differences in inflation expectations arising from the change of the ECB’s inflation target from ‘close to but below 2%’ to ‘symmetric 2%’. Another important dimension of our analysis is to assess the effect of the embedded tolerance for inflation rates at above-target levels as one of the key new features of the revised ECB strategy. We therefore randomize the information provided in Stage 3 in the following way. One group obtains ‘incomplete’ information (labeled ‘IT now’), in the sense that it does not mention the overshooting clause, but only the symmetry property of the target as in the introductory text. Another group of respondents instead receives the unabridged, fully detailed description complemented by the overshooting clause (labeled ‘IT now full’), as follows:

This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. To avoid negative deviations from the inflation target becoming entrenched, it may be necessary to implement especially forceful or persistent monetary policy action. This may also imply a transitory period in which inflation is moderately above target.

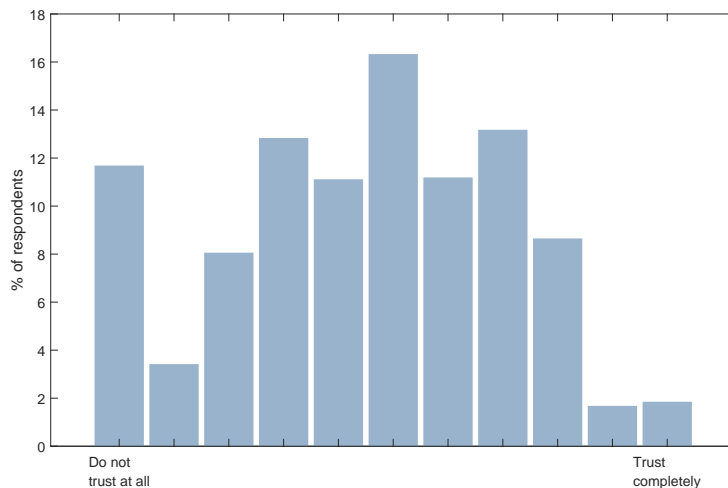
To maximize statistical power and increase the estimation precision of the treatment effects (Clifford et al., 2021), we omit the inclusion of a control group. As we are interested in comparing how expectations differ across the previous and the new ECB strategy in different inflation environments, the remaining six information treatments summarized in Table 1 combine variations in the monetary policy strategy – previous and new, with and without overshooting – with different assumptions about near-term inflation. Specifically, three groups are asked to assume that inflation averages 1% in the next twelve months and thus currently runs below target. Analogously, to assess the adjustment of inflation expectations from above the target, we implement another three splits with a corresponding 3% assumption. Participants in each group are asked again to assign probabilities in the four-bin histogram format described above. Appendix A.1 provides the exact order formulation of the questions in the RCT. In either treatment, we use neutral framing to

⁶This is also the case in the FRBNY Survey of Consumer Expectations, see <https://www.newyorkfed.org/microeconomics/sce#/probinflout-1>.

reduce potential experimenter demand effects (Haaland et al., 2023).

2.3 Additional questions

Figure 1: Trust in the ECB’s ability to deliver on its mandate of price stability.

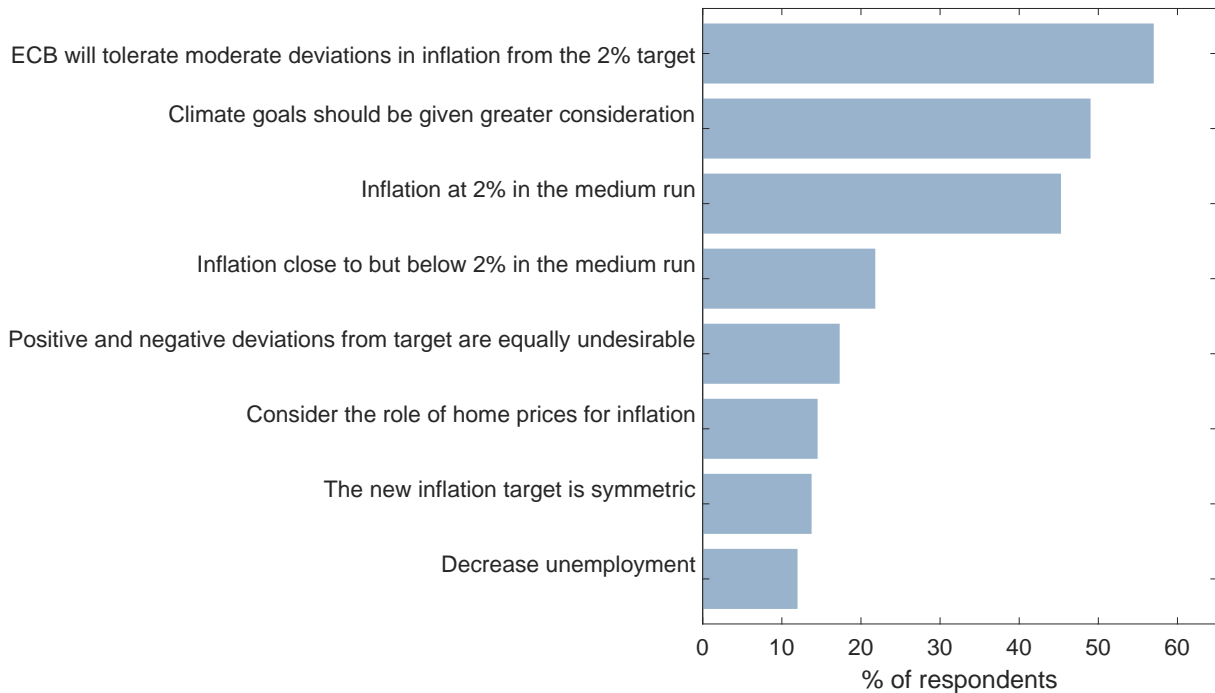


Notes: Respondents can indicate their trust in the ECB’s ability to achieve price stability on a scale from 0, meaning ‘no trust’, to 10, ‘trust completely’.

In addition to the experimental setup described above, the survey questionnaire included a few questions related to the ECB and its new strategy. In particular, prior to the information provision, we asked about trust in the ECB to deliver price stability on a zero-to-ten scale. The distribution of the trust values is shown in Figure 1. While there is a sizable share of roughly 11% of respondents who report not to have trust at all, the vast majority reports intermediate to high trust values, with the distribution’s mode at 5 and a mean of 4.40. In Section 3.3, we make use of these responses by analyzing the role of trust in participants’ adjustment of inflation expectations to the information treatment.

Furthermore, we included a binary question prior to the information experiment asking whether respondents were aware that the ECB had introduced a new strategy. About 30% replied affirmatively to this question. This fraction is roughly comparable to the one reported in Ehrmann et al. (2023) using data from the September 2021 wave of the CES, where 22% of the participants state they have heard news about the ECB’s new strategy. Those individuals who answered positively then received a follow-up question on what specifically they might have heard. We offered a choice of six aspects associated with the new strategy, one with the previous strategy, and one not part of the mandate at all. As shown in Figure 2, nearly 60% of the respondents selected ‘ECB will tolerate moderate deviations of inflation from the 2% target’. Almost half of the survey participants, or approximately 15% of the entire sample, correctly selected the new ECB target of “2% in

Figure 2: Knowledge about the ECB’s new monetary policy strategy.



Notes: Respondents who reported they have heard about the change in strategy are asked what they know about it. Participants are presented with the selected options, whereby the order of the options is varied randomly for each one. Participants could choose multiple options, therefore the percentages reported on the x-axis do not add up to one.

the medium run”. Again, this fraction is similar to the numbers [Ehrmann et al. \(2023\)](#) report for six euro area countries. Bringing down unemployment, which is not an explicit element of the new strategy, is mentioned the least often. Yet, the previous inflation target of ‘close to but below 2%’ still resonates with German households, being selected by about 20% of survey participants.

3 Results

This section presents our empirical results. We first assess the response of households to the introduction of the new strategy in Section 3.1. We then quantify the treatment effects based on mean inflation expectations derived from the individual probabilistic assessments in Section 3.2. Finally, we assess the role of trust in the ECB for the sign and magnitude of the observed responses in Section 3.3.

3.1 Probabilistic assessments of medium-term inflation

Figure 3 shows the distribution of expected medium-term inflation across survey participants in October 2021. The blue bars (‘IT then’) represent the average implied probabil-

ities of all participants at Stage 2 of the RCT, i.e. the prior inflation expectation under the previous monetary regime. The red ('IT now') and the green ('IT now full') bars, in turn, refer to the inflation expectations in Stage 3 of the RCT for the two groups being provided information about the new strategy with different degrees of detail but without further assumptions about near-term inflation.

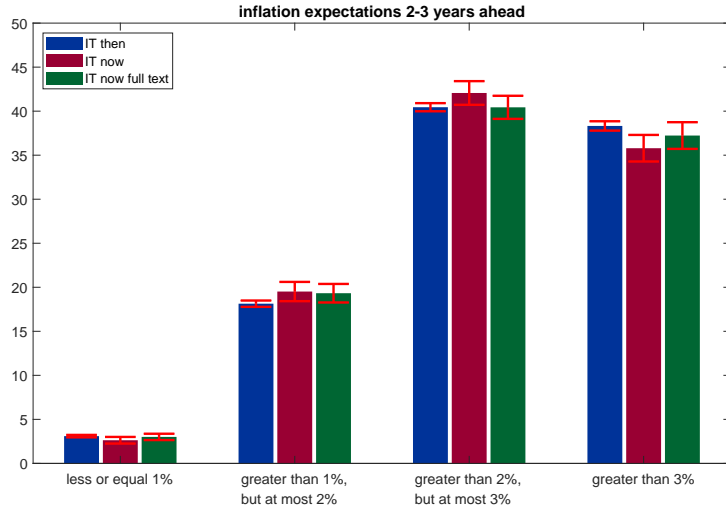
About three-quarters of the probability mass is attributed to inflation rates above the ECB's target of 2%. This is consistent with actual inflation rates as well as perceived past-year inflation rates having sharply increased throughout 2021 after multiple years of below-target inflation. Comparing the blue ('IT then') to the red ('IT now') bars in the figure, it appears that respondents make little difference between the previous 'close to but below 2%' strategy and the new 'symmetric 2%' strategy. Even those respondents provided with the unabridged description of the new strategy ('IT now full') show only small differences with respect to the other groups. Hence, we find that *unconditionally*, there is little difference between inflation expectations formed under the former and the new strategy, independent of the detail with which the new strategy is communicated.⁷

The symmetry of the inflation target is a key pillar of the new ECB strategy. That said, the central bank also emphasized in its communication an important novel aspect. Specifically, in situations when inflation has been running *below* the target for a prolonged period of time, the ECB announced to now exhibit a tolerance for inflation *overshooting* the 2% target for some time thereafter, but not vice versa. Hence, the response of medium-term expectations to the information treatment should depend on the level of near-term inflation expectations relative to the target. To assess the effect of this clause, we thus compare the reported expected inflation across groups of respondents being provided with different assumptions about inflation over the next twelve months. We start by investigating how the strategies fare in times of below-target inflation. To do so, we ask respondents to assume that inflation over the next twelve months would be at 1%.

Figure 4 plots the average subjective probabilities for the three groups of participants provided with the 1% assumption as 'IT then 1%' (blue bars), 'IT now 1%' (red), and 'IT now full 1%' (green). Compared to Figure 3, under 'IT then 1%', more probability mass is allocated to inflation between 1% and 2%, and the mass is centered more closely around

⁷This result may be interpreted as in line with a strategic shift in the ECB's communication stance prior to the strategic review. In fact, former ECB president Mario Draghi already interpreted the inflation aim of the price stability mandate as a symmetric point target back in 2019. He stated, for instance, 'Of course, we remain fully committed to return inflation to 2% [...] Our inflation aim doesn't imply a ceiling at 2%; inflation can deviate from our objective in both directions, so long as the path of inflation converges to our medium-term objective.', see the ECB's press conference of 10 April 2019 at <https://www.ecb.europa.eu/press/pressconf/2019/html/ecb.is190410~c27197866f.en.html> Further, Draghi said '[...] the conviction that we should pursue our objective in a symmetric fashion was also expressed', see the ECB's press conference of 6 June 2019 at <https://www.ecb.europa.eu/press/pressconf/2019/html/ecb.is190606~32b6221806.en.html>.

Figure 3: Unconditional distributions of medium-term (2-3Y) inflation expectations.



Notes: Blue bars show the average subjective probabilities (ASP) of medium-term inflation from respondents assuming the previous ECB monetary policy strategy of ‘close to but below 2%’ (treatment ‘IT then’) is still in place. Red bars show ASP collected from respondents assuming the new ECB monetary policy strategy of ‘symmetric 2%’ (treatment ‘IT now’), having received only abridged information about the strategy. Green bars represent the ASP for respondents who have received the full text of the ECB statement (‘IT now full’). A two-standard error band is plotted in red.

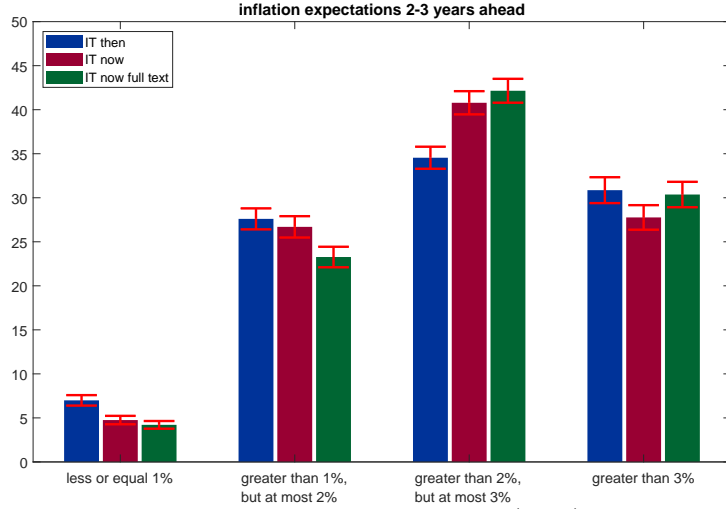
the inflation target. The probabilities in bins covering outcomes above 3% are lower than in the unconditional treatments (i.e. without the 1% near-term inflation assumption) in either regime. Most importantly, households given the unabridged treatment text consider it significantly more likely that following a period of inflation *below* the target, the rate of price change will be moderately *above* target in the medium term. This is shown by a marked increase in the probability in the bin for inflation between 2% and 3%. The decline in probability in the fourth bin (compared to Figure 3) implies that survey participants do not expect inflation to substantially overshoot the target.

When comparing distributions under the previous and the new ECB strategy, we observe that the differences are statistically significant at the 1% level independent of whether respondents received the abridged or unabridged version of the statement. Set in a low inflation environment, households seem to recognize the key differences between the previous ‘close to but below 2%’ and the ‘symmetric 2%’ regime, and expect inflation to moderately overshoot the target under the full new monetary policy strategy.

We next assess whether households interpret the new strategy aspect of potential overshooting as asymmetric or not. Specifically, we ask three other groups of respondents to assume that inflation over the next twelve months would be at 3%.

Figure 5 shows the implied distributions of expected inflation for the three different treatment arms, which we label ‘IT then 3%’ (blue bars), ‘IT now 3%’ (red) and ‘IT now full 3%’ (green). Clearly, when asked to assume above-target inflation in the short term,

Figure 4: Distributions of medium-term (2-3Y) inflation expectations, conditioned on current inflation being at 1%.

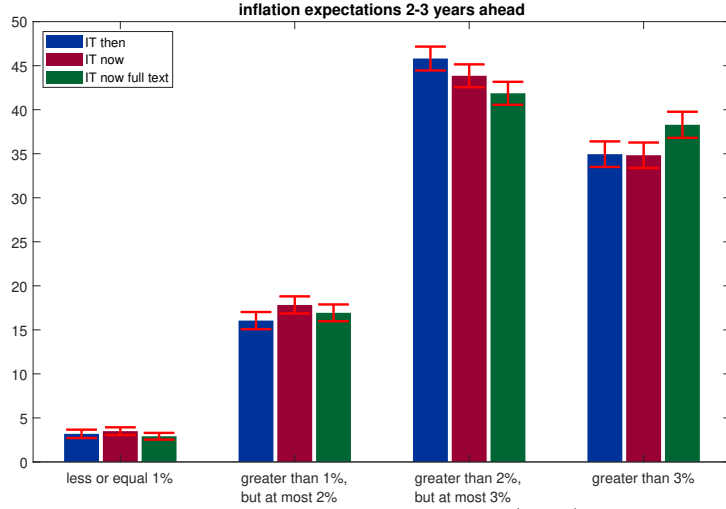


Notes: Blue bars show the average subjective probabilities (ASP) of medium-term inflation from respondents assuming the previous ECB monetary policy strategy of ‘close to but below 2%’ (treatment ‘IT then’) is still in place. Red bars show ASP collected from respondents assuming the new ECB monetary policy strategy of ‘symmetric 2%’ (treatment ‘IT now’), having received only abridged information about the strategy. Green bars represent the ASP for respondents who received the full text of the ECB statement (‘IT now full’). A two-standard error band is plotted in red.

households do not perceive the previous and the new strategy differently. Respondents in all three treatment arms assign about equal mass to inflation outcomes below the 2% target. The same is true for inflation outcomes above the target, although respondents that are given the unabridged text attribute somewhat more mass to inflation outcomes above 3%. This could indicate that households perceive a somewhat reduced urgency of the central bank to bring inflation back to the target under the new strategy. In any case, households clearly interpret the *forceful and persistent* clause of the new strategy as asymmetric: they expect overshooting of inflation after a period of below-target inflation, but do not expect an undershooting of inflation after above-target inflation.

In a nutshell, we observe that the new strategy appears capable of generating higher inflation expectations than the previous one in a low inflation environment. However, this is primarily due to the overshooting clause. That said, households perceive the new strategy as implying only a moderate overshooting above the 2% target, and assign less mass to inflation above 3% in the medium term. In contrast, we do not find evidence of households’ inflation expectations undershooting the target following a period of above-target inflation. In sum, households appear to form expectations qualitatively in line with the ECB’s intended communication.

Figure 5: Distributions of medium-term (2-3Y) inflation expectations, conditioned on current inflation being at 3%.



Notes: Blue bars show the average subjective probabilities (ASP) of medium-term inflation from respondents assuming the previous ECB monetary policy strategy of ‘close to but below 2%’ (treatment ‘IT then’) is still in place. Red bars show ASP collected from respondents assuming the new ECB monetary policy strategy of ‘symmetric 2%’ (treatment ‘IT now’), having received only abridged information about the strategy. Green bars represent the ASP for respondents who received the full text of the ECB statement (‘IT now full’) A two standard error band is plotted in red.

3.2 Regression-based analysis of mean inflation expectations

So far we have studied the average reported probabilities that reflect the distribution of expected inflation aggregated across individuals. While it is important for the ECB to be able to exercise command on inflation in all regions of the distribution, it is key for an inflation-targeting central bank that individuals’ expectations are close to the target on average. Therefore, in this section, we focus on households’ mean inflation expectations derived from the reported histograms as explained in Section 2.2.

We obtain these individuals means as the first moment from a flexible distribution fitted to the respondents’ individual histograms, broadly following Engelberg et al. (2009). A more detailed description of the procedure and the underlying assumptions, as well as the resulting distribution, is provided in Appendix A.4 and Figure 9 in Appendix A.2, respectively. Arguably, the resulting values for mean expected inflation could be influenced by our choice of response scale discussed in Section 2.2. The fact that our response scale does not allow to differentiate between inflation outcomes somewhat above and strongly above 3%, might bias the derived distribution of mean inflation expectations towards the target. As such, our results can be viewed as conservative estimates of the reaction of household expectations under the different monetary strategies.

We measure expectations twice, before and after providing participants with informa-

tion. Thus the mean expected inflation of each individual before ($t = 0$) and after ($t = 1$) the treatment can be expressed as

$$t = 0 : \text{mean}_{i,0} = \alpha_i + \beta \mathbb{X}_i + \varepsilon_{i,0}, \quad (1)$$

$$t = 1 : \text{mean}_{i,1}^s = \alpha_i + \beta \mathbb{X}_i + \delta_s d_{s,i} + \varepsilon_{i,1}. \quad (2)$$

To identify the treatment effects, we employ a simple econometric set-up where we subtract Equation 1 from Equation 2 and regress the difference between prior and posterior expectations on a set of dummy variables $d_{s,i}$. These indicate into which treatment arm s respondent i was randomly sampled. The resulting equation is as follows:

$$\text{mean}_i^{s,1} - \text{mean}_{i,0} = \delta_s d_{s,i} + u_i, \quad (3)$$

with $u_i = \varepsilon_{i,1} - \varepsilon_{i,0}$. Estimates of the coefficient δ_s correspond to the causal effect of information treatment s . The eight treatment arms s are labeled IT then 1%, IT then 3%, IT now, IT now 1%, IT now 3%, IT now full, IT now full 1%, and IT now full 3%. Throughout the analysis, we use [Huber \(1981\)](#) weighted regressions to account for potential outliers in the data, and show robustness with respect to using OLS with trimmed data. Furthermore, we control for various socio-demographic characteristics such as age, income, education, or marital status to account for potential heterogeneity of the treatment effects.

Our main objective is to compare inflation expectations under the different strategies shown to the survey participants. Hence, we are interested in the relative differences between coefficients δ_s . [Table 2](#) provides estimates of these differences as well as the p -values of the corresponding F test statistics. Considering the responses of all survey participants in [Column \(1\)](#), we find our results from the aggregate distribution confirmed. Households tend to make little difference between the two strategies unless they are informed about the overshooting clause. These findings are in line with [Galati et al. \(2022\)](#) who show that median long-term inflation expectations of Dutch households remain unchanged immediately after the introduction of the new target in August 2021. In our sample, the difference in mean expectations of seven basis points between ‘IT now full’ and ‘IT then’ is rather small in magnitude, but nonetheless statistically significant.

However, when considering the treatment in the context of a low inflation environment, the information about potential overshooting becomes more important for households’ expectation formation. This is reflected by the difference of eight basis points between ‘IT now full 1%’ and ‘IT then 1%’, and a difference of ten basis points between ‘IT now full 1%’ and ‘IT now 1%’, which are both statistically significant. In contrast, the results in [Table 2](#) show that respondents perceive no significant difference between the previous

Table 2: Baseline regression results for BOP-HH Wave 22 October 2021

	<i>Dependent variable: $mean_i^s - mean_i^{ITthen}$</i>						
	(1a)	(1b)	(2)	(3)	(4)	(5)	(6)
IT now - IT then	0.04	-0.03	-0.08	-0.03	-0.10	0.07	-0.05
IT now full - IT then	0.07*	0.03	0.01	-0.05	-0.22	0.10**	0.09
IT now full - IT now	0.03	0.06**	0.09	-0.02	-0.12	0.03	0.14
IT now 1% - IT then 1%	-0.02	0.03	-0.06	-0.06	-0.09	-0.01	-0.09
IT now full 1% - IT then 1%	0.08*	0.13**	0.17**	0.05	0.17*	0.09*	0.15**
IT now full 1% - IT now 1%	0.10**	0.10**	0.23**	0.11*	0.26**	0.10*	0.24**
IT now 3% - IT then 3%	0.00	0.03	0.03	-0.03	-0.04	0.01	0.05
IT now full 3% - IT then 3%	0.03	0.05	0.08	-0.01	-0.10	0.04	0.07
IT now full 3% - IT now 3%	0.03	0.05	0.05	0.02	-0.06	0.03	0.02
Observations	4859	4761	2860	1529	900	3297	1943
Trimmed sample		X					
Adjusters			X		X		X
Aware of new ECB strategy				‘Yes’	‘Yes’	‘No’	‘No’

Notes: Asterisks ***, **, and * denote statistically significant differences at the 1, 5, and 10% levels. Survey weights are applied to ensure the representativeness of the sample. To account for the presence of outliers, we use Huber (1981) weighted regressions except in Column (1b) where we use standard OLS on a sample trimmed at the top and bottom 1% of observations. The label ‘Adjusters’ refers to respondents who adjust their probabilistic assessments after treatment. The label ‘Aware of the new ECB strategy’ refers to the question: ‘Are you aware that the ECB has introduced a new monetary policy strategy?’, with ‘Yes’ and ‘No’ indicating the parts of the sample that replied accordingly.

and the new ECB strategy in a high-inflation environment.

As discussed above, we follow the common practice in the RCT literature and use Huber (1981) weighting in our baseline regressions to adjust for potential outliers. That said, our results are robust to alternative ways to account for influential observations. Column (1b) in Table 2 shows that when trimming the top and bottom 1% of observations from the sample and using standard ordinary least squares regression, the results are largely unchanged. If anything, the effect of the ‘IT now full 1%’ treatment relative to the ‘IT now 1%’ treatment increases somewhat.

It is instructive to assess whether the adjustment of inflation expectations occurs at the extensive or intensive margin. Column (2) of Table 2 provides regression results for the sub-sample of participants who adjust their probability assessments in response to the treatments, labeled ‘Adjusters’. Comparing the number of observations in Column (2) with those in Column (1), we see that almost two-thirds of the survey participants update their expectations. Moreover, the differences between mean inflation before and after the treatment of the ‘Adjusters’ substantially increase in magnitude. This is particularly true for those treated with the 1% assumption, for whom the estimated coefficients more than double. In sum, households adjust their inflation expectations at both the extensive and intensive margin.

It is conceivable that households with a better knowledge of the central bank might react differently to information about the ECB strategy. At the same time, respondents who are aware of the change in strategy might have already incorporated this information into their expectations and thus respond less strongly to the provided information. As mentioned in Section 2.3, about one-third of respondents report having heard of the ECB’s change in strategy. Column (3) of the table reports the estimates for these participants. We observe that they are indeed somewhat less pronounced compared to the baseline in Column (1). In contrast, the intersection of 900 respondents, who report being aware of the new strategy and have adjusted the assigned probabilities, update their expectations somewhat more strongly in particular when treated with the 1% assumption. Importantly, participants with no prior knowledge about the ECB regime change also appear able to process the provided information as shown in Columns (5) and (6) of Table 2. Overall, these findings document that targeted central bank communication about its strategy has the potential to affect household inflation expectations in the intended way.

The coefficient estimates for each treatment variable d_s show the changes in mean inflation expectations when moving from ‘IT then’ to one of the various subgroups s , and are reported in Table 6 in the Appendix. Overall, the revisions in mean expectations are often small in magnitude and not statistically significant. Notable exceptions are the cases where we ask respondents to assume below-target inflation in the near term.

In unreported results, we analyze whether the changes in respondents’ inflation expectations were quantitatively associated with changes in their durable consumption plans. In line with the findings of Hoffmann et al. (2022), we cannot establish such a link. The information treatments ignite virtually no changes in the respondents’ reported consumption plans. That said, we find that households *qualitatively* relate expected price changes to consumption, as summarized in Figures 6 and 7 in Appendix A.2. More than 50% of the respondents who report that currently is a good time to buy, state an expected overall increase in the price level as the main reason for the favorable spending conditions. At the same time, less than 5% of the participants reporting that now is not a good time to buy durables, mention a decline in the overall price level as a reason. This is in line with D’Acunto et al. (2020) and Andrade et al. (2020) who document a link between durable consumption plans and qualitative measures of directional changes in expected inflation.

3.3 Heterogeneity of treatment effects

Finally, we analyze whether the treatment effects are heterogeneous with respect to certain demographic characteristics of the respondents. The sample splits based on gender, education, age, income, and trust in the ECB are reported in Table 3 below. For the treatment arms where respondents did not receive additional assumptions about the fu-

ture course of inflation (Columns (1) to (3) in Table 3), we do not observe meaningful differences across socio-economic groups. One exception is the split by gender. In particular, men’s inflation expectations are significantly higher under the new strategy, albeit the difference is rather small in magnitude. We do not see significant differences across participants with respect to age and education. Interestingly, individuals with household income over 5,000 euros per month exhibit lower expected inflation under the new strategy.

As discussed by [Blinder \(2000\)](#) and others, a central bank’s ability to steer the inflation expectations of households crucially depends on its credibility. We use trust in the central bank as an empirical measure for central bank credibility, following e.g. [Christelis et al. \(2020\)](#), elicited as described in Section 2.3. Indeed, for the sub-sample of participants, who report low trust in the ECB, we do not observe any significant differences in expectations across regimes. In contrast, those with intermediate levels of trust do report about 8 to 12 bp higher expected medium-term inflation following the ‘unabridged’ information treatment. Somewhat surprisingly, individuals with high reported trust in the ECB have lower inflation expectations under the ‘IT now full’ treatment, but the differences are not statistically significant.

The estimates assuming near-term inflation below the target are reported in Columns (4) to (6) of Table 3. Our baseline results documented in Section 3.2 appear to be driven mostly by younger males with a high school (‘Abitur’). However, there is no clear pattern in the reaction of expectations based on respondents’ income. Looking at the heterogeneity with respect to trust in the ECB, we again find that participants with medium levels of trust respond the most strongly to the unabridged information about the new strategy. Finally, considering the treatments assuming one-year-ahead inflation above the target, the observed differences show little systematic variation across socio-demographic groups. Hence, the various groups of respondents do not seem to distinguish between strategies in an above-target inflation environment.

4 Conclusion

In this paper, we have studied how households adjust their medium-term inflation expectations under the new monetary policy strategy of the ECB. In a representative sample of 7,500 participants of the Bundesbank Online Panel Households, we find that survey respondents make little difference between the previous strategy of keeping inflation rates close to but below 2% and the new strategy of targeting inflation rates symmetrically around 2%. Yet, when informed that the ECB would tolerate some overshooting of inflation following prolonged negative deviations from the inflation target, households report

Table 3: Heterogeneity of treatment effects

	IT now – IT then	IT now full – IT then	IT now full – IT now	IT now – IT then	IT now full – IT then	IT now full – IT now	IT now – IT then	IT now full – IT then	IT now full – IT now	Obs
				(inflation at 1%)			(inflation at 3%)			
Demographics	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Female	0.00	0.03*	0.03	–0.06***	0.04**	0.01	0.02*	0.05	0.02***	2005
Male	0.02***	0.04***	0.02***	0.02***	0.11***	0.09***	–0.03***	–0.01***	0.01***	3011
No high school	0.02	0.06	0.04	–0.02	0.05	0.06	0.00*	0.01	0.01*	2419
High school	0.01	0.01	0.00	–0.02*	0.12*	0.13***	–0.03	0.05	0.08	2597
Age \leq 40	–0.02	–0.03	0.00	–0.01*	0.18***	0.28***	–0.05	0.08	0.12**	744
Age 40 to 60	–0.08	–0.03	0.05	0.01	0.04	0.03	0.01	0.01	0.01	1989
Age $>$ 60	–0.03	–0.01	0.03	0.02	0.01	0.00	0.01	–0.02	–0.03	2283
HH inc. \leq 2500€	0.00	0.01	0.02	–0.07	0.02	0.10**	0.04	0.07	0.03	1867
HH inc. 2500 to 5000€	0.12	0.16	0.04	–0.04*	0.11	0.15**	0.02	–0.08**	–0.10	1951
HH inc. $>$ 5000€	–0.11*	–0.18***	–0.06	0.17	0.16**	–0.01***	–0.13	0.10*	0.22**	1063
Low trust	–0.07	–0.04	0.03	–0.03	0.01	0.04	–0.01	0.06	0.07	1768
Medium trust	0.04	0.12*	0.08***	–0.07	0.13***	0.20***	0.04	0.06	0.02	1919
High trust	0.03	–0.03	–0.16	0.05	0.11*	0.06	–0.02	–0.01	0.01	1270

Notes: Asterisks ***, **, and * denote statistically significant differences at the 1, 5, and 10% levels. Survey weights are applied to ensure the representativeness of the sample. To account for the presence of outliers, we use Huber (1981) weighted regressions.

significantly higher inflation expectations. This is true, particularly for respondents who are asked to assume that inflation is currently running below target. In contrast, we do not see significant differences for participants provided with the scenario that inflation is exceeding the target in the near term. The differences are somewhat more pronounced for individuals with prior knowledge about the ECB's new inflation target. In sum, our results highlight that individuals do adjust their inflation expectations in the intended direction when informed about the new strategy. This suggests that the new ECB strategy could in principle unfold its stabilizing properties.

That said, for the successful implementation of this strategy in practice, a few additional factors that our study does not address are likely important. First, our results are based on respondents directly receiving information about the new strategy. In the real world, however, central banks may face a 'veil of inattention' ([Blinder, 2018](#)) when communicating with the public. This may particularly be the case in a low-inflation environment when the stabilizing effects of the new strategy would be needed the most ([Binder, 2017](#)). Second, even when central banks successfully reach their intended audience and manage to steer expectations, it is unclear how persistent these effects are. Recent empirical evidence suggests relatively short-lived effects of communication on individuals' inflation expectations ([Coibion et al., 2022](#)). These aspects are beyond the scope of this study and are left for future research.

References

- Andrade, P., E. Gautier, and E. Mengus (2020). What Matters in Households' Inflation Expectations? *Bank de France Working Paper* (770).
- Armantier, O., G. Topa, W. Van der Klaauw, and B. Zafar (2017). An overview of the survey of consumer expectations. *Economic Policy Review* (23-2), 51–72.
- Binder, C. (2017). Fed speak on main street: Central bank communication and household expectations. *Journal of Macroeconomics* 52, 238–251.
- Blinder, A. S. (2000). Central Bank Credibility: Why Do We Care? How Do We Build It? *American Economic Review* 90(5), 1421–1431.
- Blinder, A. S. (2018). Through a crystal ball darkly: The future of monetary policy communication. In *AEA Papers and Proceedings*, Volume 108, pp. 567–571. American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203.
- Christelis, D., D. Georgarakos, T. Jappelli, and M. van Rooij (2020). Trust in the Central Bank and Inflation Expectations. *International Journal of Central Banking* 16(6), 1–37.
- Clifford, S., G. Sheagley, and S. Piston (2021). Increasing precision without altering treatment effects: Repeated measures designs in survey experiments. *American Political Science Review* 115(3), 1048–1065.
- Coibion, O., Y. Gorodnichenko, E. S. Knotek II, and R. Schoenle (2021). Average Inflation Targeting And Household Expectations. *NBER Working Paper* 27836.
- Coibion, O., Y. Gorodnichenko, and M. Weber (2022). Monetary policy communications and their effects on household inflation expectations. *Journal of Political Economy* 130(6), 1537–1584.
- D'Acunto, F., D. Hoang, M. Paloviita, and M. Weber (2020). IQ, Expectations, and Choice. *forthcoming in Review of Economic Studies*.
- Ehrmann, M., D. Georgarakos, and G. Kenny (2023). Credibility Gains from Communicating with the Public: Evidence from the ECB's new Monetary Policy Strategy. Technical report, ECB Working Paper No. 2785.
- Engelberg, J., C. F. Manski, and J. Williams (2009). Comparing the Point Predictions and Subjective Probability Distributions of Professional Forecasters. *Journal of Business & Economic Statistics* 27, 30–41.

- Galati, G., 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*.
- Haaland, I., C. Roth, and J. Wohlfart (2023). Designing information provision experiments. *Journal of economic literature* 61(1), 3–40.
- Hoffmann, M., E. Moench, L. Pavlova, and G. Schulte Frankenfeld (2022). Would households understand average inflation targeting? *Journal of Monetary Economics* 129, S52–S66.
- Huber, P. J. (1981). *Robust Statistics*. Wiley, New York.
- Krüger, F. and L. Pavlova (2023). Quantifying subjective uncertainty in survey expectations. *International Journal of Forecasting*.
- Petersen, L., O. Kostyshyna, and J. Yang (2022). A Horse Race of Monetary Policy Regimes: Experimental Evidence. *NBER Working Paper 30530*.

A Appendix

A.1 Survey Questionnaire

This section provides details on selected questions, relevant for the analysis from the BOP-HH waves 20 and 22 both from the core module as well as project-specific questions. The full questionnaires can be found online and without cost at <https://www.bundesbank.de/en/bundesbank/research/survey-on-consumer-expectations/>.

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22

The inflation rate-Intro
Now we would like you to think more carefully about the inflation rate. The inflation rate. Inflation is the percentage increase in the general price level. It is mostly measured using the consumer price index. A decrease in the price level is generally described as ‘deflation’.
CQ002 - Core-Q - Inflation development
Respondent group: all Range of valid values: -100.0 to 100.0 Question: What do you think the rate of inflation or deflation in Germany was over the past twelve months? Note: If you assume there was deflation, please enter a negative value. Values may have one decimal place. Please enter a value here: Input field percent
CM002 - Core-M - Inflation expectations qualitative
Respondent group: all Question: Do you think inflation or deflation is more likely over the next twelve months? Note: Inflation is the percentage increase in the general price level. It is mostly measured using the consumer price index. A decrease in the price level is generally described as ‘deflation’. Please select one answer: 1 Inflation more likely 2 Deflation more likely
CM003 - Core-M - Inflation expectations quantitative
Respondent group: all Range of valid values: -100.0 to 100.0 If CM001 = 1 or -9997 or -9998 Question: What do you think the rate of inflation will roughly be over the next twelve months? If CM002 = 2

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

Question: What do you think the rate of deflation will be over the next twelve months?

Note: Inflation is the percentage increase in the general price level. It is mostly measured using the consumer price index. A decrease in the price level is generally described as ‘deflation’.

Please enter a value in the input field (values may have one decimal place).

Input field percent

CM004 - Core-M - Inflation expectations probabilistic

Respondent group: all

The programming of the question requires the sum of the 10 variables to be 100. The current sum of all entered points is shown to the respondent when answering the question. Respondents are asked to correct their responses if the sum does not equal 100.

Question: In your opinion, how likely is it that the rate of inflation will change as follows over the next twelve months?

Note: The aim of this question is to determine how likely you think it is that something specific will happen in the future. You can rate the likelihood on a scale from 0 to 100, with 0 meaning that an event is completely unlikely and 100 meaning that you are absolutely certain it will happen. Use values between the two extremes to moderate the strength of your opinion. Please note that your answers to the categories have to add up to 100.

- a The rate of deflation (opposite of inflation) will be 12% or higher
 - b The rate of deflation (opposite of inflation) will be between 8% and 12%
 - c The rate of deflation (opposite of inflation) will be between 4% and 8%
 - d The rate of deflation (opposite of inflation) will be between 2% and 4%
 - e The rate of deflation (opposite of inflation) will be between 0% and 2%
 - f The rate of inflation will be between 0% and 2%
 - g The rate of inflation will be between 2% and 4%
 - h The rate of inflation will be between 4% and 8%
 - i The rate of inflation will be between 8% and 12%
 - j The rate of inflation will be between 12% or higher
-

P2201 - Trust in the ECB

Respondent group: all

We would like to ask you some questions about the European Central Bank (ECB).

Question: On a scale from 0 to 10, how much do you trust that the European Central Bank is able to deliver price stability?

- 0 Do not trust at all
 - 1 to 9 [no label]
 - 10 Trust entirely
-

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

I am not familiar with the European Central Bank

P2202 - Awareness new monetary policy [Wave 22 only]

Respondent group: all

Input filter P2201 != i

Question: Are you aware, e.g. from the media, that the European Central Bank (ECB) has introduced a new monetary policy strategy?

1 Yes

2 No

P2203 - Knowledge new monetary policy [Wave 22 only]

Respondent group: all

Input filter P2202 = 1

Allow for multiple answers, randomize items. **Question:** What do you know about the ECB's new monetary policy strategy?

1 The rate of inflation should be close to but below 2% over the medium term.

2 Climate goals should be taken into greater account.

3 The rate of inflation should be 2% over the medium term.

4 If the rate of inflation is over 2%, the ECB will respond in exactly the same way as if the rate of inflation were under 2%.

5 The unemployment rate should be reduced.

6 In the future, residential property should be taken into greater account when calculating the rate of inflation.

7 Negative and positive deviations from the inflation target are equally undesirable.

8 The ECB will tolerate moderate deviations from the inflation target above 2%

Treatment text

Respondent group: all

We would now like to ask you about your views on the monetary policy of the European Central Bank outlined above. The European Central Bank (ECB) has adopted a new monetary policy strategy. As before, the primary objective of the ECB is to maintain price stability. The ECB **previously** considered this target to be achieved if the annual rate of inflation was below but close to 2% in the medium term. It now considers that price stability is best maintained by aiming for a 2% inflation target over the medium term. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable.

P2204 - ECB former monetary policy

Assume that the ECB, as it had until now, is aiming for an annual inflation rate that is below, but close to 2% over the medium term.

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

Question: In your opinion, how likely is it that the rate of inflation will change as follows over the next two to three years?

The rate of inflation will:

Note: The aim of this question is to determine how likely you think it is that something specific will happen in the future. You can rate the likelihood on a scale from 0 to 100, with 0 meaning that an event is completely unlikely and 100 meaning that you are absolutely certain it will happen. Use values between the two extremes to moderate the strength of your opinion. Please note that your answers to the categories have to add up to 100.

a not exceed 1%

b be above 1%, but below 2%

c be above 2%, but below 3%

d be above 3%

P2205 - Pre-treatment: Good time to buy [Wave 22 only]

Respondent group: all

Input filter if P2204 != -9997 or -9998

You expect that the inflation rate over the next two to three years will [result from P2204]

Assume that you would like to make major purchases (e.g. a fridge, sofa or a wardrobe).

Question: In your view of expectations regarding the inflation rate, which of the following statements applies to you?

1 I think now would be a good time to make major purchases.

2 I think now would not be a good time to make major purchases.

P2206 - ECB old or new monetary policy - Information treatments

Respondent group: all

‘IT now’ Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable.

‘IT now full’ Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. To avoid negative deviations from the inflation target becoming entrenched, it may be necessary to implement especially forceful or persistent monetary policy action. This may also imply a transitory period in which inflation is moderately above target.

‘IT then 1%’ Assume that the ECB, as it had until now, is aiming for an annual inflation rate that is below but close to 2%, over the medium term. Please also assume that the inflation rate will be 1% over the next twelve months.

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

‘IT now 1% Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. Please also assume that the inflation rate will be 1% over the next twelve months.

‘IT now full 1% Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. To avoid negative deviations from the inflation target becoming entrenched, it may be necessary to implement especially forceful or persistent monetary policy action. This may also imply a transitory period in which inflation is moderately above target. Please also assume that the inflation rate will be 1% over the next twelve months.

‘IT then 3% [Wave 22 only] Assume that the ECB, as it had until now, is aiming for an annual inflation rate that is below but close to 2%, over the medium term. Please also assume that the inflation rate will be 3% over the next twelve months.

‘IT now 3% [Wave 22 only] Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. Please also assume that the inflation rate will be 3% over the next twelve months.

‘IT now full 3% [Wave 22 only] Now assume that the ECB is aiming for an annual inflation rate of 2% over the medium term, in line with its new strategy. This target is symmetric, meaning that negative and positive deviations of inflation from the target are equally undesirable. To avoid negative deviations from the inflation target becoming entrenched, it may be necessary to implement especially forceful or persistent monetary policy action. This may also imply a transitory period in which inflation is moderately above target. Please also assume that the inflation rate will be 3% over the next twelve months.

Question: In your opinion, how likely is it that the rate of inflation will change as follows over the next two to three years?

The rate of inflation will:

Note: The aim of this question is to determine how likely you think it is that something specific will happen in the future. You can rate the likelihood on a scale from 0 to 100, with 0 meaning that an event is completely unlikely and 100 meaning that you are absolutely certain it will happen. Use values between the two extremes to moderate the strength of your opinion. Please note that your answers to the categories have to add up to 100.

a not exceed 1%

b be above 1%, but below 2%

c be above 2%, but below 3%

d be above 3%

P2207 - Inflation expectations post-treatment [Wave 22 only]

Respondent group: all

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

Range of valid values: -100.0 to 100.0

Question: What do you think the rate of inflation or deflation will roughly be on average over the next two to three years?

Note: Please enter a value in the input field (values may have one decimal space). If you assume that prices will fall (deflation), please enter a negative value.

Input field percent

P2208 - Post-treatment: Good time to buy [Wave 22 only]

Respondent group: all

Input filter if P2206 != -9997 or -9998

You expect that the inflation rate over the next two to three years will [result from P2206]

Assume that you would like to make major purchases (e.g. a fridge, sofa or a wardrobe).

Question: In your view of expectations regarding the inflation rate, which of the following statements applies to you?

1 I think now would be a good time to make major purchases.

2 I think now would not be a good time to make major purchases.

P2209A - Post-treatment: Good time to buy - reasons

[Wave 22 only]

Respondent group: all

Input filter if P2208 = 1

Randomize items

Question Why do you think that now would be a good time to make major purchases? Please select the reason you think is most important.

a I expect a sharper increase in the general price level.

b I expect a sharper increase in the prices of the items mentioned in particular.

c I need a replacement, e.g. a fridge or a piece of furniture.

d I have money left over at the moment and would like to use it to buy myself something useful.

e I have access to favorable financing terms.

f Other [Input field]

P2209B - Post-treatment: Not a good time to buy - reasons [Wave 22 only]

Respondent group: all

Input filter if P2208 = 2 Randomize items

a I expect a weaker increase or a decline in the general price level.

b I expect a weaker increase or a decline in the prices of the items mentioned in particular.

c I have no need for such items at the moment.

d I do not have sufficient financial resources left over for such items at the moment.

Table 4: BOP-HH August 2021 Wave 22 and October 2021 Wave 22 (Continued)

e I do not wish to take out consumer credit in the current situation.

f I do not wish to deplete my savings in the current situation.

g Other [Input field]

A.2 Additional Figures

Figure 6: Reasons why currently good time to buy durables

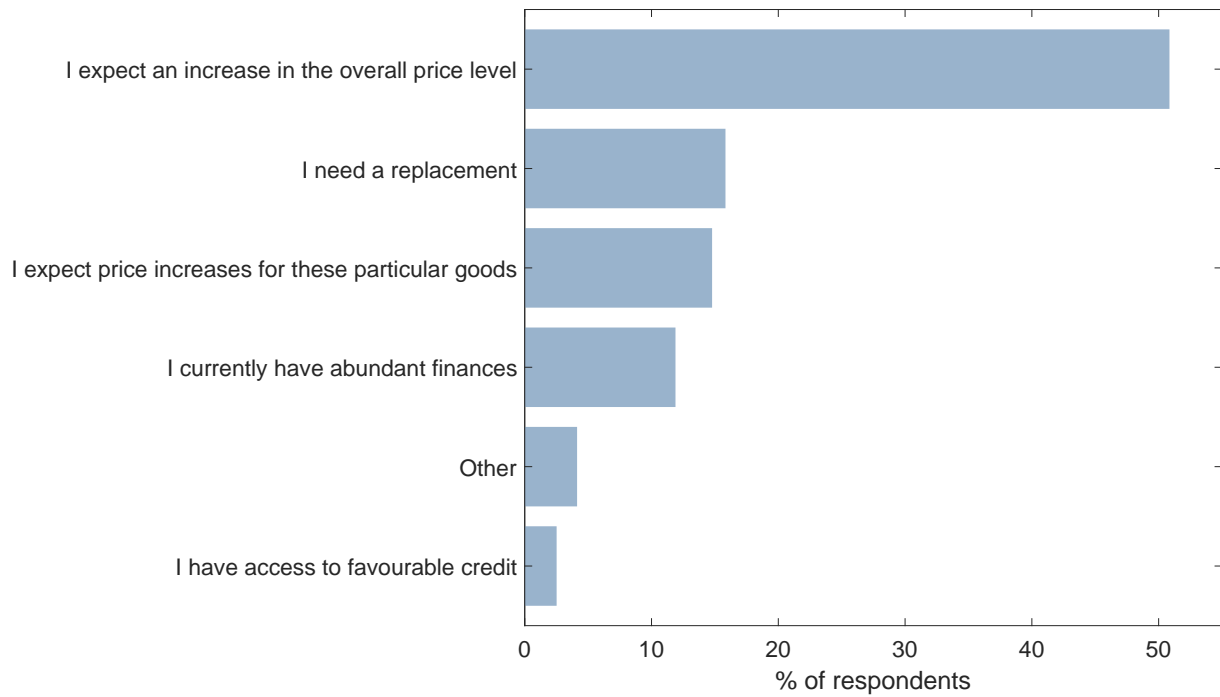
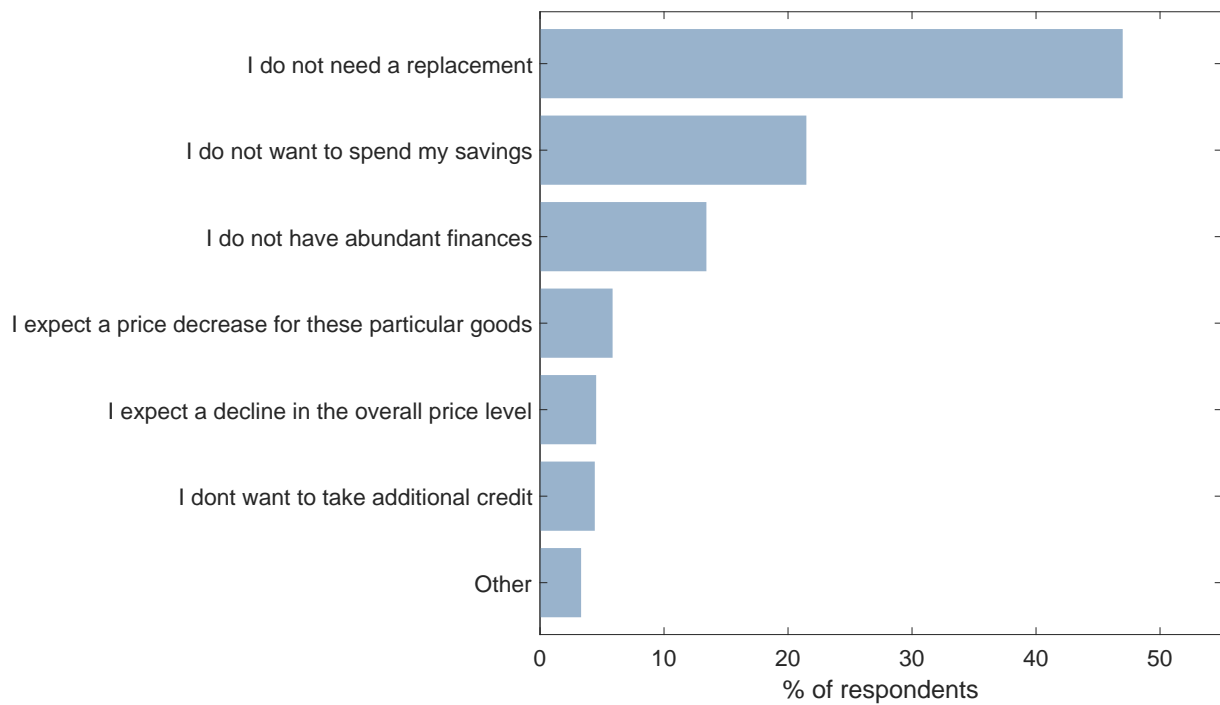


Figure 7: Reasons why currently bad time to buy durables



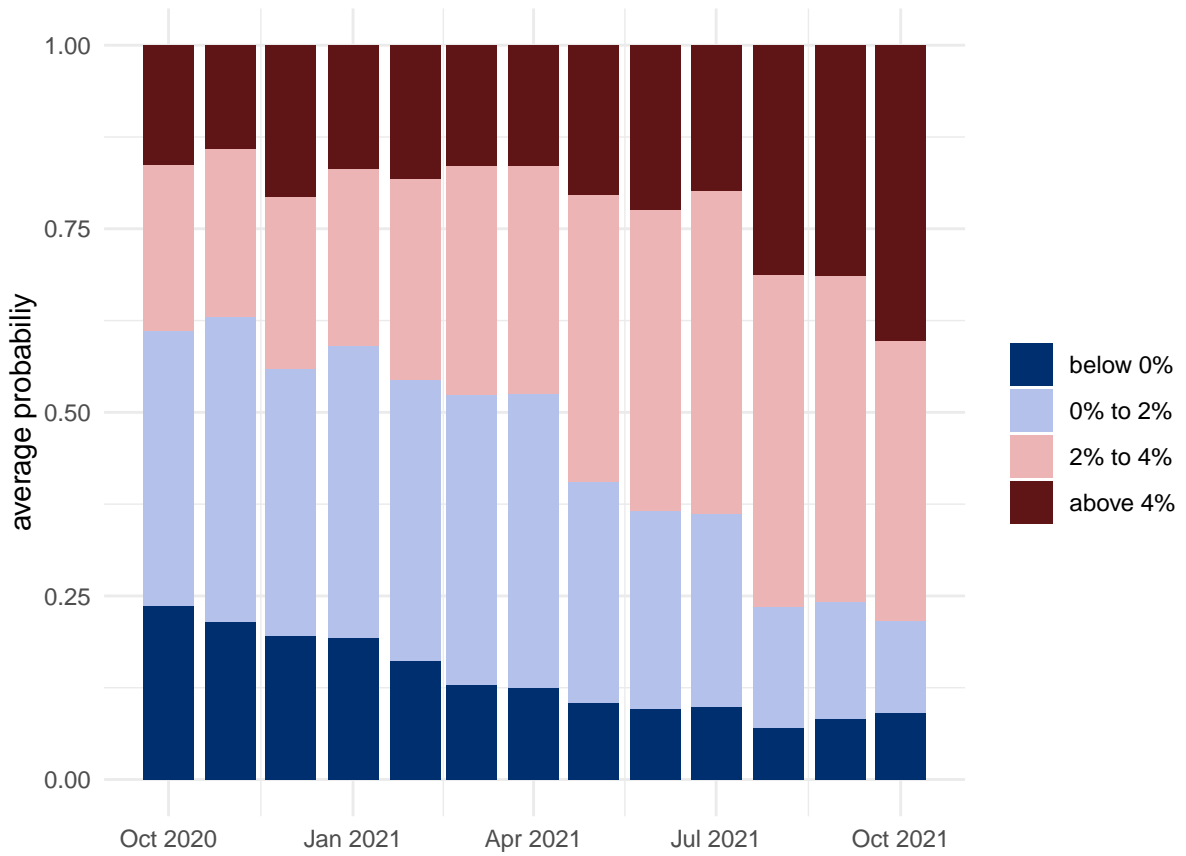
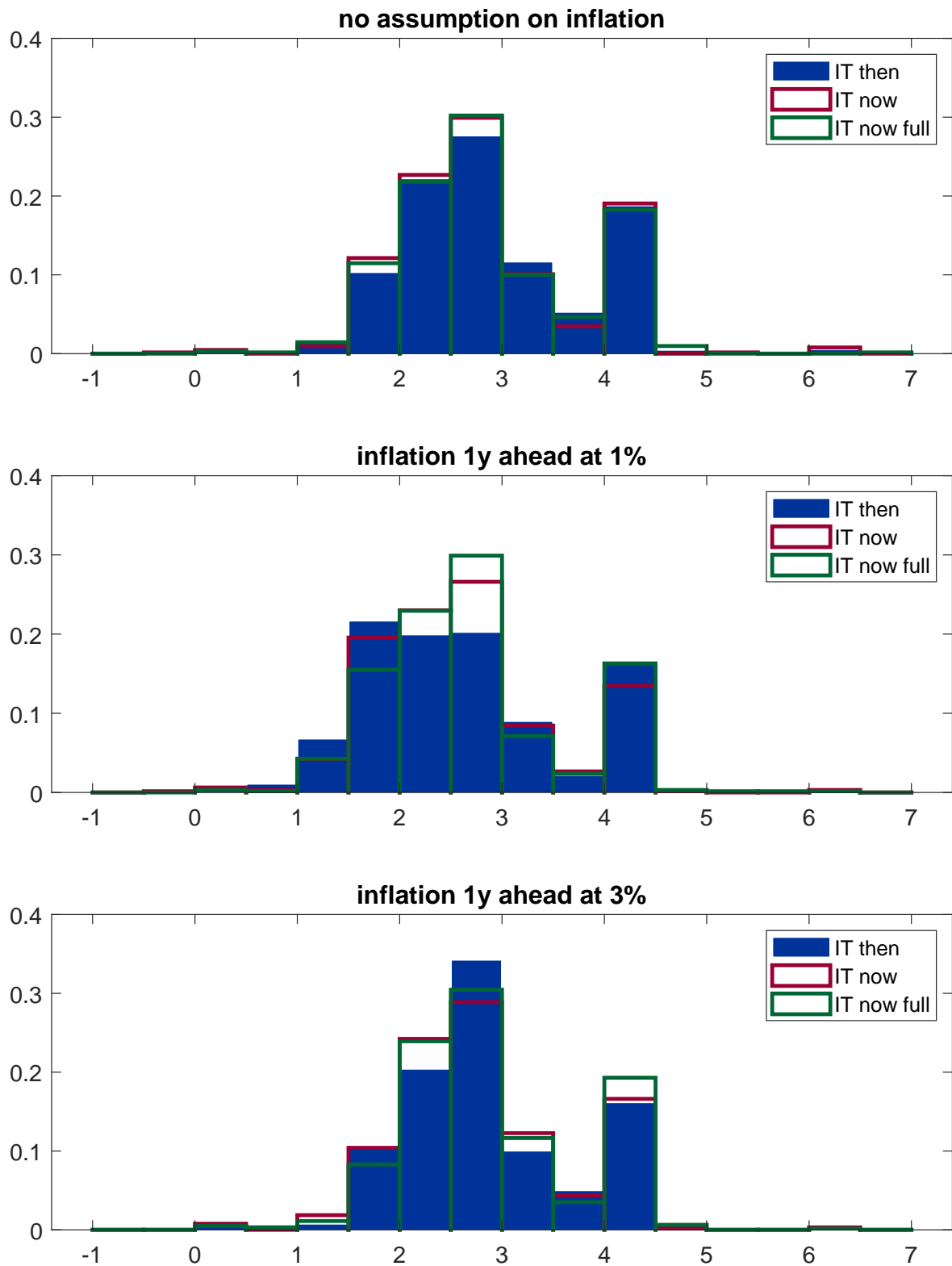


Figure 8: Average subjective probabilities for inflation 1-year ahead from BOP-HH core module, monthly between October 2020 and October 2021

Figure 9: Distribution of means for expected medium-term (2-3Y) inflation derived from the individual histograms across treatments



A.3 Additional Tables

Table 5: BOP-HH Wave 22 — Sample and sub-samples composition

	(1)	(2)	(3)	(4)
Age under 40	35.48	39.97	44.07	37.49
Age 40 to 60	38.30	36.07	33.33	37.50
Age over 60	26.22	23.95	22.61	25.01
HH income under 1,500€	12.68	13.59	11.10	12.87
HH income 1,500 to 3,000€	32.77	30.60	25.94	33.19
HH income 3,000 to 5,000€	36.16	36.62	36.23	37.28
HH income over 5,000€	18.40	19.19	26.73	16.66
HH size (one)	24.67	23.94	20.84	25.05
HH size (two)	42.08	41.60	47.54	40.56
HH size (three)	14.83	14.61	13.80	14.61
HH size (over four)	18.42	19.86	17.82	19.77
Male	50.73	49.67	65.10	45.42
Female	49.27	50.33	34.90	54.58
Non-employed	37.58	37.38	36.66	36.95
Employed	62.42	62.62	63.34	63.05
No college degree	76.22	73.76	66.59	75.98
College degree	23.78	26.24	33.41	24.02
No high school (Abitur)	63.08	59.98	51.42	62.50
High school (Abitur)	36.92	40.02	48.58	37.50
Single	20.32	20.29	20.45	20.36
Married or living with partner	79.68	79.71	79.55	79.64
Born in West Germany pre 1989	82.33	82.33	82.24	82.55
Born in East Germany pre 1989	17.67	17.67	17.76	17.45
Trust in the ECB (on a scale from 0 to 10)				
0	12.41	8.91	11.95	7.69
1	2.64	2.27	2.93	2.02
2	8.62	8.63	11.15	7.64
3	13.10	12.98	12.37	13.23
4	11.94	12.16	6.76	14.29
5	16.30	15.33	9.88	17.44
6	10.38	12.55	12.20	12.69
7	12.97	14.05	17.35	12.76
8	7.89	8.75	9.49	8.47
9	1.59	1.68	2.61	1.31
10	2.16	2.69	3.30	2.45
Observations	5297	3218	975	2202
Adjusters		X	X	X
Aware of new ECB strategy			‘Yes’	‘No’

Notes: The numbers are reported in percent. Sample weights are used to ensure sample representativeness for the German population aged 16 and above. The label ‘Adjusters’ refers to the sub-sample of respondents who adjust their probabilistic assessment after treatment. The label ‘Aware of the new ECB strategy’ refers to the question: ‘Are you aware that the ECB has introduced a new monetary policy strategy?’, with ‘Yes’ and ‘No’ indicating the parts of the sample that replied accordingly.

Table 6: Baseline regression results: mean expectations

	<i>Dependent variable: $mean_i^s - mean_i^{ITthen}$</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
IT now	0.04 (0.06)	-0.08 (0.1)	-0.03 (0.12)	-0.1 (0.19)	0.07 (0.07)	-0.05 (0.13)
IT now full	0.07* (0.06)	0.01 (0.11)	-0.05 (0.11)	-0.22 (0.19)	0.10** (0.08)	0.09 (0.13)
IT then 1%	-0.11*** (0.06)	-0.4*** (0.1)	-0.16** (0.12)	-0.45*** (0.18)	-0.10** (0.07)	-0.37*** (0.12)
IT then 3%	0.07** (0.06)	0.02 (0.1)	0.01 (0.11)	-0.03 (0.17)	0.09** (0.08)	0.06 (0.12)
IT now 1%	-0.13*** (0.06)	-0.46*** (0.1)	-0.22*** (0.11)	-0.54*** (0.17)	-0.11** (0.08)	-0.46*** (0.12)
IT now 3%	0.07** (0.06)	0.05 (0.1)	-0.02 (0.12)	-0.07 (0.19)	0.10** (0.07)	0.11 (0.12)
IT now full 1%	-0.03 (0.06)	-0.23*** (0.1)	-0.11 (0.11)	-0.28* (0.17)	-0.01 (0.07)	-0.22** (0.12)
IT now full 3%	0.10*** (0.06)	0.10 (0.10)	0.00 (0.11)	-0.13 (0.17)	0.13*** (0.07)	0.13 (0.12)
IT now full – IT now	0.03	0.09	-0.02	-0.12	0.03	0.14
IT now 1% – IT then 1%	-0.02	-0.06	-0.06	-0.09	-0.01	-0.09
IT now full 1% – IT then 1%	0.08*	0.17***	0.05	0.17*	0.09*	0.15**
IT now full 1% – IT now 1%	0.10**	0.23***	0.11*	0.26***	0.10*	0.24**
IT now 3% – IT then 3%	0.00	0.03	-0.03	-0.04	0.01	0.05
IT now full 3% – IT then 3%	0.03	0.08	-0.01	-0.1	0.04	0.07
IT now full 3% – IT now 3%	0.03	0.05	0.02	-0.06	0.03	0.02
Observations	4859	2860	1529	900	3297	1943
Adjusters		X		X		X
Aware of new ECB strategy			‘Yes’	‘Yes’	‘No’	‘No’

Notes: Standard errors reported in parenthesis. Asterisks ***, **, and * denote statistically significant differences at the 1, 5, and 10% levels. Survey weights are applied to ensure the representativeness of the sample. To account for the presence of outliers we use Huber (1981) weighted regressions. The label ‘Adjusters’ refers to respondents who adjust their probabilistic assessments after treatment. The label ‘Aware of the new ECB strategy’ refers to the question: ‘Are you aware that the ECB has introduced a new monetary policy strategy?’, with ‘Yes’ and ‘No’ indicating the parts of the sample that replied accordingly.

Table 7: Baseline results under alternative quantification assumptions

Specification	<i>Dependent variable: $mean_i^S - mean_i^{ITthen}$</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
IT now	0.04 (0.08)	-0.15 (0.14)	-0.05 (0.15)	-0.30 (0.26)	0.07 (0.10)	-0.08 (0.16)
IT now full	0.07* (0.08)	-0.03 (0.14)	-0.07 (0.14)	-0.35* (0.25)	0.12** (0.10)	0.08 (0.17)
IT then 1%	-0.13*** (0.08)	-0.48*** (0.13)	-0.20** (0.15)	-0.60*** (0.23)	-0.11** (0.10)	-0.42*** (0.15)
IT then 3%	0.07* (0.08)	-0.03 (0.13)	0.00 (0.14)	-0.14 (0.22)	0.10** (0.10)	0.04 (0.16)
IT now 1%	-0.15*** (0.08)	-0.56*** (0.13)	-0.26*** (0.15)	-0.71*** (0.22)	-0.11** (0.11)	-0.52*** (0.17)
IT now 3%	0.07* (0.08)	-0.01 (0.13)	-0.04 (0.15)	-0.19 (0.23)	0.11** (0.10)	0.09 (0.16)
IT now full 1%	-0.05 (0.08)	-0.32*** (0.13)	-0.14* (0.14)	-0.49*** (0.23)	-0.01 (0.10)	-0.26** (0.16)
IT now full 3%	0.10*** (0.08)	0.04 (0.13)	-0.01 (0.14)	-0.29* (0.22)	0.14*** (0.10)	0.10 (0.16)
IT now full – IT now	0.03	0.12	-0.02	-0.05	0.05	0.16
IT now 1% – IT then 1%	-0.02	-0.08	-0.06	-0.11	0.00	-0.10
IT now full 1% – IT then 1%	0.08	0.16**	0.06	0.11	0.10	0.16
IT now full 1% – IT now 1%	0.10*	0.24***	0.12	0.22	0.10	0.26**
IT now 3% – IT then 3%	0.00	0.02	-0.04	-0.05	0.01	0.05
IT now full 3% – IT then 3%	0.03	0.07	-0.01	-0.15	0.04	0.06
IT now full 3% – IT now 3%	0.03	0.05	0.03	-0.1	0.03	0.01
Observations	4859	2860	1529	900	3297	1943
Adjusters		X		X		X
Aware of new ECB strategy			‘Yes’	‘Yes’	‘No’	‘No’

Notes: Standard errors reported in parenthesis. Asterisks ***, **, and * denote statistically significant differences at the 1, 5, and 10% levels. Survey weights are applied to ensure representativeness of the sample. To account for the presence of outliers we use Huber (1981) weighted regressions. The label ‘Adjusters’ refers to respondents who adjust their probabilistic assessments after treatment. The label ‘Aware of the new ECB strategy’ refers to the question: ‘Are you aware that the ECB has introduced a new monetary policy strategy?’, with ‘Yes’ and ‘No’ indicating the parts of the sample that have replied accordingly.

A.4 Quantification Details

Following [Engelberg et al. \(2009\)](#), we fit a symmetric triangular distribution for the case where the respondent has used one or two bins and a flexible generalized beta distribution otherwise. In the former case, we set the outer bins to have double the size of the inner closed bins and, for the case of a flexible distribution the bounds of the support are estimated together with the shape parameters, but we impose a bound of $\pm 20\%$. For more details, see also [Krüger and Pavlova \(2023\)](#).

Table 7 presents the baseline results for a set of alternative assumptions for the quantification procedure. More precisely, in the case where triangular distribution is used and the respondent has placed positive probability in one or more outer bins, their width is assumed to be four times the width of the closed bins. For the case of the generalized beta distribution the endpoints of the outer bins are limited to ± 38 following [Armantier et al. \(2017\)](#).