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THE ECB'S CLIMATE ACTIVITIES AND PUBLIC TRUST

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ABSTRACT

As central banks, including the European Central Bank (ECB), adopt climate-related responsibilities, gauging public support becomes essential. Drawing on a June 2023 Bundesbank household survey, we find that 69% of households report increased trust in the ECB due to its climate actions, valuing the institution's broader scope and concern. While 17% and 20% of households express concerns over risks to price stability or independence, 23% believe climate engagement reinforces the ECB's core objectives. An information intervention indicates minimal impact on household inflation expectations, suggesting a disconnect between institutional trust and inflation outlooks. An internal survey reveals that central bankers accurately gauge trust impacts but tend to overestimate effects on inflation expectations. Overall, our findings indicate broad public support for the ECB's climate initiatives.

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1 Introduction

Central banks today acknowledge the significance of climate change in relation to their core objectives, which include ensuring price stability, fostering economic growth, and maintaining financial stability, as well as contributing to overall well-being (Carney 2015, Schnabel 2022, Kogstrup 2022). An ever-growing number of central banks are actively engaging in initiatives to support the transition towards a more sustainable economy, often in collaboration with other organizations. These efforts include assessing the implications of climate change and different climate scenarios on economic resilience through sophisticated modeling techniques. Furthermore, many central banks are instituting policies that mandate financial institutions to integrate climate-related risks into their governance frameworks, strategic planning, risk management processes, and regulatory stress testing procedures (Dikau and Volz 2021). Central banks also contribute to the sustainable finance dialogue by participating in thought leadership and advocacy efforts, which encompass delivering public speeches, conducting research, providing education, and improving the availability of climate-related data. Efforts to minimize their own carbon footprints reflect a commitment to leading by example in the transition towards sustainability.

The European Central Bank (ECB)[1] interprets its mandate to address climate change as part of its broader commitment to economic support, financial stability, and price stability, as outlined in the Treaty on the Functioning of the European Union, Article 127 (1), and align its actions with the objectives of the Paris agreement and the EU's climate neutrality objectives.[2] The ECB acknowledges the risks climate change poses to the economy and financial sector, emphasizing the importance of understanding these impacts to maintain price stability and ensure banking safety. It pledges to contribute to combating climate change within its mandate[3], by focusing on three main objectives: managing climate-related risks, supporting the green transition, and fostering wider action.[4] In 2021, the ECB established a climate change center to consolidate its climate-related efforts and guide its climate agenda, which was published in 2022.

Central banks must strike a balance between the possible reputational and legal risks associated with their actions and the environmental and financial implications of inaction. In

[1] Throughout this paper we assume that the ECB's activities represent those of the entire Eurosystem.

[2] See ECB [2021], ECB [2022]

[3] Former president Lagarde, as quoted in ECB [2022]: "With these decisions we are turning our commitment to fighting climate change into real action."

[4] https://www.ecb.europa.eu/ecb/climate/html/index.en.html

cases of insufficient action, a central bank could face criticism for hindering the shift towards a green economy, potentially jeopardizing its core goals over the long term. On the other hand, excessive intervention could lead to undue influence over resource distribution, creating economic distortions that might affect its core objectives, as well as its independence and credibility.

This paper examines how households perceive the ECB's engagement with climate-related activities and assesses public support for those efforts. Using data from the June 2023 (Wave 42) Bundesbank-Online-Panel-Households (BOP-HH) survey, we examine the responses from over 4,000 German households on their trust in the ECB and how this trust is shaped by its focus on climate change. Additionally, we investigate public perceptions of potential trade-offs between the ECB's primary objectives, its institutional independence, and its ability to address climate-related challenges. These are questions we specifically introduced into the survey, and generating this new data is a key contribution of our paper.

Our main findings are as follows. First, although information about the ECB's climate objectives was publicly available, it was novel to most survey respondents. Only 30% of households self-report being previously aware of the ECB's climate activities. Second, a substantial majority (69% of all respondents) indicate that their trust in the ECB increased due to its engagement with climate change. Most of them (61% of all households) report a mild increase ("somewhat"), while a smaller portion (8%) report a large share in trust. Third, these households primarily value the ECB's broader scope, appreciating its concern beyond purely economic matters and its original mandate. Fourth, a minority of all households (comprising 17% and 20% respectively of all respondents) express concerns that the ECB's climate efforts could compromise price stability or its independence. In contrast, a larger group (23% of all respondents) believes that the ECB's climate initiatives help it better achieve its core objectives. Fifth, less than 20% of all respondents express doubts about the ECB's effectiveness in addressing climate change. Finally, our regression analysis shows a positive relationship between households' overall trust in the ECB and the increase in trust due to its climate engagement.

In a next step, we compare Wave 43 and Wave 44 inflation expectations of treated respondents from Wave 42 with those who had not participated in Wave 42. Our treatment not only provided households with information about the ECB's climate activities but also encouraged them to reflect on their own concerns about climate change and how these concerns shape their trust in the ECB. This type of"reflective information intervention" may

be particularly effective in situations where individuals tend to avoid complex or challenging information, such as climate change, which could per se impact inflation expectations. We find little evidence that our treatment led to any unanchoring of inflation expectations due to our treatment.

Finally, we conducted an internal survey of Bundesbank employees to evaluate their perceptions of how the ECB's climate initiatives affect household trust and long-term inflation expectations. Policymakers often rely on assumptions regarding public attitudes, beliefs, and expectations, that shape people's behavior. However, when these assumptions are inaccurate, policy decisions may be suboptimal. Our findings reveal that while Bundesbank employees have a good understanding of how the ECB's climate-related activities influence household trust, they tend to overestimate the impact these activities have on inflation expectations.

Our paper contributes to the growing body of literature that examines the determinants and ability to influence public trust in central banks and, in particular, the ECB. Recent studies suggest that factors beyond the fulfillment of a central bank's narrow mandate play an important role in shaping public trust. Eickmeier and Petersen [2024] demonstrate that the ECB's broader scope and concern, as well as holistic factors such as integrity of leading central bankers, and transparency , matter for public trust in the institution. Similarly, Kril et al. [2016] show that the Bank of Israel's social awareness of the Bank of Israel contributes to fostering public trust in the institution.

Our paper is also closely related to two recent randomized controlled trials (RCTs) that assess credibility (i.e. that the ECB will maintain price stability in the euro area over the next 3 years) and public trust in the ECB following its recent strategic shift, particularly its commitment to addressing climate change. Ehrmann et al. [forthcoming] and Dräger and Nghiem [2023] investigate the effects of supplementing information about the ECB's new symmetric inflation target with details about its climate objectives. Both studies report a lack of additional credibility and trust gains from information about the ECB's climate objectives. Our study, in addition, investigates the underlying reasons for households' evaluation of the ECB's climate engagement. Moreover, our information intervention differs from theirs by incorporating reflective engagement with participants, as discussed earlier .

Lastly, our paper engages with the literature on the interplay between abatement policies and monetary policy. Previous research has examined how carbon pricing impacts key

variables related to core monetary policy (e.g., Nakov and Thomas 2023, McKibbin et al. 2021, McKibbin et al. 2020) and the extent to which monetary policy frameworks influence the outcomes of, and incentives for, abatement policies (McKibbin et al. 2020). These studies advocate for the joint consideration of monetary and climate policies. On the other hand, Hansen [2022] critiques central banks' involvement in climate action, questioning their expertise, effectiveness, and the potential risks to their credibility.

In the remainder of the paper we present details of the survey, see Section 2. We then discuss the main findings in Section 3, including descriptive statistics, results from multivariate regression analyses explaining changes in trust due to the ECB's climate engagement as well as inflation expectations. In Section 4, we assess central bankers' understanding of how households' trust and inflation expectations are influenced by the ECB's climate initiatives. The paper ends with a general discussion and conclusion in Section 5.

2 Data

Our analysis makes use of data collected within the Bundesbank Online Panel of Households (BOP-HH). The survey is conducted online monthly on a representative set of German households. It consists of a core set of questions related to expectations about household and macroeconomic outcomes, as well as a set of special questions. We study households' attitudes toward the ECB's climate objectives in the June 2023 (Wave 42) survey. A total of 4,151 households participated in the survey. We also utilize a variable capturing the expected economic situation as well as socio-demographic information on gender, age, education and income. The majority of participants were experienced panelists while 500 new respondents were introduced into Wave 42.

2.1 Special questions

In Wave 42 of the BOP-HH, we introduced a series of special questions to gauge how the ECB's climate objectives have influenced household trust. At the start of the survey, participants are asked to rate their level of concern about climate change and their overall trust in the ECB. Both of these questions are presented to respondents using a Likert scale.

Climate concern.[5] "On a scale from 0 to 10, how concerned are you about climate change?" where 0 refers to "Not concerned at all" and 10 refers to "Very strongly concerned".

[5]The bolded abbreviations here and henceforth were not included in the survey questions. We list them here for easy reference in later data analysis.

Trust in the ECB. "On a scale from 0 to 10, how much trust do you have in the European Central Bank (ECB)?" where 0 refers to "No trust at all" and 10 refers to "Absolute trust".

We then provide all respondents with information about the ECB's actions regarding climate change (and we note that survey respondents at this point of the survey were already informed about the ECB's original price stability mandate from a previous question).[6]

"You will now receive some information about the ECB: Since 2022, the ECB has highlighted that, as part of its activities, it will monitor and manage risks associated with climate change. It will also support the transition to a "green economy" and further climate-relevant measures within the scope of its mandate."

After providing information about the ECB's climate-related actions, we ask respondents whether this information was novel.

Knowledge climate activities. "Did you already know this information prior to this survey?" The respondents could answer yes or no.

Following this, we directly asked respondents about how this information about the ECB's climate change actions impacts their trust in the institution.

Influence trust. "To what extent does the ECB's involvement in combating climate change affect your trust in the ECB?" The respondents could choose to answer "Strengthens trust greatly", "Strengthens trust somewhat", "Weakens trust somewhat", or "Weakens trust greatly".

Those who initially skipped the question were given the additional option to answer "don't know" as a follow-up.

For those respondents who indicated that the information greatly or somewhat strengthens

[6] In Eickmeier and Petersen [2024] we asked households in the same survey (Wave 42), before we provide the information on the fact that the ECB engages in climate activities: "On a scale from 0 to 10, to what extent do the following aspects play a role in your trust in the ECB?" where 0 refers to "Does not play a role at all" and 10 refers to "Plays a major role". One possible choice we give them is: "It has largely achieved its main objective of price stability in the past." In this way survey participants knew about the ECB's primary objective *before* they received the information about the ECB's new climate orientation.

their trust, we further inquire:

Increase trust reasons. "Why has the ECB's involvement in combating climate change strengthened your trust in the ECB? Please select all answers that apply."

- **Better achieves its main objectives.** "The ECB is better able to achieve its original objectives by monitoring and managing climate-related risks."
- **Supports the green transition.** "I believe it is right that the ECB is taking on responsibility in society beyond its original objectives and supporting the transition to a "green economy"."
- **Fosters wider action.** "The ECB can play an important role in further action on climate change."
- **Concern about nature** "I think it is a good thing that the ECB is concerned about nature (climate, biodiversity, etc.)."
- **Transparent about environment.** "I like the fact that the ECB is transparent about the state of the environment."
- **Links climate, economy, well-being.** "I appreciate that the ECB takes into account the links between climate change, the economy, and people's general well-being."

For those respondents who indicated that the information had somewhat or greatly diminished their trust in the ECB, we further inquire about the specific reasons behind their decreased trust:

Decrease trust reasons. "Why has the ECB's involvement in combating climate change weakened your trust in the ECB? Please select all answers that apply."

- **Price stability compromised.** "If the ECB addresses climate change, it runs the risk of not achieving its original objective of price stability."
- **Independence compromised.** "I fear that the ECB's independence will suffer if it addresses matters that extend beyond its actual objectives."
- **No expertise.** "The ECB has no expertise in combating climate change."
- **Ineffective.** "The ECB is unable to play a meaningful role in combating climate change due to other reasons."

We chose to inform all Wave 42 survey respondents about the ECB's climate objectives rather than randomize participants into treated and untreated groups. We based this design decision on our priors that information about the objectives was widespread, and we wanted to ensure more uninformed participants received the information and to be able to elicit the rationales for respondents' *changes* in trust. Furthermore, for questions that are repeated in each wave (e.g. inflation expectations), we anticipated having two control groups: those who participated in Wave 42, and the untreated respondents who were not present in Wave 42 that would participate in subsequent waves.

3 Findings

3.1 Trust in the ECB

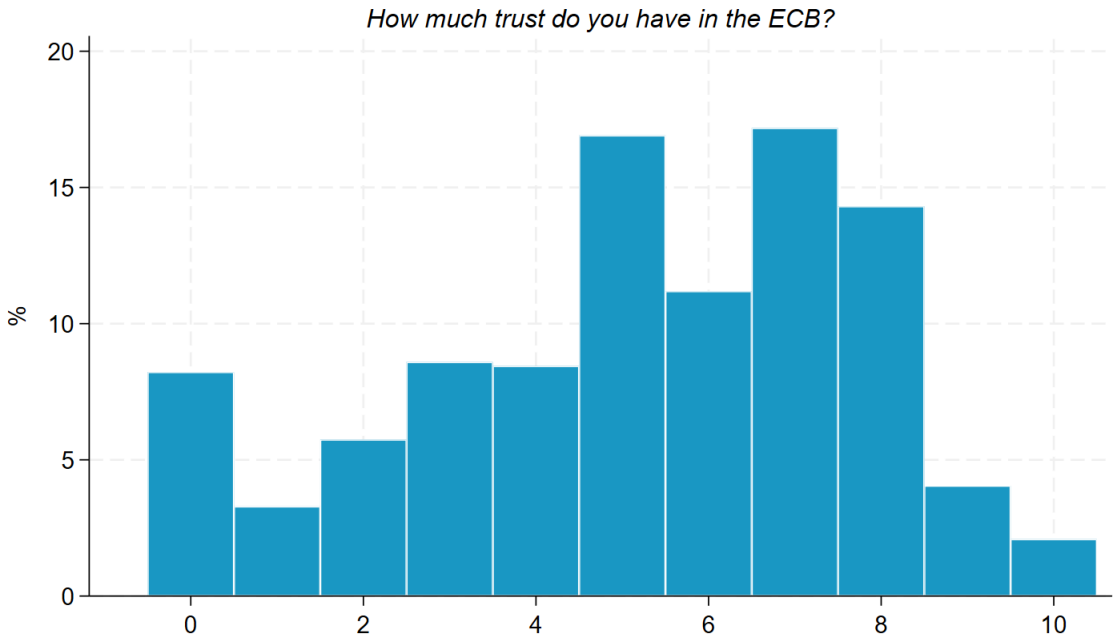
We begin by examining the baseline level of trust in the European Central Bank (ECB). Figure 1 illustrates the distribution of expressed trust levels in the ECB.[7] The average trust level is 5.2, with the median being 5. Notably, there is considerable heterogeneity in the trust levels for the ECB. The distribution is hump-shaped and skewed slightly to the right, with a mere 2% of respondents indicating complete trust (a score of 10). A significant majority, exceeding 66%, express medium to high trust levels (scores ranging from 5 to 10). Conversely, only 8% of respondents report having "no trust at all" in the ECB. Table 1 presents the distribution across socio-demographic groups of those households who report intermediate to high trust (i.e. scores for trust in the ECB equal or larger than the median of 5) (second column) and that for the whole sample (first column). The two distributions are very similar, i.e. high trust in the ECB is not specific to certain socio-demographic groups.

3.2 Concerns about climate change

Climate change is a significant concern among the surveyed population. The average concern level is 6.7, with a median value of 7. As depicted in Figure 2, the distribution of concern levels is skewed to the right. A small fraction, only 3.5% of households, report no concern whatsoever about climate change. In contrast, a substantial 81% of households indicate intermediate to high levels of concern (scoring between 5 and 10). Notably, 16% of the respondents express a very strong concern, rating their worry at the maximum level of 10. The third column of Table 1 reveals, again, that there are no major differences between those

[7] We drop "Don't know" answers throughout the paper.

Figure 1: Distribution of trust in the ECB



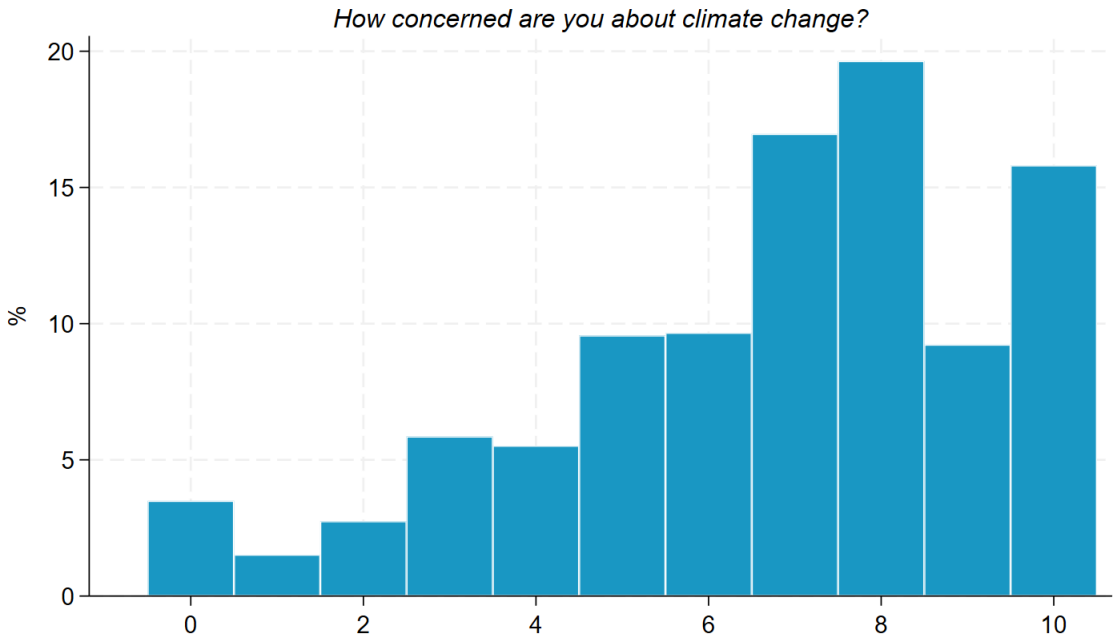
Note: 0 refers to "No trust at all", 10 to "Absolute trust".

who report scores for climate concerns equal or above the median of 7 across socio-economic groups, compared to the overall sample.

3.3 Trust in the ECB and climate-related activities

Knowledge about the climate activities by the ECB We presented respondents with details regarding the ECB's initiatives in climate action. 68% of the participants acknowledged that this information was new to them, as illustrated in Figure 3. Consistent with other indicators of financial and economic literacy, our findings reveal that men, older individuals (representing a household), and those with higher levels of education and income are generally more informed (Table 1, fourth column). Despite this, it is noteworthy that across all demographic groups examined and to our surprise, a significant majority did not previously know about the ECB's efforts in addressing climate issues. Additionally, the proportion of participants who report being informed (68%), is likely the maximum estimate of the actual share. Survey respondents may exhibit an over-claiming bias and be reluctant to disclose their lack of knowledge.

Figure 2: Distribution of concerns about climate change



Note: 0 refers to "Not concerned at all", 10 to "Very strongly concerned".

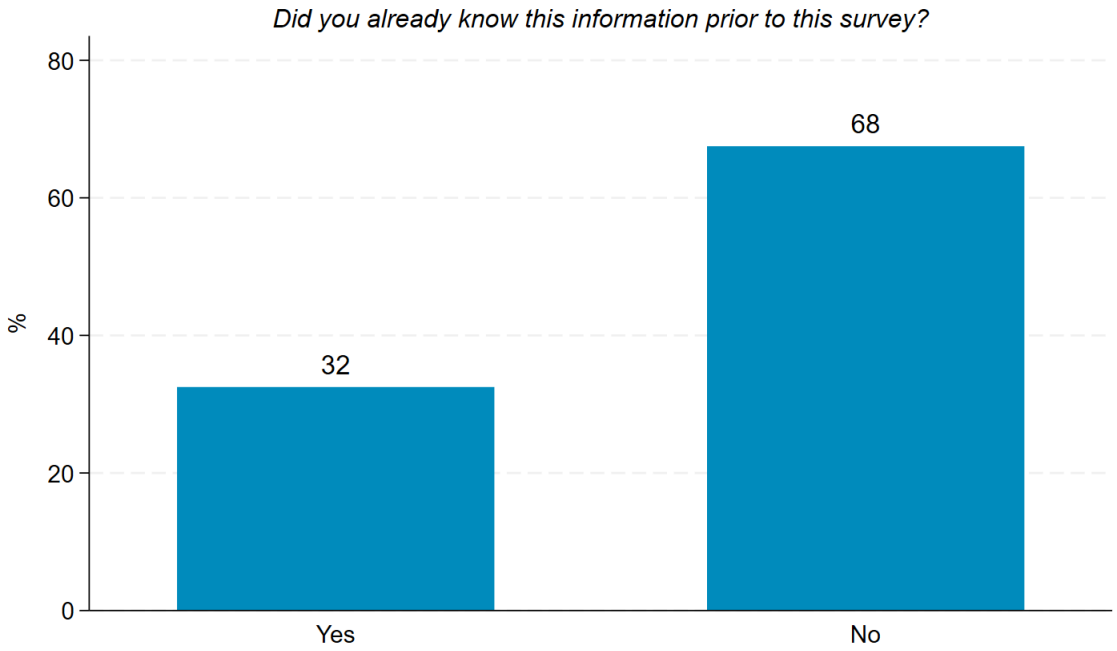
Table 1: Distribution across socio-demographic groups, in % of all observations

	Total	Intermediate and high trust in the ECB	Climate concern	Knowledge climate activities
Female	37.1	37.3	39.4	26.6
Male	62.9	62.7	60.6	73.4
Age (16-24 years)	2.3	2.4	2.5	1.8
Age (25-60 years)	53.1	53.5	51.8	46.9
Age (> 60 years)	44.6	44.3	45.7	51.3
Income (< 2,500 Euros)	11.6	10.3	11.4	10.8
Income (2,500-6,000 Euros)	62.0	60.4	60.0	59.1
Income (> 6,000 Euros)	26.4	29.3	28.6	30.1
Education (no degree or in training)	2.5	2.5	2.8	1.7
Education (less or equal techn. or comm. college)	51.8	55.5	54.9	54.6
Education (bachelor degree)	15.4	10.3	11.0	10.3
Education (graduate degree)	30.3	31.7	31.4	33.5

Notes: Education (less or equal techn. or comm. college) refers to apprenticeship, vocational school, technical or commercial college. "Intermediate and high trust in the ECB" refers to self-reported scores for trust in the ECB larger or equal the median of 5. "Climate concern" refers to scores larger or equal the median of 7. "Knowledge climate activities" refers to those households who report that they knew about the fact that the ECB engages in climate activities.

Self-reported changes in trust due to the ECB's climate-related activities A significant portion of our respondents, nearly 70%, report that the ECB's engagement in climate-related activities has positively influenced their trust in the institution, as illustrated

Figure 3: Self-reported knowledge of ECB's climate activities

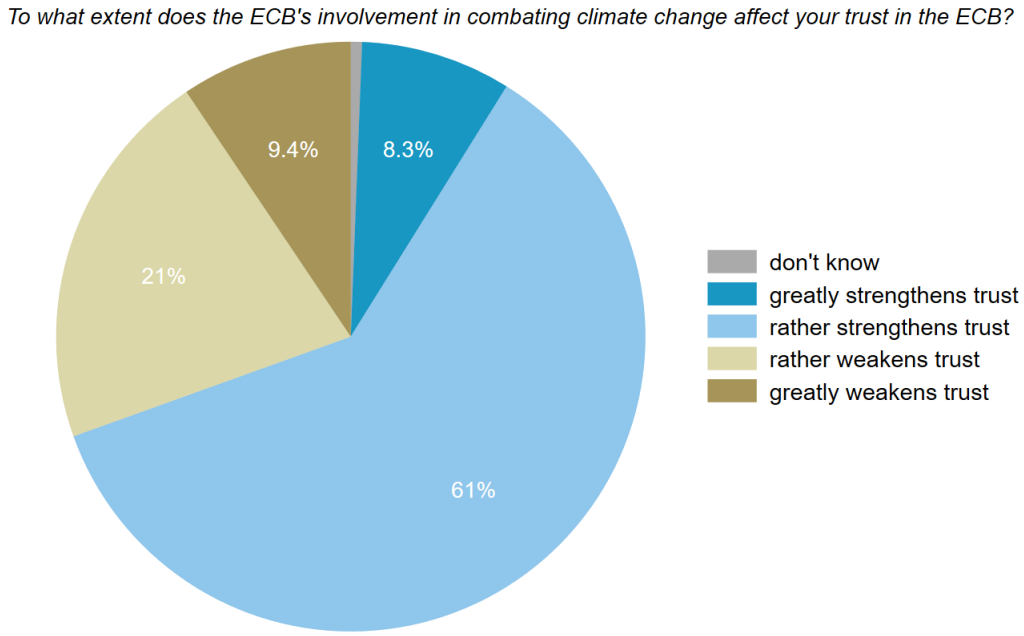


Note: Response after receiving the information: "You will now receive some information about the ECB: Since 2022, the ECB has highlighted that, as part of its activities, it will monitor and manage risks associated with climate change. It will also support the transition to a "green economy" and further climate-relevant measures within the scope of its mandate."

in Figure 4. Specifically, 8.3% of participants indicate a significant increase in trust, while a larger group, 60.6%, report a moderate enhancement in their trust levels. On the other hand, 30.5% of respondents experienced a decline in trust after becoming aware of these activities, with 21.1% noting a slight decrease and 9.4% reporting a substantial reduction in their trust towards the ECB. The proportion of respondents indicating "don't know" is negligible.

Reasons for changes in trust in the ECB Figure 5 illustrates the factors contributing to the shift in trust among respondents. First, among the 69% of households who report a strengthened trust in the ECB, a significant two-thirds credit this enhanced trust to the institution's broader focus and attention to societal issues (in line with Eickmeier and Petersen 2024 and Kril et al. 2016). Specifically, 72% valued the ECB's consideration of the interconnections between the economy, climate, and overall well-being. Furthermore, 63% appreciated the ECB's commitment to social responsibility and its support for the green transition. Additionally, 50% were encouraged by the ECB's concern for the environment, while 47% recognized its role in fostering wider action.

Figure 4: Change in trust in the ECB due to its climate activities



Among the 31% of respondents who reported a decrease in trust, a segment expressed doubts about the ECB's capacity to effectively address the climate crisis. Specifically, 54% of this group questioned the ECB's expertise in tackling climate change, while 29% were skeptical about the bank's ability to contribute significantly for various other reasons. These percentages correspond to 17% and 9% of the entire sample, respectively, which are relatively modest proportions. This skepticism reflects broader trends identified in the literature, such as the findings from OECD [2022], which indicate that while half of the citizens in OECD countries consider climate change action a priority, only a third believe in their government's effectiveness in managing this challenge.

Third, there is a notable share (34% of the 69%) which believes that the ECB can more effectively fulfill its primary objectives by addressing climate-related risks. Conversely, within the 31% who experienced a decrease in trust, 57% are concerned about the ECB's potential failure to meet its main goals, and 66% are apprehensive about a possible compromise to its independence. The proportion of Wave 42 survey respondents who see climate engagement as beneficial to the ECB's core missions marginally surpasses those expressing concerns within the overall sample. This distinction represents a significant insight, and we will explore the implications of the ECB's climate actions on price stability in further detail shortly. Finally, a smaller segment, 27% of the 69% with increased trust, attributes this rise to the ECB's enhanced transparency concerning environmental conditions.

Figure 5: Reasons for a change in trust in the ECB, shares of respondents in those who report an increase (69%) or a decrease (30%) in trust, respectively, in %

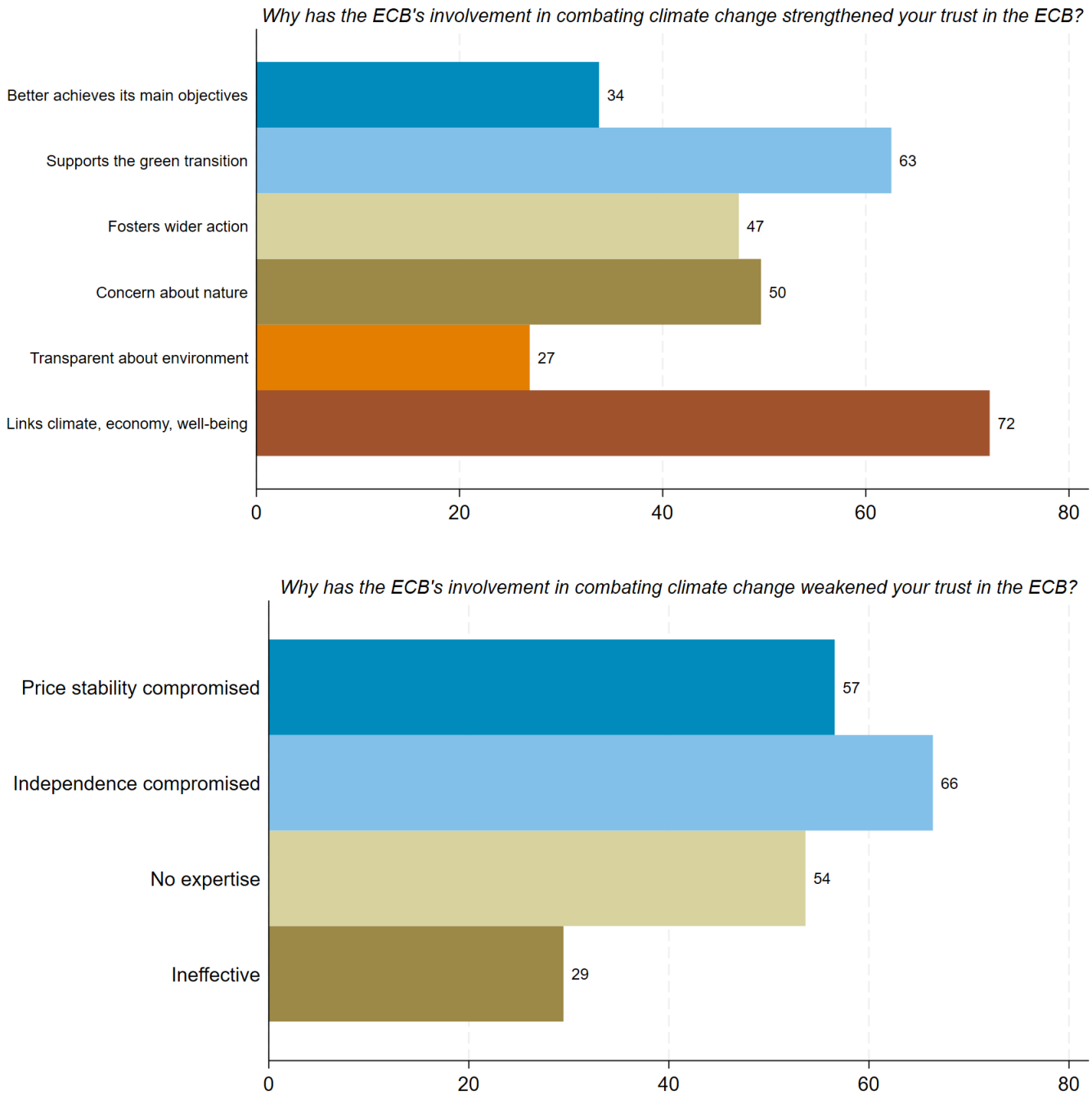


Table 2 shows the distribution across socio-demographic groups. Increased trust in the ECB, particularly among younger individuals, those with higher education, and those with higher incomes, is often attributed to the perception that the ECB is considering the broader picture and showing greater concern for wider issues. Conversely, among those who report a decrease in trust due to the ECB's climate initiatives, men, middle-aged individuals, and those with lower education levels express more concerns about price stability and the ECB's independence. They are also more likely to doubt the ECB's capacity to contribute to climate change mitigation. High-income households exhibit considerable concern over price stability and the ECB's independence while low-income households are less likely to believe that the ECB can significantly impact the climate crisis.

Table 2: Distribution across socio-demographic groups, in % of all observations

	Total	Broader scope and concern	Price stab. and indep. compromised	No expertise and ineffective
Female	37.1	34.6	29.2	32.9
Male	62.9	65.4	70.8	67.1
Age (16-24 years)	2.3	3.3	1.1	1.4
Age (25-60 years)	53.1	55.1	64.0	59.0
Age (> 60 years)	44.6	41.7	34.9	39.6
Income (< 2,500 Euros)	11.6	10.1	8.5	14.6
Income (2,500-6,000 Euros)	62.0	59.5	61.5	60.9
Income (> 6,000 Euros)	26.4	30.4	30.0	24.5
Education (no degree or in training)	2.5	3.3	2.3	1.4
Education (less or equal techn. or comm. college)	51.8	49.2	55.3	59.9
Education (bachelor degree)	15.4	10.6	10.8	11.3
Education (graduate degree)	30.3	36.9	31.6	27.5

Notes: Education (less or equal techn. or comm. college) refers to apprenticeship, vocational school, technical or commercial college. "Broader scope and concern" refers to those households who select that "Supports the green transition", "Fosters wider action", "Concern about nature" and "Links climate, economy, well-being" explain their increase in trust in the ECB. "Price stab. and indep. compromised" refers to those who select that "Price stability compromised" and "Independence compromised" explain their decrease in trust in the ECB. "No expertise and ineffective" refers to those who select that "No expertise" and "Ineffective" are reasons for their reported decrease in trust in the ECB.

Multivariate regression analysis We next quantify the drivers of variations in trust using a multivariate regression analysis. To begin, we create a four-point measure of self-reported change in trust ("Influence trust"):

- - 1.5: Weakens trust greatly

- -0.5: Weakens trust somewhat
- 0.5: Strengthens trust somewhat
- 1.5: Strengthens trust greatly

We then regress the reported change in trust in the ECB due to its climate engagement on the socio-demographic variables, the level of trust in the ECB, climate concerns and knowledge of the ECB's climate activities as well as the reasons for a change in trust in the ECB due to climate activities by the ECB. We estimate the following linear regression:

$$\Delta Trust_i^c = \gamma + \delta' X_i + \epsilon_i \tag{1}$$

where $\Delta Trust_i^c$ denotes the change in trust in the ECB due to the fact that it engages in climate-related activities as reported by household i. X_i is the $n \times 1$ vector of regressors (i.e. socio-demographic characteristics and others). δ denotes the n-dimensional coefficient vector. We estimate the equation using OLS with robust standard errors. Later we also estimate an ordered probit model, which allows us to move beyond the linear regression assumption that the distance between response categories is uniform.

Table 3 displays our regression analysis results. Initially, with only socio-demographic factors and anticipated economic growth[8] considered in specification (1), the adjusted R^2 is modest, at 0.13. It significantly improves to 0.49 in specification (2), where variables such as trust in the ECB, climate change concern, and households' prior knowledge of the ECB's climate initiatives are included as regressors.

[8]We use qualitative expectations for economic growth, which are asked on a five-point scale. "What developments do you expect in the following metrics over the next 12 months?". Answers can range from 1 (Decrease significantly), 2 (Decrease slightly), 3 (Remain roughly the same), 4 (Increase slightly), and 5 (Increase significantly).

Table 3: Changes in self-reported trust in the ECB due to the ECB's climate activities (1)

$\Delta Trust^c$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Expected economic growth	0.264***	0.077***	0.024***	0.024***		0.030***	0.077***		0.025**	0.073***
	(0.01)	(0.01)	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.03)
Female	0.190***	0.076***	0.049***	0.049***	0.057***	0.070***	0.070***	0.045***	0.037**	0.166***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.02)	(0.05)
Age	0.001*	0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Income	0.015***	0.002	0.003	0.003	0.001	0.003	0.000	0.003	0.004	0.011
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Education	0.017***	-0.009**	-0.001	-0.001	-0.001	0.003	-0.008*	-0.001	-0.001	-0.000
	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Trust in the ECB		0.112***	0.056***	0.056***	0.055***	0.063***	0.104***	0.059***	0.049***	0.188***
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Climate concern		0.118***	0.050***	0.057***	0.049***		0.118***	0.050***	0.040***	0.160***
		(0.00)	(0.00)	(0.01)	(0.00)		(0.00)	(0.00)	(0.00)	(0.01)
Knowledge climate activities		0.013	0.008	-0.069	0.005	0.006	0.007	0.006	0.010	0.045
		(0.02)	(0.01)	(0.04)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.05)
Climate concern × Knowledge climate activities				-0.011*						
				(0.01)						
Inflation expectations					-0.010***					
					(0.00)					
Consider myself an anxious person						0.006*				
						(0.00)				
Achieved price stability in past							0.013***			
							(0.00)			
Integrity							0.002			
							(0.00)			
Acts on broader concern							0.013***			
							(0.00)			
Constant	-0.857***	-1.416***	-0.542***	-0.515***	-0.387***	-0.353***	-1.541***	-0.490***	-0.479***	
	(0.07)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	
N	3804	3800	3800	3800	3726	3800	3776	3800	3800	3800
Controls (reasons)	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
R^2 adj. / pseudo R^2	0.126	0.490	0.717	0.717	0.718	0.698	0.495	0.716	0.712	0.530

Notes: The dependent variable is the change in trust due to the ECB's climate activities. It takes values -1.5, -0.5, 0.5, 1.5. Female is a dummy variable equal to 1 for females and 0 for males. Age is a continuous variable from 16 to 80 years and older. Income has categories 1-13 from under 500, 500-999, 1,000-1,499, 1,500-1,999, 2,000-2,499, 2,500-2,999, 3,000-3,499, 3,500-3,999, 4,000-4,999, 5,000-5,999, 6,000-7,999, 8,000-9,999, 10,000 and more EUR. Education ranges from 0-8, where 0: no degree, 1: in training / studying, 2: apprenticeship, 3: vocational school, 4: technical of commercial college, 5: university of cooperative education, 6: bachelor, 7: master / diploma, 8: doctorate. "Climate concern", "Trust in the ECB", "Knowledge climate activities", "Expected economic growth" are defined in the text. Controls are the reasons for an increase or a decrease in trust due to the ECB's climate policies. They equal 1 when the item has been selected and 0 otherwise. N denotes the number of observations. (1)-(8) refer to OLS regressions, (9) refers to an OLS regression, where weights are applied to adjust for differences in the distribution across socio-demographic characteristics between the survey sample and the German population, (10) refers to an ordered probit regression (where the pseudo R^2 is shown). For all regressions we use robust standard errors.

Self-reported trust in the ECB increases more among those anticipating higher economic growth, women, households with already high trust in the ECB, and those more worried about climate change. The influence of education levels is minimal and proves to be inconsistent across different model specifications. When education is categorized into groups, the resulting dummy variables do not show significant effects. Our income variable enters our model positively, but not significantly.[9] Additionally, whether households were previously informed about the ECB's climate efforts (and had perhaps time to contemplate their opinions) does not significantly affect their change in trust. This indicates that the widespread increase in trust towards the ECB reported by most households in our survey is not merely a spontaneous response.

We next introduce reasons for the reported change in trust towards the ECB as additional regressors in specification (3), which we designate as our baseline model. We create dummy variables for each reason, assigning a value of 1 if a particular reason is selected by a respondent and 0 if it is not mentioned or not relevant to them. These additional regressors increase the adjusted R^2 to 0.72, indicating a more comprehensive explanation of the variance in trust changes. These new regressors serve as control variables, and while we do not detail or interpret their individual coefficients here, it is noteworthy that all exhibit the expected signs and achieve statistical significance. This is inherently due to the design of the survey, where respondents could only select from the first 6 reasons if they reported an increase in trust, and from a different set if they reported a decrease, without overlap between the groups. The coefficients for socio-demographic and other previously included variables show a decrease in magnitude compared to earlier models, yet their signs and statistical significance remain consistent.

We proceed with several robustness checks to validate our findings. First, we include in specification (4) the variable "climate concern" interacted with a dummy for prior knowledge about the ECB's climate engagement. The coefficient is marginally significant and positive. The reminder of the ECB's climate activities seems to have increased trust more among those who are more concerned about climate change.[10] We then substitute expected economic growth with expected inflation[11] (specification (5)). The latter variable is signif-

[9] When we replace income with 12 dummies (which can take the values 1 or 0) for all income categories but the lowest one (less than 500 EUR), we find that the categories 2,000-2,499 to 6,000-7,999 EUR enter positively and significantly. Other findings are unaffected.

[10] This is similar to Bernard et al. [2022] who find that people with a higher degree of climate concerns are more willing to change their behaviour in response to the information treatment they receive about ways to reduce carbon emissions than the less concerned.

[11] We truncate expected inflation to fall between -5% and 20% in order to exclude extreme events.

icantly negatively correlated with trust changes, indicating that respondents anticipating lower inflation rates are more positively influenced by the ECB's climate initiatives in terms of trust adjustments. We subsequently incorporate additional variables derived from questions posed to all households in the same survey (Wave 42), which were initially developed for a different study in (Eickmeier and Petersen 2024):

"On a scale from 0 to 10, to what extent do the following statements describe you, where 0 refers to "Not at all" and 10 refers to "Fully"?" We then confront households with the following statement:

- **Consider myself an anxious person.** "I tend to consider myself an anxious person."

We further ask "On a scale from 0 to 10, to what extent do the following aspects play a role in your trust in the ECB?" where 0 refers to "Does not play a role at all" and 10 refers to "Plays a major role"?"

- **Achieved price stability in past.** "It has largely achieved its main objective of price stability in the past.
- **Integrity.** "The ECB's President and senior management have a moral compass, i.e. they are people with integrity."
- **Acts on broader concern.** "It acts out of concern for the well-being of the general public (extending beyond economic concerns)."

We replace in specification (6) "Climate concern" with people's self-reported anxiety ("Consider myself an anxious person"). The coefficient is positive and significant at the 10% level. This suggests that people who state that they are more anxious change their trust in the ECB by more due to its climate-related activities. This finding is in line with evidence of "climate anxiety" (e.g. Ogunbode et al. 2022).

In specification (7) we replace our rationale controls (the reasons for a change in trust in the ECB due to its climate engagement as reported by the households) with "Achieved price stability in the past" (meant to capture a preference by households for a good performance in terms of the ECB's main objective price stability), "Integrity" (which can be linked to independence helping to protect central bankers' integrity) and "Acts on broader concern". The estimation reveals that changes in respondents' trust related to the ECB's climate initiatives are more pronounced among those for whom price stability matters more. This finding suggests that these households believe that its climate engagement may indeed support the ECB

in fulfilling its primary objective. The lack of significance in the coefficient for "Integrity" indicates that appreciation for the integrity of leading central bankers does not lead to a lesser increase or greater decrease in trust towards the ECB. Additionally, the significant coefficient for "Acts on broader concern" aligns with the substantial proportion of households expressing that environmental considerations are important to them. Note that the key messages also remain unchanged when we omit trust in the ECB from the set of regressors, which could potentially mediate between the trustworthiness measures and the dependent variable.

There might also be a concern that expected growth is endogenous with respect to the change in trust (e.g. Christelis et al. 2020, Brouwer and de Haan 2022). When we drop expected growth from our baseline model (see specification (8)), coefficients and significances of the other variables remain broadly unaffected. Furthermore, when we replace expected growth with its lag, results (including the coefficient of lagged in comparison to contemporaneous expected growth) (not shown) remain almost identical. This suggests that endogeneity is not an issue. As another robustness check we re-estimate the baseline regression (3), applying post-stratification weights to the individual observations (specification (9)). The weights are taken from the survey (BOP-HH 2024). Households which are over-represented in the survey compared to the German population along the dimensions of gender, age, income and education are down-weighted, and *vice versa* for under-represented households. Results are barely changed. In a subsequent robustness check, we employ an ordered probit regression model in specification (10), incorporating the reasons for trust changes as control variables. The results maintain the same significance levels and directional effects as observed in our baseline specification (3).

Table 4 presents further results. We divide the household sample into two groups: those whose trust in the ECB has increased and those whose trust has decreased due to its climate-related actions. In specifications (11) and (12), we examine the reasons behind trust increases and decreases, respectively, as additional regressors and additionally present the estimated coefficients. These coefficients describe reasons for a *marginal* change, i.e. from "greatly" (strengthens or weakens) to "somewhat" (strengthens or weakens) or *vice versa*, but not variation between "weakens" and "strengthens" categories. The most interesting finding is significance of "Knowledge climate activities" in both models, with a negative sign in specification (11) and a positive one in specification (12), suggesting that with time to reflect, households tend to more definitively view the ECB's climate actions as either significantly positive or negative. As to the reasons for marginal trust changes, certain factors such as environmental transparency emerge as more influential in the context of marginal trust

Table 4: Changes in self-reported trust in the ECB due to the ECB's climate activities (2)

$\Delta Trust^c$	(11)	(12)
Expected economic growth	-0.006	0.060***
	(0.01)	(0.01)
Female	0.036***	0.017
	(0.01)	(0.03)
Age	0.000	-0.000
	(0.00)	(0.00)
Income	0.002	-0.002
	(0.00)	(0.01)
Education	0.001	-0.007
	(0.00)	(0.01)
Trust in the ECB	0.035***	0.047***
	(0.00)	(0.01)
Climate concern	0.032***	0.042***
	(0.00)	(0.00)
Knowledge climate activities	0.046***	-0.109***
	(0.01)	(0.03)
Better achieves its main objectives	0.024*	
	(0.01)	
Supports the green transition	0.012	
	(0.01)	
Fosters wider action	0.040***	
	(0.01)	
Concern for nature	0.021	
	(0.01)	
Transparent about environment	0.050***	
	(0.02)	
Links climate, economy, well-being	-0.001	
	(0.01)	
Price stability compromised		-0.022
		(0.02)
Independence compromised		0.002
		(0.03)
No expertise		-0.031
		(0.02)
Ineffective		-0.076***
		(0.03)
Constant	0.074*	-1.144***
	(0.04)	(0.08)
N	2645	1155
R^2	0.130	0.261

Notes: See notes to Table 3. (11) ((12)) is estimated for only those who reported an increase (a decrease) in trust in the ECB due to its climate policies.

changes, despite appearing less critical in earlier analyses (Figure 5).

3.4 Impact of information intervention on inflation expectations

There was a large number of respondents in subsequent waves who were unexposed to our "reflective information intervention". Recall that our intervention is not a simple information intervention. Survey participants from Wave 42 received information that the ECB engages in climate activities, which was either new or a reminder. In addition, they were given the opportunity to reflect on whether they were concerned about climate change and how the ECB's climate activities would change their trust in the ECB and for what reasons. Hence, they engaged in a whole process around the issue of climate change and corresponding policy measures. Our intervention is, hence, rather comparable to a "nuanced" randomized control trial aimed at raising awareness around the issues of climate change, own attitudes and climate-related policy measures (e.g. Ash et al. 2023).

By comparing the inflation expectations of treated and untreated respondents from July 2023 (Wave 43) and August 2023 (Wave 44), we aim to understand the persistent effects of the treatment on respondents' inflation expectations. To ensure a fair comparison between the untreated and treated groups, our analysis is confined to respondents with prior survey participation, as newcomers tend to exhibit markedly higher inflation expectations.[12] There were 2,281 (1,345) participants in Wave 43 and 1,130 (2,687) participants in Wave 44 that had (not) participated in Wave 42 when the information provision took place. We also examine the inflation expectations of households pre-intervention in earlier waves. In Wave 40, there were 789 (1673) participants, and in Wave 41 1,937 (1,753) participants who were subsequently treated (untreated and did not participate) in Wave 42.

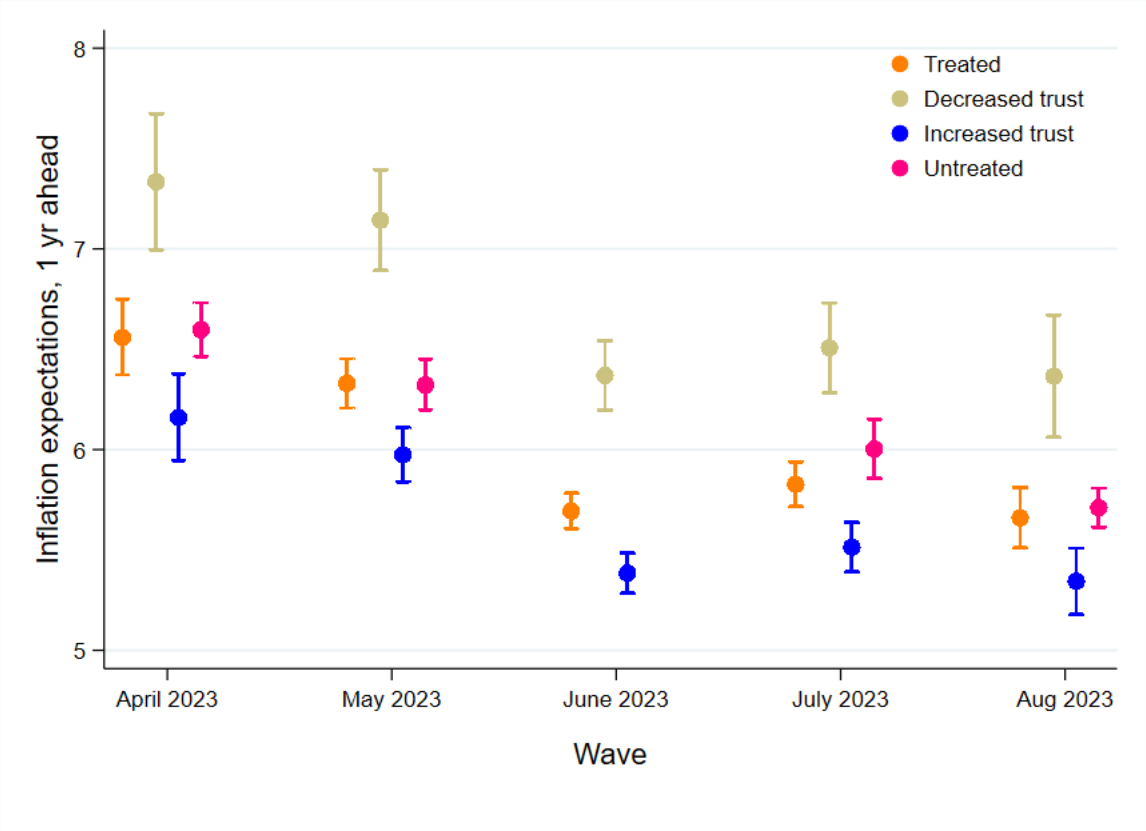
Figure 6 compares the mean long-run inflation expectations of seasoned respondents who received the treatment in June 2023 (Wave 42) against those who did not participate in the intervention.[13] The error bars denote 95% confidence intervals around the reported means. We also separate Wave 42 respondents by how the treatment influenced their trust in the ECB.

Mean 3/5 year-ahead inflation expectations are very similar among treated and untreated respondents in Waves 40 and 41 before the intervention (5.34 vs. 5.24 p.p. in Wave 40, 5.28

[12] In most of our analysis, we use the untreated respondents as a control group, as the share of Wave 42 respondents who previously knew about the ECB's climate objectives was disproportionately too small and unreliable for empirical comparisons. We focus our analysis on respondents whose expectations fell between -5 and 20 p.p.

[13] The BoP-HH monthly survey asks half of the respondents for their 3-year-ahead inflation expectation and the other half for their 5-year ahead inflation expectation. We pool them together.

Figure 6: 3/5-year inflation expectations (point forecasts), by wave



Notes: The treatment took place in June 2023 (Wave 42). April 2023 - Aug 2023 correspond to Waves 40-44.

vs. 5.22 p.p. in Wave 41, two-sided t-test, $p > 0.28$). We observe no significant differences across the treated and untreated in Waves 43 and 44 ($p > 0.19$ in both waves).

Both prior to and in Wave 42, respondents who report an increase in trust due to the information intervention had significantly lower inflation expectations compared to those who report a decrease in trust. In Waves 40, 41, and 42, the differences were 1.05, 0.94, and 0.93 p.p., respectively ($p = 0.0000$ in all waves). It is important to note that respondents in Wave 42 were exposed to the intervention only *after* they had provided their inflation forecasts and thus the intervention has no bearing on Wave 42 expectations. Following the intervention, those who decreased their trust continue to form longer-run inflation expectation that are 1.01 p.p. higher in Wave 43 and 0.77 p.p. higher in Wave 44 than those with increased trust. The differences still remain significant at the 0.1% level.

We next estimate difference-in-difference regressions to more formally and extensively assess the impact of the treatment on inflation expectations (short term and long term, point and qualitative forecasts, as well as on inflation uncertainty). We find no or only marginally significant effects on the different measures of inflation expectations and inflation uncertainty, confirming our graphical analysis. The regression model is described in detail and results are shown in the Appendix.

In summary, we find little evidence that the ECB's climate engagement affects inflation expectations. This result is in line with Ehrmann et al. [forthcoming] and Dräger and Nghiem [2023], suggesting that the treatment design (conventional vs. reflective information treatment) may not matter in this context.

4 Do central bankers understand the effect of the ECB's climate engagement on households' trust and inflation expectations?

Policymakers rely on their understanding of people's preferences, attitudes, and expectations to inform their decisions. However, these factors are often difficult to measure directly and may not always be accurately understood. This challenge becomes more pronounced when reliable survey data is lacking, when external factors such as climate change or economic restructuring alter preferences, or when policymakers lack insight into how people

form expectations. If policymakers rely on outdated or incorrect narratives, it can lead to suboptimal policy decisions and economic outcomes. The role of beliefs and narratives in economics is gaining recognition (e.g. Shiller 2019, Candia et al. 2020). However, research on the influence of policymakers' beliefs and narratives - whether accurate or not - is limited. One notable exception is Colombatto et al. [2023], which highlights a disconnect during the pandemic: surveys showed public support for international vaccine distribution, yet professional civil servants believed that people preferred to prioritize domestic needs over global cooperation.

In this section, we examine whether central bankers accurately anticipate the (mildly) positive impact of the ECB's climate measures on households' trust, as well as the observed lack of responsiveness in inflation expectations.

In June 2024, we conducted an internal survey among employees of the Bundesbank[14], targeting departments such as Economics, Financial Stability, Banking Supervision, Communication, Research, Digital Euro, Sustainability, Data and Statistics, Markets, and Cash Management. The survey focused on the ECB's climate activities, utilizing questions from the BOP-HH survey for research purposes. Participants were informed that the survey aimed to uncover the assumptions central bank employees often make about household preferences, expectations, and behaviors, and to compare these assumptions with actual household responses. Only those who had not previously seen the household survey results were asked to participate. Participation was voluntary and anonymous. A total of 524 employees participated in the survey.

We shared the following information with the participants:
"In a June 2023 survey, we asked German households about their trust in the ECB and their concerns regarding climate change. We also provided them with the following information: "Since 2022, the ECB has highlighted that, as part of its activities, it will monitor and manage risks associated with climate change. It will also support the transition to a "green economy" and further climate-relevant measures within the scope of its mandate.""

We then asked central bankers to assess the following variables that were introduced in subsection 2.1: **Influence trust**, **Increase trust reasons**, **Decrease trust reasons**, as well as households' long-term inflation expectations.

[14]The internal survey was supported by the IT department of the Bundesbank, which used an internal survey tool different from the BOP-HH.

- **Influence trust.** Specifically, we first asked participants: "What do you think is the share of households who reported that the contribution of the ECB to the combat of climate change increases / decreases their trust in the ECB. Please allocate 100% among "Greatly strengthens trust", "Rather strengthens trust", "Rather weakens trust", "Greatly weakens trust", "Don't know"."

- **Increase trust reasons.** Next we asked: "Households who reported that climate activities of the ECB strengthens their trust in the ECB, were asked for the reasons for the strengthening. Please select up to 3 reasons, which were particularly relevant for the households." We then listed the possible reasons, see subsection 2.1.

- **Decrease trust reasons.** Then we asked: "Households who reported that climate activities of the ECB weakens their trust in the ECB, were asked for the reasons for the weakening. Please select up to 2 reasons, which were particularly relevant for the households." We then listed the possible reasons, see subsection 2.1.

- **Inflation expectations.** Finally, we requested them to answer: "What do you think, how have long-term inflation expectations (horizon of 3-5 years) of survey participants changed due to their reflection on this issue. Please provide 1 answer." Participants could select among "increased", "decreased", and "stayed the same".

The results are presented in Table 5, both for the full sample and broken down by gender, age categories, and management versus non-management positions.[15]

It is important to note that the exact numbers are not directly comparable. Regarding the Influence trust question, the "Don't know" option was not initially available to household survey participants but was offered later to those who initially declined to choose among the four responses (see subsection 2.1). In contrast, for technical reasons central bankers were provided the "Don't know" option along with the other choices from the outset. Additionally, Bundesbank employees were permitted to select up to three responses for the second question and up to two for the third, while households faced no such limits. Moreover, we have point estimates for households' inflation expectations, whereas central bankers were only asked to categorize expectations as "increased," "decreased," or "stayed the same."

[15] We also obtained results by department. We intended to test, for example, whether the Communications department, which regularly interacts with the public, showed any systematic difference. However, we found either no significant differences across departments, or the group sizes were too small, so that we could not report results without compromising confidentiality. Therefore, results for individual departments are not shown here.

Therefore, the focus in this section will be on relative figures, such as the proportion of respondents reporting a strengthening versus a weakening of trust, or the relative importance of different reasons as perceived by central bankers compared to households.

Overall, Bundesbank staff offered a realistic assessment of how the ECB's climate activities have affected households' trust and identified the primary reasons for any changes in trust. The relative shares were very similar (though the "Don't know" option was frequently chosen, likely due to survey design issues, as discussed). Some minor differences emerged among groups: female employees and younger participants were more likely to believe that a greater proportion of households reported increased trust compared to their male and older counterparts.

Regarding inflation expectations, the large majority of Bundesbank employees predicted a rise in long-term inflation expectations, a forecast not supported by our household panel findings. This trend was consistent across all groups. Central bankers may be overstating the negative impact of climate measures on inflation expectations, potentially due to a conservative bias aimed at avoiding high inflation (Rogoff 1985). There are some minor differences across groups. A higher proportion of women believe that the ECB's climate engagement will lead to a change (either positive or negative) in household inflation expectations compared to men. Additionally, the belief that inflation expectations would rise was more common among managers compared to non-managers, as well as among both younger employees (under 35) and older employees (over 55), relative to those in the middle-aged group.

5 Discussion and conclusion

Our findings demonstrate a mild increase in self-reported trust in the ECB among a majority of households following its new emphasis on climate issues. Notably, we find that most households appreciate the ECB's broader scope and concern beyond its traditional mandate. However, there is some apprehension among households that this shift could compromise price stability and independence. On the other hand, a larger group of households believe that the ECB's climate engagement helps it better achieve its primary objectives. Finally, we detect little evidence that the ECB's climate initiatives have a significant effect on inflation expectations. In summary, our results suggest that the public overall endorses the ECB's climate engagement.

Table 5: Internal survey results

	Total	Female	Male	<35	35-44	45-54	>55	Manager	No manager
Influence trust: mean (std. dev.)									
Greatly strengthens trust	10.7 (8.9)	11.3 (10.3)	10.6 (8)	12.1 (9)	11.5 (9.9)	9.8 (7.5)	8.7 (7.9)	10.6 (8.7)	10.8 (8.9)
Rather strengthens trust	27.7 (15.2)	30.7 (16.6)	26.5 (14.1)	29.3 (14.6)	27.7 (15.1)	28 (15.1)	24.7 (16.3)	27.5 (15)	27.7 (15.3)
Rather weakens trust	21.2 (14.4)	18.7 (13.3)	22.6 (14.8)	20.9 (11.9)	21.1 (14.2)	21.6 (14.5)	21.7 (18)	22.5 (14.3)	20.9 (14.5)
Greatly weakens trust	13.7 (12.7)	11.7 (10.9)	14.4 (12.5)	13.9 (9.5)	14.2 (13.2)	12.8 (11.4)	13.9 (16.8)	14.8 (16.1)	13.5 (11.7)
Don't know	26.3 (19.7)	26.9 (19.8)	26.1 (19.5)	24.4 (15.4)	25 (19.7)	27.7 (20)	29.7 (24.2)	24.5 (18.1)	26.8 (20.1)
Increase trust reasons: in %									
Better achieves its main objectives	22.3	24.6	21.3	22.3	25.6	20.5	18.7	11.7	24.9
Supports the green transition	78.6	78.1	79.3	81.5	78.4	78.0	75.8	83.5	77.4
Fosters wider action	34.7	34.4	34.9	40.0	32.4	35.4	30.8	30.1	35.9
Concern about nature	54.0	47.5	57.1	51.5	54.0	57.5	52.7	61.2	52.3
Transparent about environment	13.4	12.0	14.5	14.6	10.2	15.7	14.3	14.6	13.1
Links climate, economy, well-being	74.4	77.6	72.8	73.1	76.7	76.4	69.2	77.7	73.6
Decrease trust reasons: in %									
Price stability compromised	72.5	72.1	72.8	75.4	76.1	70.1	64.8	72.8	72.4
Independence compromised	57.6	59.0	56.5	60.8	56.3	53.5	61.5	50.5	59.4
No expertise	54.0	53.0	54.6	51.5	55.7	58.3	48.4	55.3	53.7
Ineffective	12.6	12.6	13.3	10.8	9.7	16.5	15.4	16.5	11.6
Inflation expectations have									
... increased (in %).	65.3	68.9	63.0	67.7	61.9	65.4	68.1	71.8	63.7
... decreased (in %)	4.2	6.0	3.1	6.9	2.8	3.9	3.3	4.9	4.0
... not changed (in %).	30.5	25.1	34.0	25.4	35.2	30.7	28.6	23.3	32.3
N	*524*	*183*	*324*	*130*	*176*	*127*	*91*	*103*	*421*

Our analysis has also uncovered further scope by the ECB (and possibly other central banks) to enhance public trust in its climate engagement. Some measures are straightforward and a continuation of the ECB's actual policies (such as to contribute to a positive economic environment and take care of price stability). Other possibilities have not yet been explored (sufficiently), and we will discuss these options in the remainder of this last section.

First, our analysis reveals a significant relationship between high levels of trust in the ECB and the public's valuation of its climate activities. Given that households generally report moderate trust in the ECB, a critical question arises: how can the ECB further strengthen this trust? Eickmeier and Petersen [2024] offer a fresh perspective by adopting an interdisciplinary approach, integrating insights from political science and psychology to provide a more holistic view of the factors shaping central bank trust. Their findings suggest that households who value outcomes such as price stability and technocratic decision-making are more likely to trust the ECB. Conversely, respondents who place greater importance on values like the integrity of central bankers, transparent communication, and broader societal concerns tend to exhibit lower levels of trust in the institution. To enhance public trust, the ECB should not only highlight its commitment to price stability and analytically formed decision-making but also emphasize its alignment with public values.

Second, our findings indicate that a significant proportion of households believe the ECB can play a meaningful role in addressing climate change. Specifically, 33% of all respondents believe that the ECB can foster wider action on climate change and 44% feel it is right that the ECB supports the green transition. A smaller yet notable share (16% and 9%, respectively) remains skeptical. The ECB has made it clear that while governments hold the primary responsibility and possess the most effective tools for combating climate change, it can still contribute within the limits of its mandate and the tools available to it.

Central banks must develop a clear understanding of their capacities and limitations, as well as the uncertainties surrounding the impacts of climate change and intervention, and communicate these transparently to the public (e.g. Hansen 2022). It is crucial that central banks' climate engagement does not distract the public from, or reduce efforts by, those who possess more effective tools for addressing the climate crisis.[16] All policy makers need to do their part to address the climate crisis. In this way, they also best support each other in achieving their core objectives.

[16]This risk is stressed by Davig and Gürkaynak [2015] who examine the optimal policy mix in an environment with multiple inefficiencies and policies and a central bank with only one instrument.

A third strategy that central banks, including the ECB, might consider is revisiting the complex relationship between the various (central bank and other, broader) goals. For some time now, central banks have been expanding the range of factors they consider in evaluating the economy to better fulfill their mandates, and this trend is likely to continue. Economists are only beginning to recognize risks beyond climate change that could affect the economy, price stability, and financial markets. These risks include other environmental challenges like biodiversity loss, soil and ocean pollution, as well as the social impacts of climate change, such as migration, social unrest, and political stability(e.g. Elderson 2023, Weder di Mauro 2023).

As central banks increasingly engage with issues beyond their traditional mandates, debates about trade-offs between objectives and central bank independence are likely to intensify among both policymakers and observers. Our findings of increased trust in the ECB by the majority of households in response to information about the its climate engagement, along with the stability of inflation expectations, suggest that there is broad public support for climate-related actions. Furthermore, households' concerns about the potential compromise of the ECB's independence appear to be relatively minor. Additionally, most households did not perceive a trade-off between price stability and climate action when surveyed. However, if central banks take on responsibilities they cannot fulfill, public trust could be at risk.

Central banks must address these challenges. One way forward is to acknowledge and communicate that all policies should ultimately serve the broader well-being of both humans and other living beings. In the long run, there should be no trade-off between environmental protection and economic goals. Accordingly, the ECB is now clearly communicating that its contribution to a green transformation and its mandate are ultimately compatible.[17]

[17] Schnabel [2022], for example, emphasizes the impact of climate change on inflation ("climateflation, fossilflation and greenflation") and states: "monetary policy cannot simply ignore the effects of the green transition if they threaten to jeopardise the achievement of our primary mandate of price stability." And she explains in another speech (Schnabel 2023) how, at the same time, the "[g]reen transition can only thrive with price stability".

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A Additional tables and figures

We evaluate the persistent effects of the reflective information intervention on households' expectations using the following difference-in-difference regression framework:

$$\begin{aligned} E_{i,t}Y_{t+1} = \rho + \gamma_1 Wave43 + \gamma_2 Wave44 + \beta_1' Treated_i + \beta_2' Treated_i \times Wave43 \\ + \beta_3' Treated_i \times Wave44 + \phi' X_i + \zeta' E_{i,t-1} Y_t \end{aligned} \tag{2}$$

where $E_{i,t}Y_{t+1}$ denotes respondent i's Wave t one-year ahead subjective expectation of inflation, specifically the one-year ahead point and qualitative inflation expectations, a longer-term quantitative inflation expectation (either three- or five-years ahead, pooled together), credibility in the ECB's inflation target (measured as the negative of the absolute deviation of that long-term quantitative inflation expectation from target), and the inter-quartile range of their one-year ahead probabilistic forecasts, which is a measure of respondents' subjective inflation uncertainty (see Armantier et al. 2017 and Kostyshyna and Petersen 2023).[18] $Wave43$ and $Wave44$ are wave fixed effects and $Treated_i$ is a dummy variable that takes the value of 1 if a respondent participated in Wave 42 (and received the treatment), and 0 otherwise. X_i is the $n \times 1$ vector of time-invariant regressors (i.e. socio-demographic groups). We also include as an additional control the most recent lag of the dependent variable.[19] In Panel A we include all observations, in Panels B and C we reduce the treated sample to include only observations for those who have reported an increase in trust or a decrease in trust due to the ECB's climate activities, respectively. ϕ, β, and ζ denote N-dimensional coefficient vectors and μ_i is a subject-level random effect. We restrict our analysis to experienced respondents whose expectations fall between -5 and 20%. We estimate Equation 2 as an OLS regression with robust standard errors for both the full sample and subsets of observations in Waves 41 to 45, and excluding Wave 42. Estimation results are presented in Panels A-C of Table A.1.

In Panel A, we observe very small and, in most cases, statistically insignificant effects of the treatment on respondents' subsequent expectations. Qualitative expectations are significantly lower following the intervention, but the adjustment is very minor and delayed (occurring in Wave 44). Panels B and C show that these effects are being driven by the response of those who self-report increased trust in the ECB. In all other cases, the effects

[18] Qualitative expectations are asked on a five-point scale. "What developments do you expect in the following metrics over the next 12 months?". Answers can range from 1 (Decrease significantly), 2 (Decrease slightly), 3 (Remain roughly the same), 4 (Increase slightly), and 5 (Increase significantly).

[19] For respondents who were not in Wave 42 (Untreated), this may have been Wave 41 or 40 responses. Note that not all subjects have a recorded recent response leading to a reduced sample size.

of the treatment are not large or significant in the subsequent waves.

Table A.2 includes the estimated effects of the demographic control variables on inflation expectations, for the full sample. Our analysis reveals that inflation expectations tend to be higher among respondents who are female, have lower incomes, or possess lower levels of education, aligning with previous research (Gorodnichenko et al. 2022, Kostyshyna and Petersen 2023, Reiche 2023).

Table A.1: Effects of the intervention on inflation expectations in Waves 43 and 44

	(1) Point 1 yr. ahead	(2) Qualitative 1 yr. ahead	(3) Point 3/5 yrs. ahead	(4) CB Credibility	(5) IQR 1 yr. ahead
Panel A: Full sample					
Treated × Wave 44	-0.047	-0.001	-0.162	0.003	0.180
	(0.28)	(0.10)	(0.31)	(0.26)	(0.20)
Treated × Wave 44	-0.100	-0.118**	-0.013	-0.018	-0.025
	(0.16)	(0.06)	(0.14)	(0.13)	(0.12)
N	7520	7733	7235	7301	7262
F	30.31	42.12	115.2	141.9	21.01
Panel B: Untreated vs. Increased trust					
Treated × Wave 43	0.000	0.013	-0.150	-0.001	0.169
	(0.28)	(0.10)	(0.31)	(0.26)	(0.20)
Treated × Wave 44	-0.034	-0.109*	0.072	-0.075	-0.030
	(0.17)	(0.06)	(0.16)	(0.14)	(0.13)
N	6309	6468	6075	6126	6095
F	29.39	41.92	91.80	116.4	18.41
Panel C: Untreated vs. Decreased Trust					
Treated × Wave 43	-0.120	-0.025	-0.194	0.023	0.251
	(0.33)	(0.12)	(0.35)	(0.30)	(0.25)
Treated × Wave 44	-0.149	-0.135	-0.221	0.121	0.011
	(0.26)	(0.09)	(0.24)	(0.23)	(0.20)
N	4647	4791	4444	4489	4487
F	25.05	35.76	74.82	90.27	12.55

Notes: All specifications in Panels A through C include controls for age, gender, education and income and past expectations. Sample is restricted to experienced respondents. *$p < 0.10$, **$p < 0.05$, and ***$p < 0.01$.

Table A.2: Effects of the intervention on inflation expectations in Waves 43 and 44 - with full set of controls

	(1) Point 1 yr. ahead	(2) Qualitative 1 yr. ahead	(3) Point 3/5 yrs. ahead	(4) CB Credibility	(5) IQR 1 yr. ahead
Panel A: Full sample					
Wave43	-0.528**	0.035	-0.034	0.138	-0.173
	(0.26)	(0.09)	(0.29)	(0.24)	(0.18)
Wave44	-0.655***	0.119***	-0.318***	0.320***	-0.067
	(0.10)	(0.04)	(0.09)	(0.08)	(0.07)
Treated	0.121	0.042	0.113	-0.074	-0.117
	(0.12)	(0.04)	(0.11)	(0.10)	(0.09)
Treated × Wave43	-0.047	-0.001	-0.162	0.003	0.180
	(0.28)	(0.10)	(0.31)	(0.26)	(0.20)
Treated × Wave44	-0.100	-0.118**	-0.013	-0.018	-0.025
	(0.16)	(0.06)	(0.14)	(0.13)	(0.12)
$E_{i,t-1}Y_t$	-0.000	-0.000***	0.434***	0.519***	0.132***
	(0.00)	(0.00)	(0.02)	(0.02)	(0.03)
Age	0.001	-0.004***	0.004**	-0.005**	-0.017***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Education	-0.064***	-0.039***	-0.061***	0.073***	0.030***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Income	-0.102***	-0.046***	-0.054***	0.067***	-0.045***
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Female	0.524***	0.219***	0.373***	-0.390***	0.076
	(0.07)	(0.02)	(0.07)	(0.06)	(0.05)
Constant	7.083***	3.715***	3.130***	-2.072***	3.278***
	(0.19)	(0.07)	(0.20)	(0.18)	(0.20)
N	7520	7733	7235	7301	7262
F	30.31	42.12	115.2	141.9	21.01

Notes: Treated is a dummy variable taking the value of 1 if the respondent participated in Wave 42. Sample is restricted to experienced respondents. *$p < 0.10$, **$p < 0.05$, and ***$p < 0.01$.