

Anchoring Households' Inflation Expectations When Inflation Is High

Giang Nghiem^{1 3 4}

Lena Dräger^{1 2}

Ami Dalloul¹

¹Leibniz University Hannover ²CESifo ³University of Konstanz ⁴Centre for Applied Macroeconomic Analysis (ANU)

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Central Bank Communication in Times of High Inflation

- In the years 2021-2024, the euro area and other advanced economies struggled with persistently high inflation.
- To manage inflation expectations, central banks increasingly communicate with the general public by:
 - ▶ Providing inflation forecasts
 - ▶ Sharing their inflation target, policy rates, explanations, etc.

Central Bank Communication in Times of High Inflation

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- To manage inflation expectations, central banks increasingly communicate with the general public by:
 - ▶ Providing inflation forecasts
 - ▶ Sharing their inflation target, policy rates, explanations, etc.
- President Lagarde of the European Central Bank (ECB) has emphasized the importance of addressing inflation, stating:
"Fighting inflation is our mantra, our mission, our mandate. We know that the current situation is difficult for many people in the euro area - that's why we need to raise interest rates to tame inflation."

Research questions

- 1 Which communication strategies (quantitative/numerical vs. qualitative/commitment or a combination thereof) effectively anchor households' inflation expectations in times of high inflation?
- 2 Do these strategies have uniform effects across different segments of the population?

This paper

- Measure the anchoring of inflation expectations using:
 - ▶ Distance of medium-run expectations from the 2% inflation target
 - ▶ Uncertainty of medium-run expectations
- Conduct an RCT survey experiment with various communication strategy treatments:
 - ① Inflation forecasts
 - ② Inflation target
 - ③ Statement of commitment
 - ④ Combinations of these treatments: 1+3 and 2+3
- Evaluate the heterogeneous treatment effects across:
 - ▶ Financial Literacy
 - ▶ General Trust in the Central Bank
 - ▶ ECB policy meeting on February 8 2024

Survey Sample

- Online survey
- Conducted by Bilendi Research
- The survey (February 3-20, 2023):
 - ▶ 4,000 German consumers
 - ▶ Representative in terms of age, gender, income, and region
- The follow-up survey (May 2-16, 2023):
 - ▶ 2,900 respondents who participated in the first wave

Survey Experiment Design

- Part 1: Before providing information treatments
 - ▶ Demographics, financial literacy, knowledge about the ECB, and general trust in the ECB
 - ▶ Point forecast of prior inflation expectations in 2025 ($\pi^{prior,3y}$) and 2027 ($\pi^{prior,5y}$)

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 - Part 2: Information treatments
 - Part 3: Posterior inflation expectations in 2025 ($\pi^{post,3y}$) and 2027 ($\pi^{post,5y}$)
 - ▶ Minimum and maximum values of expected inflation
 - ▶ Probability that inflation expectations will be higher than the mid-point between the reported minimum and maximum
- ⇒ Calculate the weighted mean and standard deviation of posterior expectations

Measuring Inflation Expectations

● Prior Inflation Expectations

- ▶ In your opinion, what will be the average inflation or deflation rate in Germany in 2025? Please enter a figure in the box below.
 - ★ I expect an average inflation/deflation rate for Germany in 2025 of ...%
 - ★ I don't know

● Posterior Inflation Expectations

- ▶ What do you think is the lowest and highest value that the average inflation or deflation rate in Germany could reach in 2025?
 - ★ (a) Please enter the minimum value: %
 - ★ (b) Please enter the maximum value: %
- ▶ What is the probability that the average inflation rate in 2025 will be greater than X %? (X is automatically calculated as $((a) + (b))/2$ and shown on the respondent's screen)
 - ★ Please give an answer on a scale from 0 to 100, where 0 means "absolutely no chance" and 100 means "absolutely certain": ...

Information treatments

- ① **T1** (inflation projections): Average inflation in the euro zone in 2022 was 8.4%. The European Central Bank (ECB) expects average inflation in the euro zone to be 6.3% in 2023, 3.4% in 2024 and 2.3% in 2025.

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- 4 **T4**: T1 + T3

Information treatments

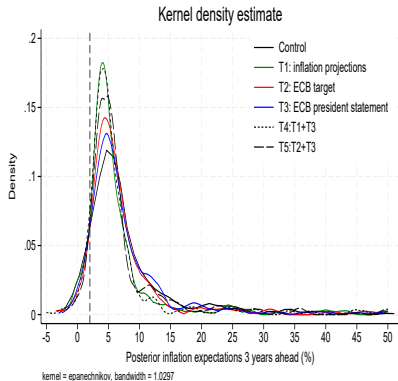
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- 5 **T5**: T2 + T3

Summary statistics: Control group

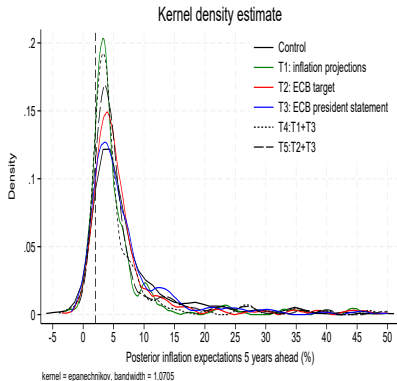
Variable	Mean	Median	Std. Dev.	Min.	Max.	N
$\pi^{prior,3y}$	5.44	5	3.35	-5	20	457
$\pi^{posterior,3y}$	5.86	6	3.42	-2.8	23.5	428
$ \pi^{posterior,3y} - 2 $	4.02	4	2.92	0	19.25	421
$\pi^{prior,5y}$	4.78	5	3.78	-5	25	411
$\pi^{posterior,5y}$	5.05	5	3.29	-5	20.88	379
$ \pi^{posterior,5y} - 2 $	3.27	3.2	2.79	0	18.5	378

Mean and standard deviation are computed using Huber robust weights.

Distributions of Posterior Inflation Expectations: Control and Treatment Groups



Expectations 3 years ahead



Expectations 5 years ahead

Average Treatment Effects on Posterior Inflation Exp.

- ① Effects on Distance of Posterior Inflation Expectations from Target

$$|\pi_i^{post} - 2| = \alpha + \beta|\pi_i^{prior} - 2| + \sum_{j=1}^5 \eta_j Treatment_{j,i} + \zeta X_i + \epsilon_i \quad (1)$$

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- 2 Effects on Uncertainty of Posterior Inflation Expectations

$$\sigma \pi_i^{post} = \alpha + \beta \pi_i^{prior} + \sum_{j=1}^5 \eta_j Treatment_{j,i} + \zeta X_i + \epsilon_i \quad (2)$$

Treatment Effects on Posterior Inflation Expectations

	(1) 3 years ahead $ \pi^{post,3y} - 2 $	(2) $\sigma\pi^{post,3y}$	(3) 5 years ahead $ \pi^{post,5y} - 2 $	(4) $\sigma\pi^{post,5y}$
$ \pi^{prior} - 2 $	0.60*** (0.01)		0.68*** (0.01)	
π^{prior}		0.012*** (0.00)		0.018*** (0.00)
T1: inflation projections	-0.70*** (0.14)	-0.078** (0.04)	-0.82*** (0.14)	-0.070* (0.04)
T2: ECB target	-0.17 (0.14)	-0.037 (0.04)	-0.18 (0.13)	-0.043 (0.04)
T3: ECB president statement	-0.0082 (0.14)	0.026 (0.04)	-0.18 (0.13)	-0.0014 (0.04)
T4: T1+T3	-0.78*** (0.14)	-0.089** (0.04)	-0.77*** (0.13)	-0.067* (0.04)
T5: T2+T3	-0.37*** (0.14)	-0.069* (0.04)	-0.50*** (0.13)	-0.032 (0.04)
R ²	0.811	0.097	0.883	0.118
N observations	2572	2572	2312	2312

Note: Estimates for wave 1. Demographic controls include age, gender, education, household income, homeownership status, household size, and region. This table reports estimated coefficients from Huber robust regressions. Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Heterogeneity

Financial Literacy

	(1) Low Financial Literacy $ \pi^{post,5y} - 2 $	(2) $\sigma\pi^{post,5y}$	(3) High Financial Literacy $ \pi^{post,5y} - 2 $	(4) $\sigma\pi^{post,5y}$
T1: inflation projections	-0.51 (0.45)	0.099 (0.09)	-1.03*** (0.17)	-0.18*** (0.05)
T2: ECB target	-0.56 (0.44)	0.021 (0.09)	-0.46*** (0.17)	-0.087 (0.05)
T3: ECB president statement	0.022 (0.46)	0.10 (0.09)	-0.46** (0.18)	-0.15*** (0.05)
T4: T1+T3	-0.53 (0.45)	0.067 (0.09)	-0.93*** (0.17)	-0.13** (0.05)
T5: T2+T3	0.067 (0.45)	0.23*** (0.09)	-0.69*** (0.17)	-0.14*** (0.05)
R ²	0.779	0.186	0.815	0.159
N observations	661	661	806	806

- The effects are more pronounced for financially literate consumers
- No different effects across education or knowledge about the ECB

Trust in the ECB

	(1) Low Trust in the ECB $ \pi^{post,5y} - 2 $	(2) $\sigma\pi^{post,5y}$	(3) High Trust in the ECB $ \pi^{post,5y} - 2 $	(4) $\sigma\pi^{post,5y}$
T1: inflation projections	-1.02*** (0.27)	-0.18** (0.07)	-1.13*** (0.21)	-0.12** (0.06)
T2: ECB target	0.037 (0.28)	-0.11 (0.07)	-0.57*** (0.21)	-0.088 (0.06)
T3: ECB president statement	-0.39 (0.27)	-0.10 (0.07)	-0.61*** (0.21)	-0.069 (0.06)
T4: T1+T3	-0.64** (0.27)	-0.15** (0.07)	-1.10*** (0.22)	-0.11* (0.06)
T5: T2+T3	-0.43 (0.27)	-0.080 (0.07)	-0.81*** (0.21)	-0.10* (0.06)
R ²	0.892	0.149	0.898	0.114
N observations	703	703	688	688

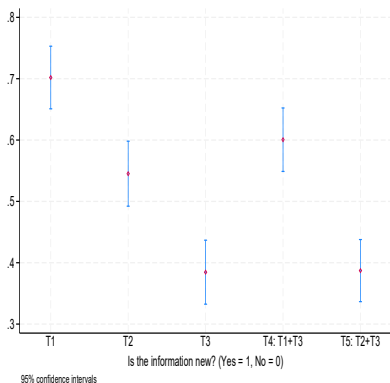
- The effects are more pronounced for those who trust the ECB
- Similar results for those with high social trust

February 8, ECB Policy Meeting

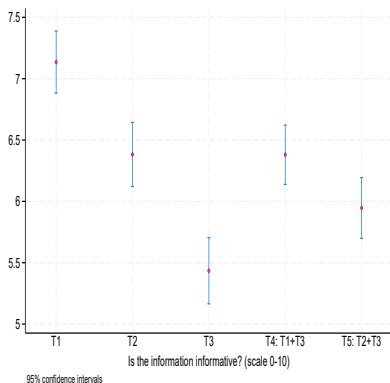
	(1)	(2)	(3)	(4)
	$ \pi^{post,3y} - 2 $		$ \pi^{post,3y} - 2 $	
	until 07.02	08.02 pre 14:30	08.02 post 14:30	after 09.02
$ \pi^{prior} - 2 $	0.71*** (0.02)	0.47*** (0.03)	0.50*** (0.04)	0.59*** (0.01)
T1: inflation projections	-0.34 (0.30)	-1.37*** (0.38)	-1.88*** (0.41)	-0.56*** (0.14)
T2: ECB target	0.29 (0.29)	-0.29 (0.41)	-1.00** (0.43)	-0.21 (0.14)
T3: ECB president statement	0.48 (0.31)	-1.21*** (0.41)	-0.80** (0.38)	0.15 (0.14)
T4: T1+T3	-0.29 (0.33)	1.54*** (0.37)	-1.15** (0.44)	-0.65*** (0.14)
T5: T2+T3	-0.076 (0.28)	-0.53 (0.34)	-0.71 (0.44)	-0.36** (0.14)
R ²	0.804	0.662	0.745	0.707
N observations	398	300	152	1455

Mechanism

Is the information treatment new or informative?

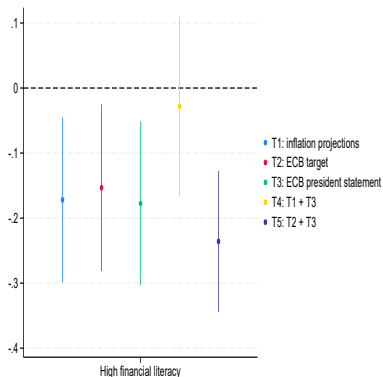


Is the information new? (Y/N)

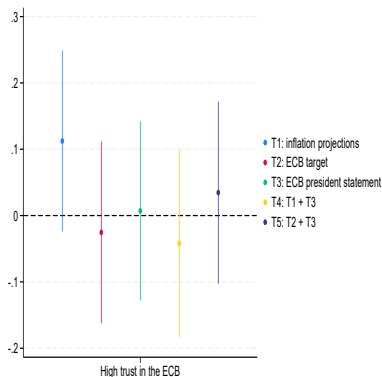


Is the information informative? (scale 0-10)

Is the information new?



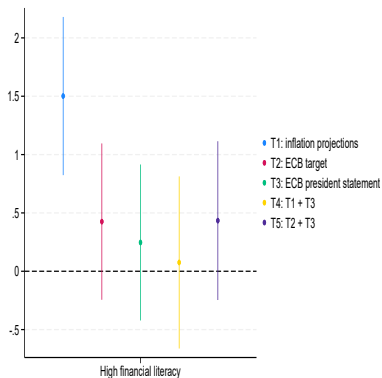
The role of financial literacy



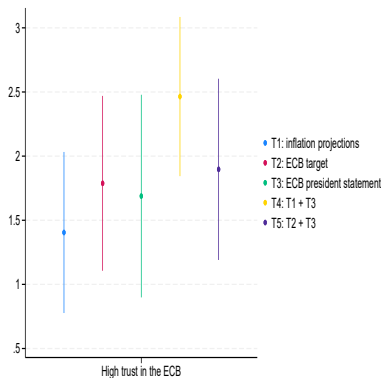
The role of trust

- Financially literate consumers are less likely to view the treatments as new information
- No difference about the newness of the treatments across trust in the ECB

Is the information informative?



The role of financial literacy



The role of trust

- Financially literate and highly trusting consumers find the treatments more informative

Results of the follow-up survey

	(1) 3 years ahead $ \pi^{post,3y} - 2 $	(2) $\sigma\pi^{post,3y}$	(3) 5 years ahead $ \pi^{post,5y} - 2 $	(4) $\sigma\pi^{post,5y}$
T1: inflation projections	-0.11 (0.22)	-0.065 (0.04)	-0.21 (0.21)	-0.0063 (0.04)
T2: ECB target	0.11 (0.21)	0.010 (0.04)	-0.050 (0.20)	0.026 (0.04)
T3: ECB president statement	0.14 (0.21)	0.037 (0.04)	0.089 (0.21)	0.030 (0.04)
T4: T1+T3	-0.16 (0.21)	-0.018 (0.04)	0.076 (0.20)	0.026 (0.04)
T5: T2+T3	-0.13 (0.21)	-0.063 (0.04)	0.026 (0.20)	-0.039 (0.04)
R ²	0.260	0.053	0.294	0.049
N observations	1921	1921	1703	1703

- No significant average treatment effects in the second wave
- Information effects tend to be short-lived

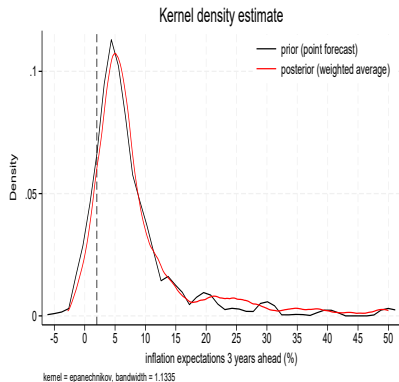
To anchor inflation expectations

- Providing inflation forecasts proved the most effective
- Adding a qualitative central bank statement to information about inflation forecasts generally does not improve the results
- Communicating either the qualitative statement or the inflation target alone has no significant impact, but combining them does
- Communication more effective for anchoring expectations of financially literate consumers and those who highly trust the CB
- Information effects may be powerful, but tend to be short-lived

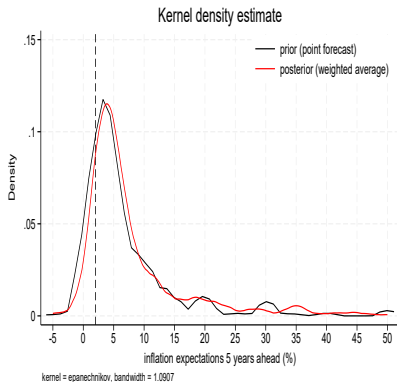
Thank you for your attention!

Appendix

Distribution of Inflation Expectations: Control Group



Expectations 3 years ahead



Expectations 5 years ahead

Treatment Effects: Bayesian Updating Approach

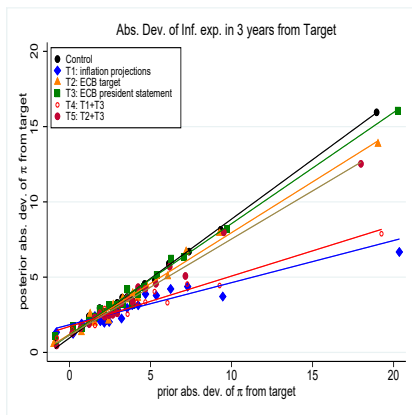
1 Bayesian updating

$$belief^{post} = G \times information + (1 - G) \times belief^{prior}$$

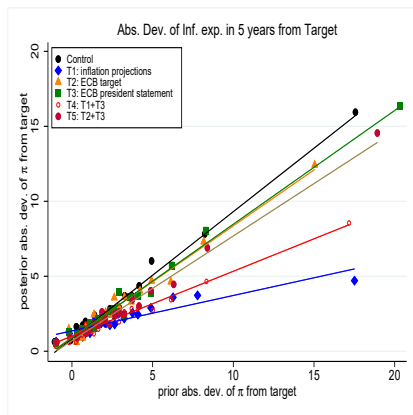
2 Econometric estimation:

$$|\pi_i^{post} - 2| = \alpha + \beta |\pi_i^{prior} - 2| + \sum_{j=1}^5 \eta_j Treatment_{j,i} + \sum_{j=1}^5 \lambda_j Treatment_{j,i} \times |\pi_i^{prior} - 2| + \zeta X_i + \epsilon_i \quad (3)$$

Binscatter plots: Distance of Inflation Exp. from Target



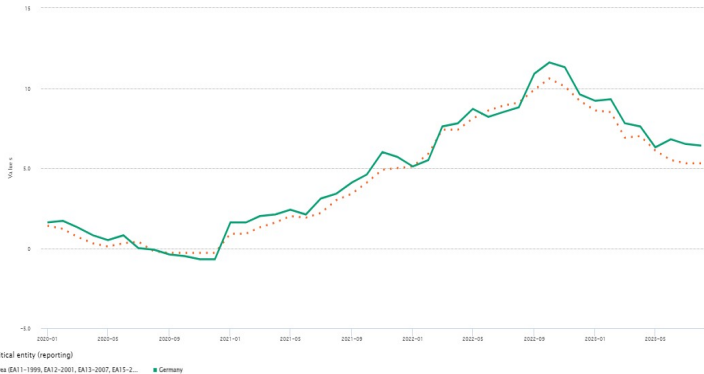
Expectations 3 years ahead



Expectations 5 years ahead

HICP - monthly data (annual rate of change)

Time / Geopolitical entity (reporting) Time frequency: Monthly Unit of measure: Annual rate of change Classification of individual consumption by purpose (COICOP): All-items HICP



Geopolitical entity (reporting)

■ Euro area (EA11-1999, EA12-2001, EA13-2007, EA15-2... ■ Germany

HICP - monthly data (annual rate of change)

Source of data: Eurostat (online data code: PRC_HICP_MANR)

Last update 31/08/2023 11:00

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eurostat

Questionnaire: Financial literacy

- Imagine you have 100 € in your account with an annual interest rate of 10%. How much money would you have in your account after two years? (Randomize answer order)
 - 1 Exactly 110 €
 - 2 Exactly 120 €
 - 3 Exactly 200 €
 - 4 **Slightly more than 120 € [50%]**
 - 5 999 Don't know/No answer

Questionnaire: Financial literacy

- Imagine that your net income (income after taxes and deductions) in 2024 is twice as high, but also, the prices of all goods have doubled. How much can you buy with your income in 2024? (Randomize answer order)
 - ① More than today
 - ② **Just as much as today [64%]**
 - ③ Less than today
 - ④ Cannot be determined based on the given information
 - ⑤ Don't know/No answer
- Do you agree with the following statement: "Investing in the stock of an individual company is less risky than investing in a fund of stocks from similar companies"? [Randomize answer order]
 - ① I agree
 - ② **I disagree [61%]**
 - ③ Don't know/No answer

Questionnaire: Trust

- To what extent do you trust the European Central Bank (ECB)?
Please express your trust on a scale from 0 (no trust at all) to 10 (complete trust).
[Insert number line between 0-10, with whole number increments] __

- In general, would you say that most people can be trusted, or that people cannot be trusted, and one should therefore be cautious in dealing with them?
Please indicate your trust in other people on a scale from 0 to 10. 0 indicates the belief that people cannot be trusted/one must be cautious, and 10 indicates the belief that most people can be trusted.
[Insert number line between 0-10, with whole number increments] __

Questionnaire: Knowledge about the ECB

- The main goal of the monetary policy of the European Central Bank (ECB) is to [Randomize the order of answers]
 - 1 stabilize prices for goods and services [35%]
 - 2 stabilize prices for corporate bonds
 - 3 keep interest rates low and stable
 - 4 reduce government debt
 - 5 Don't know/No answer
- What is your estimate of the European Central Bank's (ECB) annual inflation target, which it aims to achieve on average in the medium term (approximately 3 years)?
—% (% annually) [28% answered at 2%]
 - 1 Don't know/No answer [45%]