DEUTSCHE BUNDESBANK
EUROSYSTEM

A KISS for central bank communication in times of high inflation

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The study represents the author's opinions and does not necessarily reflect the views of the Deutsche Bundesbank or the Eurosystem.

Motivation and research question

Communication can be a powerful toolkit of a central bank

> *"Monetary policy is 98% talk and only two percent action, and communication is a big part"*
>
> — B. Bernanke (2015)

...if it can actually reach households

> *"Central banks will keep trying to communicate with the general public, as they should, for the most part they will fail"*
>
> — A. Blinder (2018)

In an environment of high inflation rates, how should the inflation outlook be communicated to the general public?

Can this communication help to bring households' expected inflation back towards the target?

What we do

Survey around 10,000 households (HHs) from the BOP-HH in two different inflation environments from March and October '22

In a RCT framework, we provide HHs with genuine ECB/Eurosystem communication about the ECB's inflation outlook, categorized as 'forecast', 'visual' and 'verbal'

Assess which of the communication treatments show largest impact on BOP-HH participants' assessments of future inflation

Rank/recommend implementable communication options

What we find

Central bank communication can help to bring HHs' inflation expectations back towards the target

But central banks should **K**eep **I**t **S**uper **S**imple

- A 'verbal'/soothing communication style and 'visual'/graphical illustration work best in guiding private HHs' expected inflation
- They steer high inflation expectations most effectively back towards the target

Results add to a growing literature, which assesses the effects of central bank communication with the general public

Blinder, Ehrmann, de Haan, Jansen (2022); Coibion, Gorodnichenko, Kumar (2018); Coibion, Gorodnichenko, Weber, (2020, 2022); D'Acunto, Hoang, Paloviita, Weber (2020); D'Acunto, Fuster, Weber (2021); Dräger, Lamla, Pfajfar (2022); Ehrmann, Georgarakos, Kenny (2023); among others

Experimental Design and Information Treatments

Experimental design (RCT)

Collected around 10,000 responses in two different inflation environments from March and October '22 waves of BOP-HH

Step 1: respondents receive information that ECB's inflation target is 2%

- Control group makes probabilistic assessment for inflation 1Y, 2-3Y, 5-10Y ahead

Today's focus is on the October '22 wave of BOP-HH

The return of high inflation

In Oct '22, HHs expected strongly elevated inflation over the next year

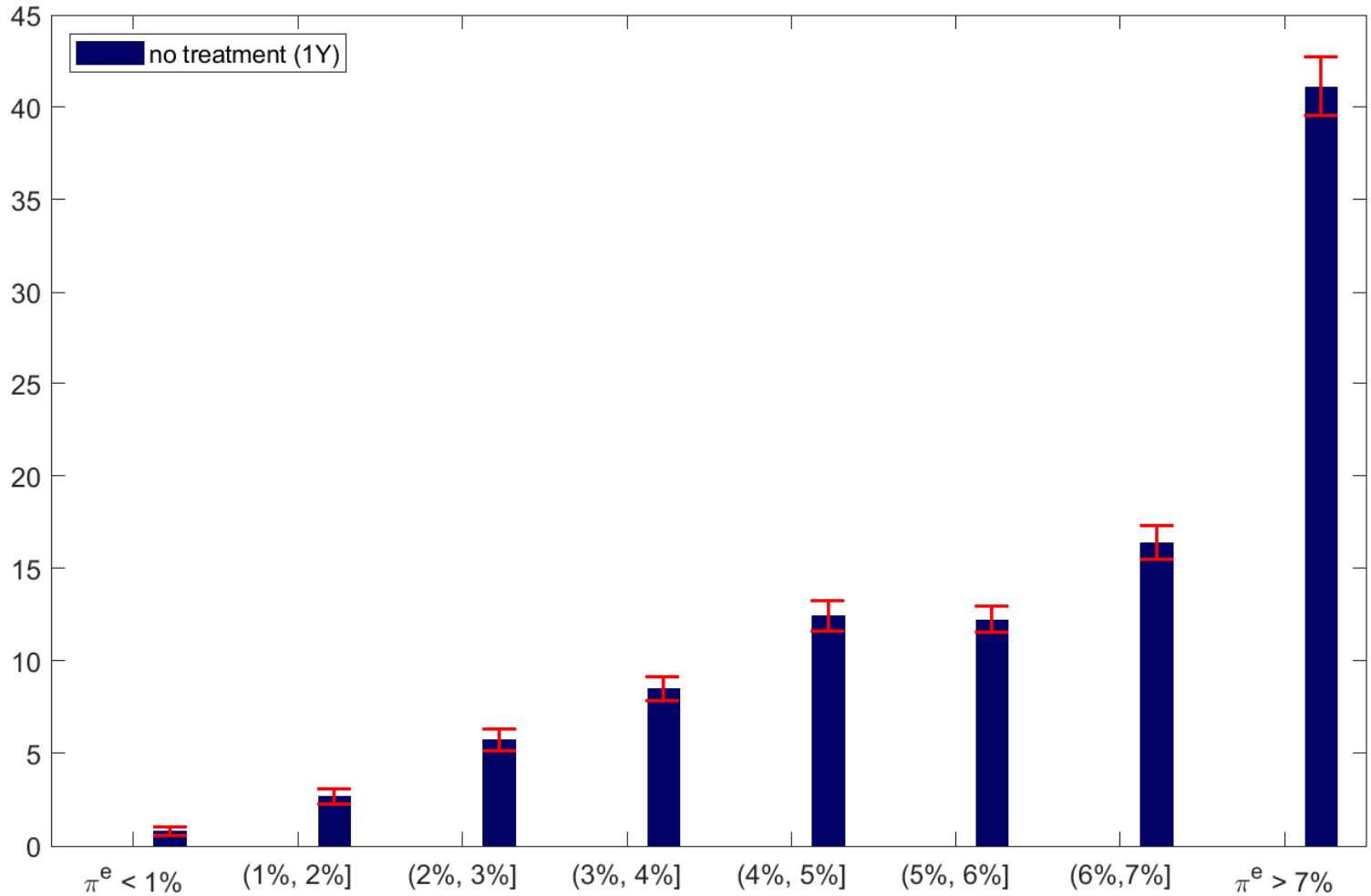


Figure 1: Average probabilities for inflation 1Y ahead from BOP-HH, October 2022.

The return of high inflation

Expectations are elevated also for the medium term (2-3Y)

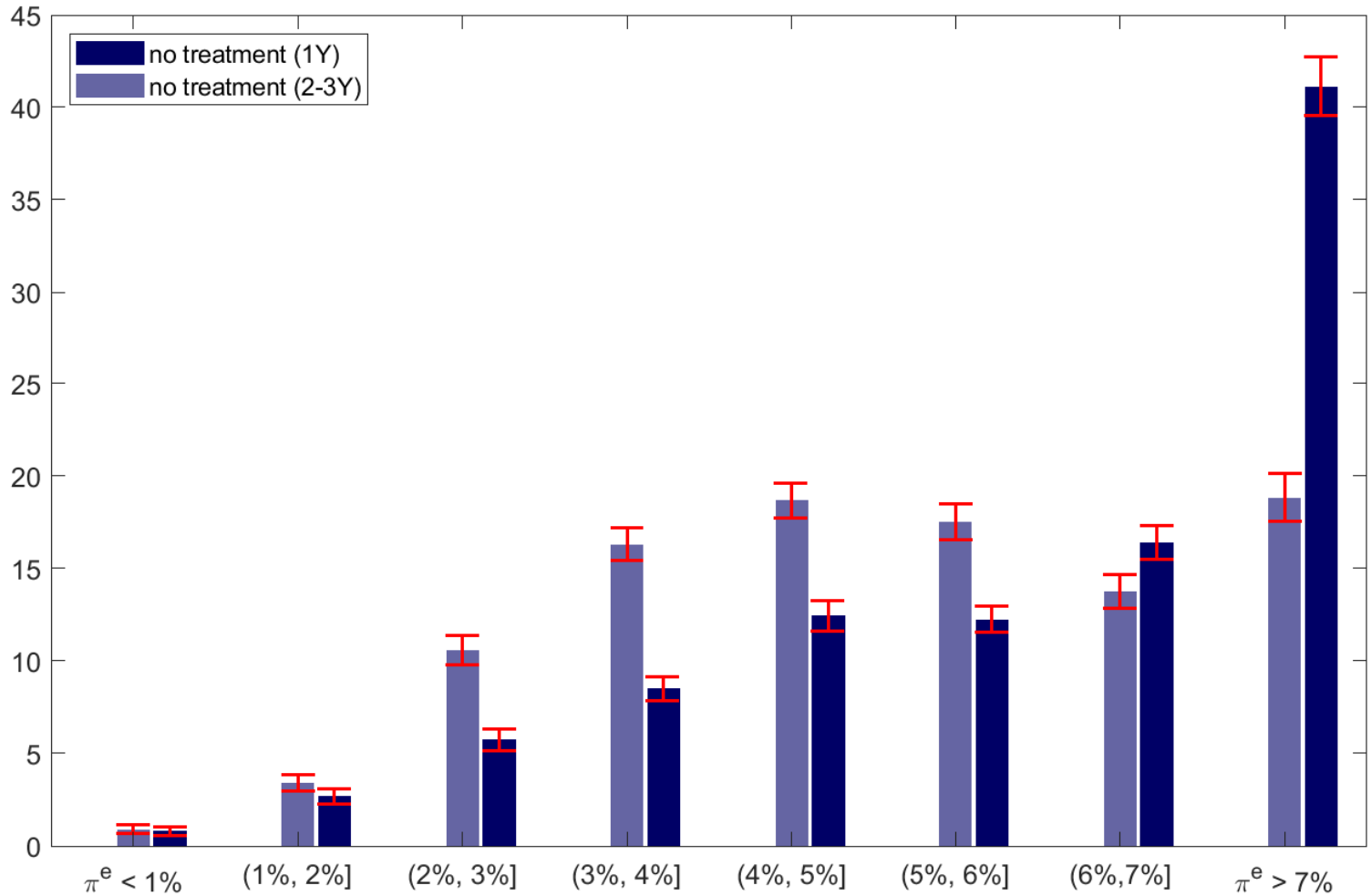


Figure 2: Average probabilities for inflation 2-3Y ahead from BOP-HH, October 2022.

The return of high inflation

Even long-run expectations (5-10Y) are still above target

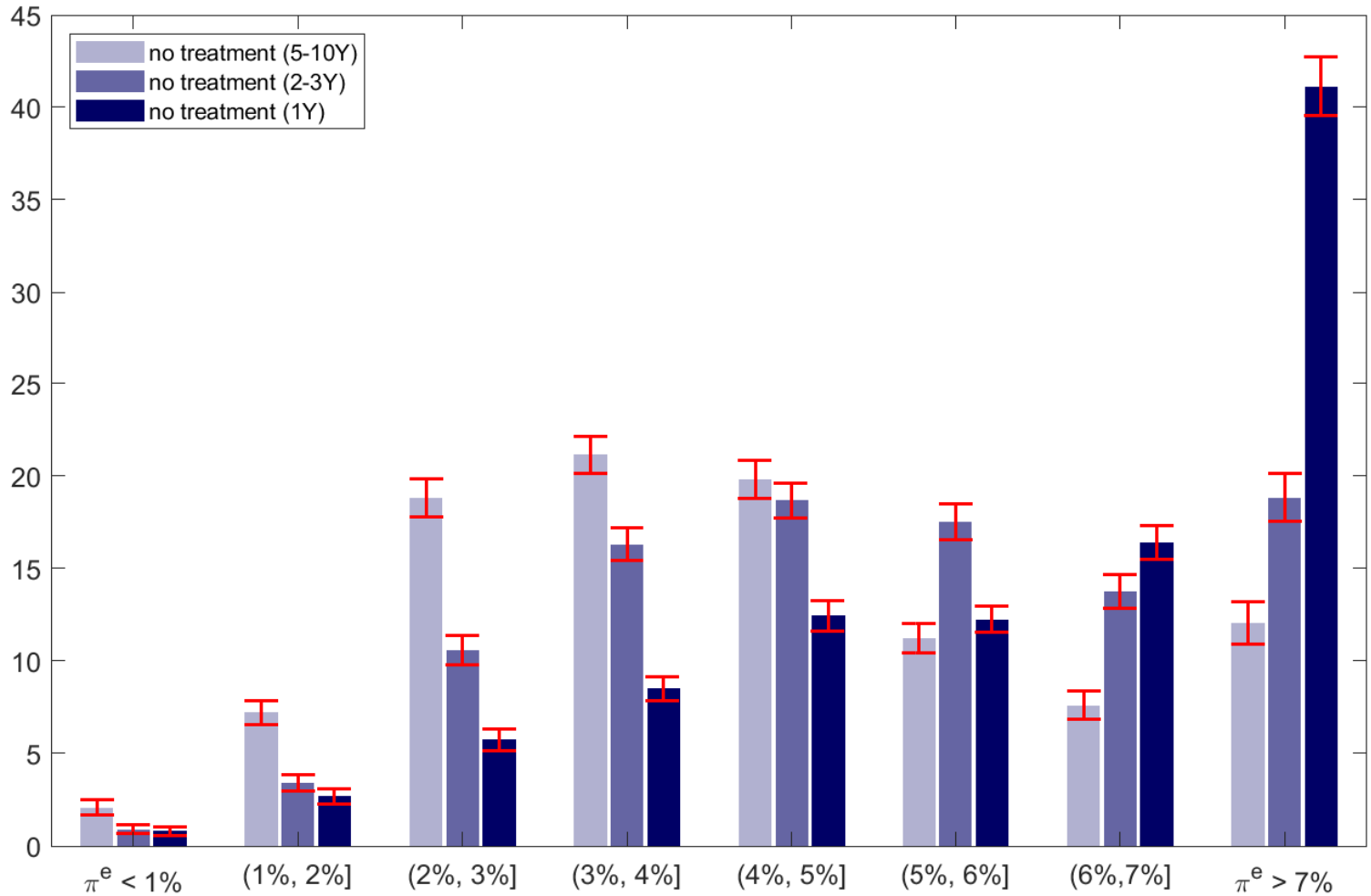


Figure 3: Average probabilities for inflation 5-10Y ahead from BOP-HH, October 2022.

Experimental design (RCT)

Collected around 10,000 responses in two different inflation environments from March and October '22 waves of BOP-HH

Step 1: respondents receive information that ECB's inflation target is 2%

- Control group makes probabilistic assessment for inflation 1Y, 2-3Y, 5-10Y ahead

Step 2: respondents randomly sampled into subgroups receive treatment

- Variations of ECB communication regarding medium-term inflation outlook: (i) 'forecast' (ii) 'visual' (iii) 'verbal'

Step 3: treated respondents asked about expected inflation over three horizons: 1Y, 2-3Y, 5-10Y ahead

- Compare inflation expectations from steps 1 and 3 (of control and treated groups)

▸ RCT

Information treatments: 'forecast'

T1: '**forecast**': Sep '22 ECB projections for 2022, 2023 and 2024

> The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. The ECB's current projections from September 2022 forecast inflation rates of 8.1% for 2022, 5.5% for 2023, and 2.3% for 2024.

T2: '**revision**': Jun '22 ECB projections and their revisions for 2022, 2023, 2024

> The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In June 2022, the ECB had forecast inflation rates of 6.8% for 2022, 3.5% for 2023 and 2.1% for 2024. The ECB's current projections from September 2022 now forecast inflation rates of 8.1% for 2022, 5.5% for 2023, and 2.3% for 2024.

Information treatments: 'visual'

T3: Jun '22 and Sep '22 ECB projections as a **table**

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area.

In June 2022, the ECB had forecast the following inflation rates:

	2022	2023	2024
Euro area HICP (i), annual percentage changes	6.8	3.5	2.1

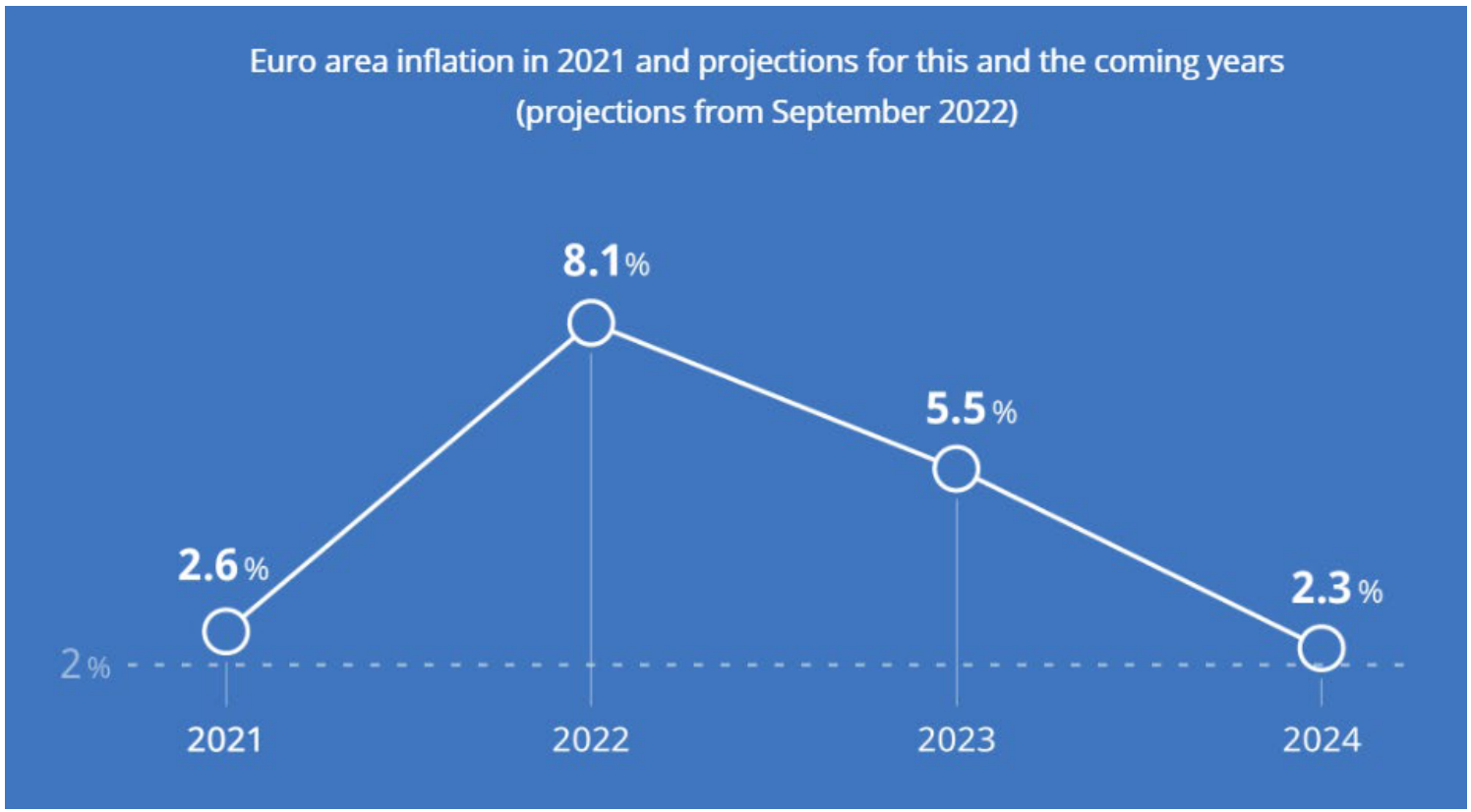
The latest ECB projections from September 2022 now forecast the following inflation rates:

	2022	2023	2024
Euro area HICP (i), annual percentage changes	8.1	5.5	2.3

Information treatments: 'visual'

T4: 2021 inflation and Sep '22 ECB projections as a **graph**

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term. The latest projections from September 2022 are shown in the chart from the ECB's website below:



Information treatments: 'verbal'

T5: **'high inflation outlook'**: participants are shown citation of Bundesbank President Nagel being worried inflation rates are yet to peak

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In an interview with the "Rheinische Post" newspaper on 20 August, Bundesbank President Joachim Nagel expressed his concern about the current inflation rates. "Overall, an inflation rate of 10% is even possible in the autumn months. [...] There is a growing probability that inflation will be higher than previously forecast and that, on average next year, we will have a six before the decimal point."

Information treatments: 'verbal'

T6: **'high inflation outlook + action'**: adds to 'high inflation outlook' that Governing Council determined to raise rates futher; info on 75bps interest rate step of Sep 2022

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In an interview with the "Rheinische Post" newspaper on 20 August, Bundesbank President Joachim Nagel expressed his concern about the current inflation rates. "Overall, an inflation rate of 10% is even possible in the autumn months. [...] There is a growing probability that inflation will be higher than previously forecast and that, on average next year, we will have a six before the decimal point."

He explained: "In order to achieve our objective, we gave a marked signal at our ECB Governing Council meeting on 21 July. We raised the key interest rate by half a percentage point and signalled further steps. [...] Given the high rates of inflation, further interest rate steps need to be taken."

The ECB subsequently raised the key interest rates again by 0.75 percentage point in its decision on interest rates of 8 September.

Information treatments: 'verbal'

T7: **'soothing'**: participants are shown citation of Jackson Hole speech of ECB Executive Board member Isabel Schnabel sharing worries about high future inflation rates, highlighting that CBs act determinedly to bring inflation back to 2% target; info on 75bps interest rate step of Sep 2022

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In a widely regarded speech at the Economic Policy Symposium – an annual meeting of key central bankers in Jackson Hole (Wyoming, United States) – at the end of August, German ECB Executive Board member Isabel Schnabel stated that "high inflation has become the dominant concern of citizens in many countries". She highlighted that central banks would have to act forcefully in times of high inflation so that the general public would not lose confidence in central banks bringing inflation back down to the 2% target. The ECB subsequently raised the key interest rates again by 0.75 percentage point in its decision on interest rates of 8 September.

Can communication help guiding expectations towards target?

CB communication lowers π^e in the short run

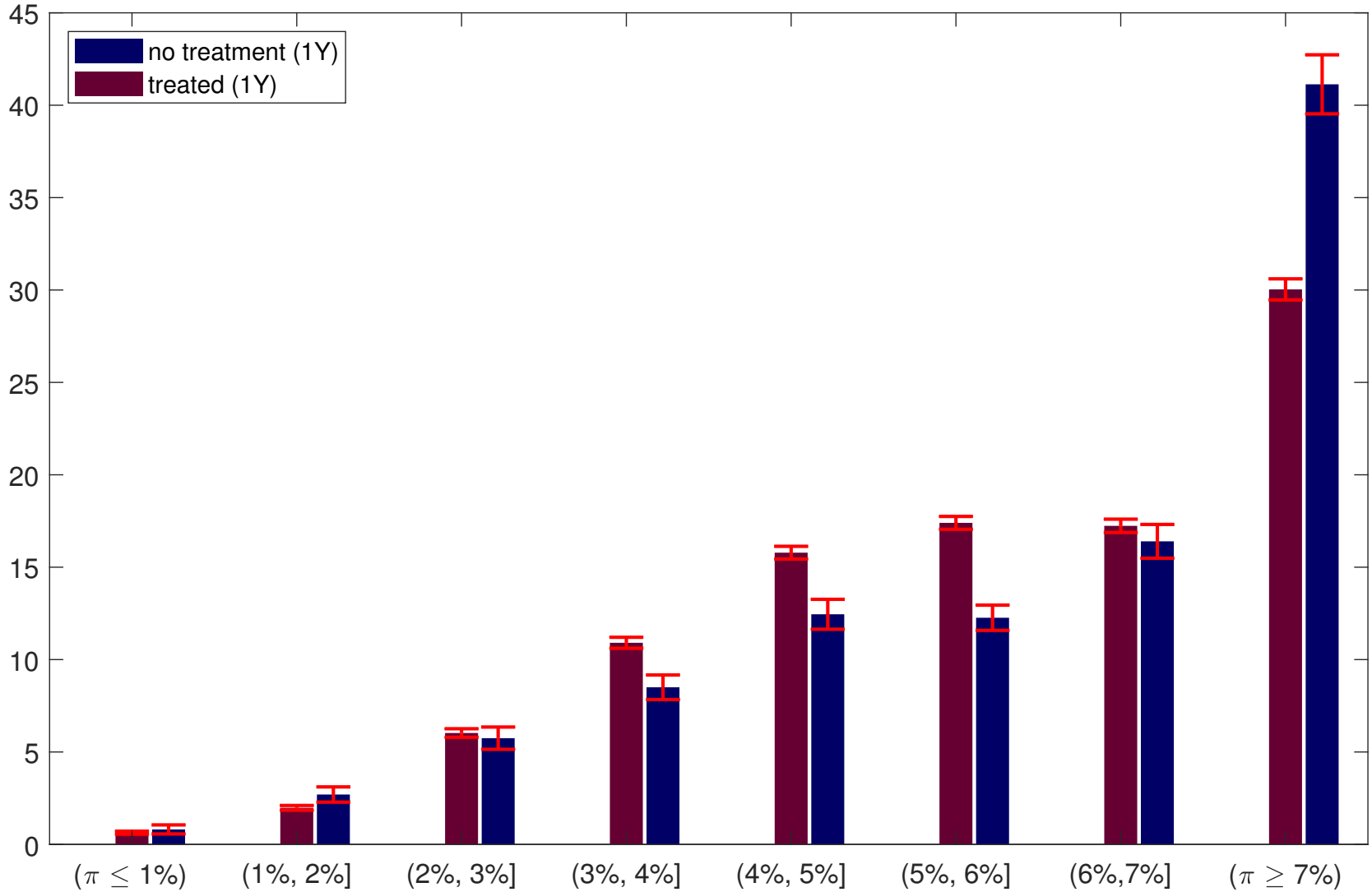


Figure 4: Average probabilities for inflation 1Y ahead. Untreated group in blue, treated (pooled over T1-T7) in red.

... but also in the medium run

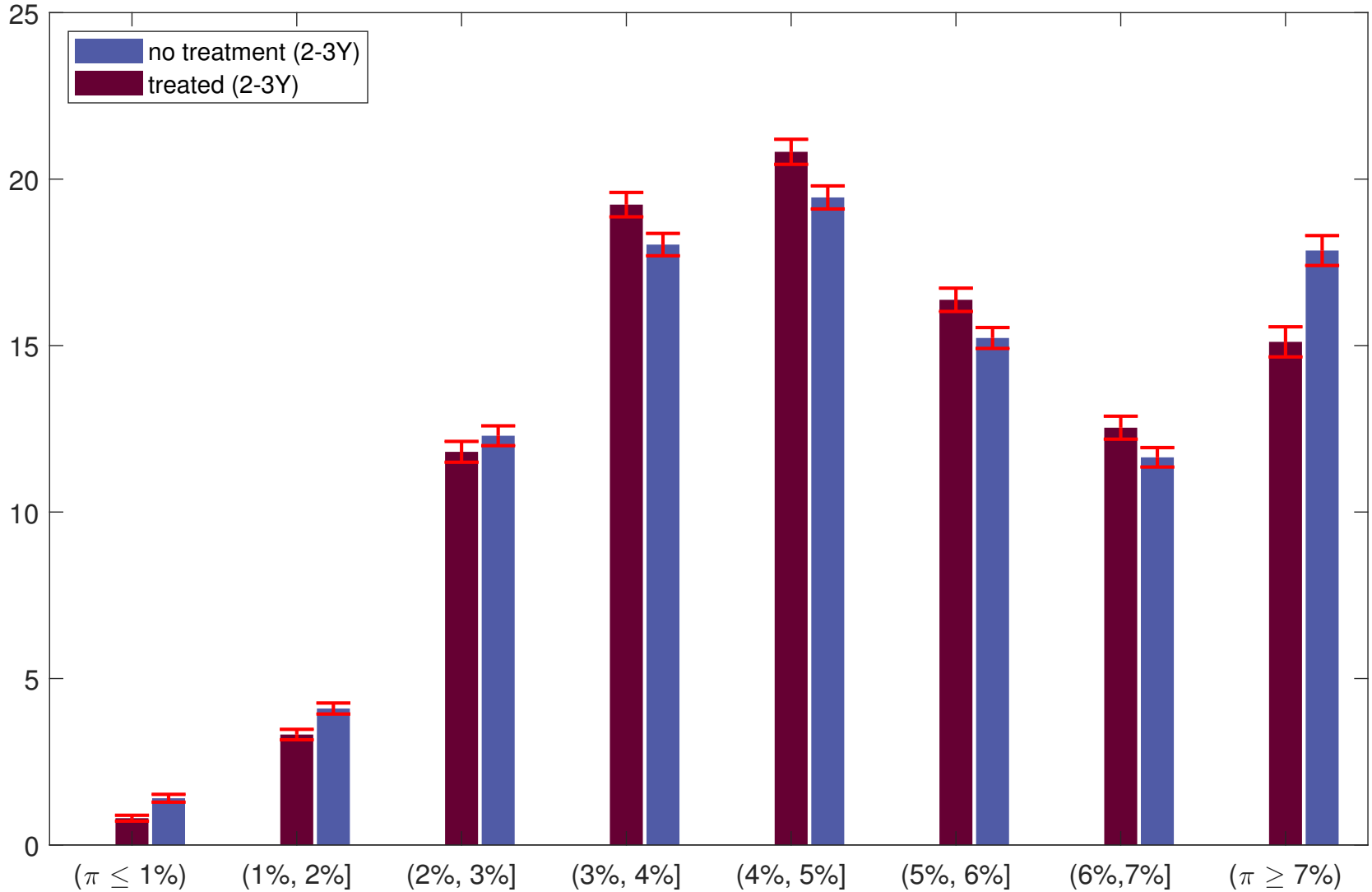


Figure 5: Average probabilities for inflation 2-3Y ahead. Untreated group in blue, treated (pooled over T1-T7) in red.

...and in the longer run

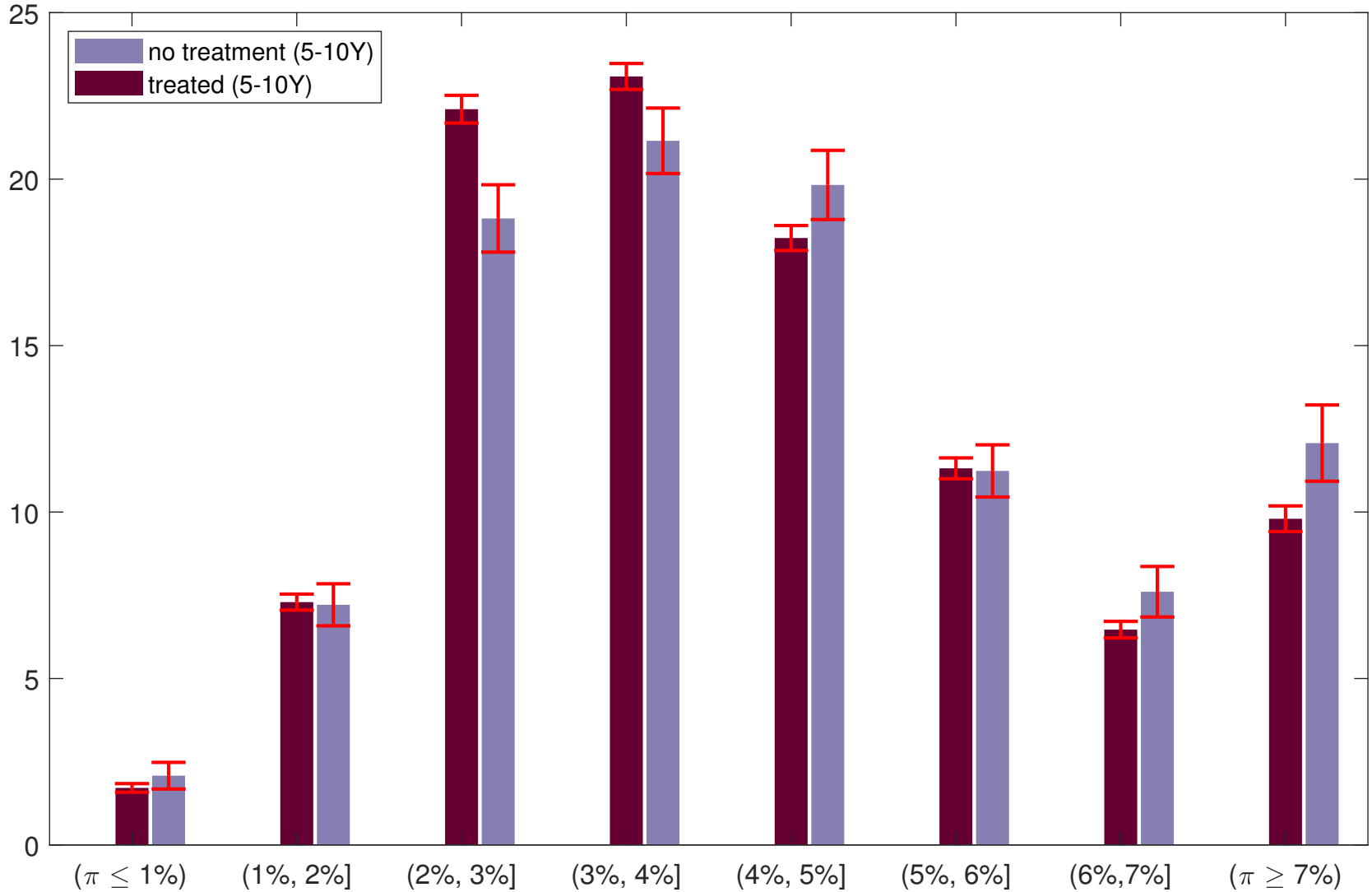


Figure 6: Average probabilities for inflation 5-10Y ahead. Untreated in blue, treated (pooled over T1-T7) in red.

Econometric set-up

Fit a distribution to the discrete histograms via standard methodology (Engelberg et al, 2009)

(Pooled) regression using Huber weighting:

$$\mathbb{E}[\pi]_i^{post} = \alpha + \sum_{s=1}^{S} \beta_s d_i^s + \gamma W_i + \varepsilon_i, \tag{1}$$

where s could be one of the treatments: forecast, revision, table, graph, soothing, 'high inflation outlook+action', 'high inflation outlook'

- α reflects the mean expected inflation of the control group
- β_s is the ATE of treatment s on mean expected inflation
- estimate eq.(1) for each horizon $h \in \{$ 1Y, 2-3Y, 5-10Y $\}$ separately

▸ Quantification

Effects on mean expected inflation

	1Y	2-3Y	5-10Y
control	6.15^{***}	5.48^{***}	4.40^{***}
treated	-0.37^{***}	-0.21^{**}	-0.21^{***}
Observations	4756	4767	4756

Notes: Asterisks (***,** ,*) denote statistically significant differences at the 1,5, and 10% levels, respectively. All observations are weighted using survey weights. Group 'treated' is pooled over treated groups T1-T7.

Setting the size of results in perspective to gains from stabilizing inflation (towards the target):

- CB which puts more weight on inflation stabilization mitigates the de-/inflationary bias by up to 30 b.p. (e.g. Nakata, Schmidt; 2019)
- HHs provided with CB communication about inflation outlook/target reduce on average π^e by around 20 b.p.(2-3y/5-10y) to 40 b.p.(1y)

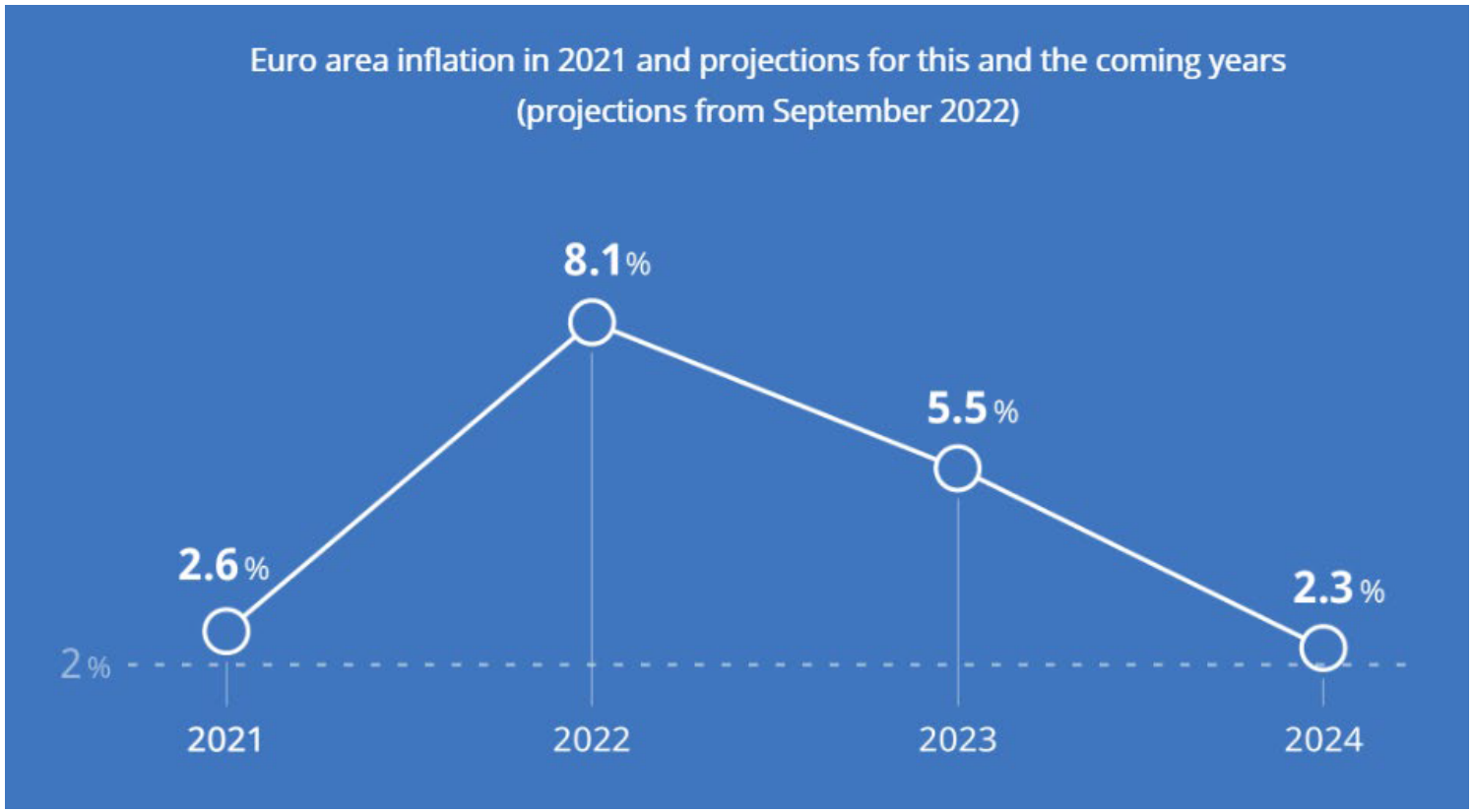
Effects on mean expected inflation

	1Y	2-3Y	5-10Y
control group	6.15***	5.48***	4.40***
forecast			
'forecast'	−0.26**	−0.25**	−0.20**
'forecast revision'	−0.48***	−0.26*	−0.17*
visual			
'table'	−0.38***	−0.32***	−0.29***
'graph'	−0.61***	−0.56***	−0.54***
verbal			
'soothing'	−0.77***	−0.30***	−0.26**
'high inflation outlook + action'	−0.20*	0.00	−0.01
'high inflation outlook'	0.05	0.17	0.06
Observations	4756	4767	4756

Notes: Asterisks (***,** ,*) denote statistical significance at the 1,5, and 10% levels, respectively. All observations are weighted using survey weights. ▸ F-tests

Possible explanations for the treatment effects

Example: information provision via 'graph'



Example: information provision via 'graph'

Provision of graphical illustration shows most consistent effects in lowering expectations across horizons

Inclusion of 2021 realized inflation results in a hump-shaped trajectory; signals timely return to initial levels

Visuals easy to process

Blue is ECB CI color; literature describes blue as trustworthy and pleasant

For communicating the outlook, "a picture is worth a thousand words"

Example: 'soothing' information provision

When comparing verbal explanations, a 'soothing' communication style produces large treatment effects, in particular for short run

Choice of words may make the information more credible; addresses emotions; optimistic framing of speech; more relatable

Less numerical (fewer values to keep track of); also lower numerical values

Has less credibility concerns

Diverse speaker

For communicating the outlook, "words speak louder than numbers"

Further aspects

Attention: simplistic verbal communication (T7: soothing) is able to reach both attentive and less attentive respondents ▸ Attention

Uncertainty: CB communication effectively reduces inflation uncertainty in the short run ▸ Uncertainty

Summing up

Conclusion and Outlook

Central bank communication can help guiding households' elevated inflation expectations back towards the target

A soothing, simplified verbal communication generates stronger treatment effects than a rather 'number-oriented' explanation of the inflation outlook

Showing graphical illustrations yields most consistent effects in lowering expectations across all horizons

This suggests that central banks should **K**eep **I**t **S**uper **S**imple

Appendix

References in relation to treatments

"The pandemic led to a decreased appetite for and tolerance of overly precise communication while increasing the efficacy of projections that also convey uncertainty. Subjects became more averse to central bank forecast errors after the onset of the pandemic if the central bank conveyed a precise outlook but not if it conveyed forecast uncertainty."

Petersen, L. and R. Rholes (2022), "Macroeconomic expectations, central bank communication, and background uncertainty: A COVID-19 laboratory experiment", Journal of Economic Dynamics & Control 143, online.

"The causal effects of central bank communication on economic expectations and their underlying mechanisms are tested in controlled laboratory experiments. [...] the size of the effect varies with the type of communication. [...] communication is effective via simple and relatable backward-looking announcements that exert strong influence on less-accurate forecasters."

O. Kryvtsov and L. Petersen (2020), "Central Bank Communication that Works: Lessons from Lab Experiments", Journal of Monetary Economics 117, 760-780.

References in relation to treatments

"[...] public comprehension can be improved by making monetary policy messages relatable to people's lives. Relatable content also increases the public's trust in central bank communications, and improves people's perceptions of the central bank."

Bholat, D. N. Broughton, J. Ter Meer, and E. Walczaka (2019), "Enhancing central bank communications using simple and relatable information", Journal of Monetary Economics 108, 1-15.

"Our results suggest more diverse policy committees are better able to reach underrepresented groups without inducing negative reactions by others, thereby enhancing the effectiveness of policy communication and public trust in the institution."

D'Acunto, F., A. Fuster, and M. Weber (2022), "Diverse Policy Committees Can Reach Underrepresented Groups", NBER Working Paper No. w29275.

References in relation to treatments

"Blue, blue-green, green, red-purple, purple, and purple-blue were the most pleasant hues, whereas yellow and green-yellow were the least pleasant. Green-yellow, blue-green, and green were the most arousing, whereas purple-blue and yellow-red were the least arousing."

Valdez, P. and A. Mehrabian (1994), "Effects of color on emotions", Journal of Experimental Psychology: General 123(4), 394-409.

"In marketing practice, blue, followed by red, is the most used color in brand logo designs. [...] The results across three studies consistently show that blue increases trust more than red, contributing to the current literature by providing solid empirical evidence of the relationship between colors and trust and insight for brand managers into brand logo design and redesign."

Su, L., A Cui, and M. F. Walsh (2019), "Trustworthy Blue or Untrustworthy Red: The Influence of Colors on Trust", The Journal of Marketing Theory and Practice 27(3), 269-281.

References in relation to treatments

"By showing respondents the graph treatment, we provide them with information that may help them assess whether the Fed indeed has a history of doing what it says it will do in terms of inflation."

Binder, C. and A. Rodrigue (2018), "Household Informedness and Long-Run Inflation Expectations: Experimental Evidence", Southern Economic Journal 85(2), 580-598.

"Effective graphics avoid taxing working memory, guide attention, and respect familiar conventions. Data visualizations can play a critical role in teaching and communication, provided that designers tailor those visualizations to their audience."

Franconeri, S. L., L. M. Padilla, P. Shah, J. M. Zacks, and J. Hullman (2019), "The Science of Visual Data Communication: What Works", Psychological Science in the Public Interest 22(3), online.

RCT textbook definition

A randomized controlled trial (RCT) is an experimental form of impact evaluation in which the population receiving the programme or policy intervention is chosen at random from the eligible population, and a control group is also chosen at random from the same eligible population. [...] One of its strengths is that it provides a very powerful response to questions of causality [...].

White, H., S. Sabarwal and Th. de Hoop (2014)

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Verbal explanation

T5: **'high inflation outlook'**

[if drandom3 = 5]

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In an interview with the "Rheinische Post" newspaper on 20 August, Bundesbank President Joachim Nagel expressed his concern about the current inflation rates. "Overall, an inflation rate of 10% is even possible in the autumn months. […] There is a growing probability that inflation will be higher than previously forecast and that, on average next year, we will have a six before the decimal point."

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Verbal explanation

T6: **'high inflation outlook + action'**

[if drandom3 = 6]

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In an interview with the "Rheinische Post" newspaper on 20 August, Bundesbank President Joachim Nagel expressed his concern about the current inflation rates. "Overall, an inflation rate of 10% is even possible in the autumn months. […] There is a growing probability that inflation will be higher than previously forecast and that, on average next year, we will have a six before the decimal point."

He explained: "In order to achieve our objective, we gave a marked signal at our ECB Governing Council meeting on 21 July. We raised the key interest rate by half a percentage point and signalled further steps. […] Given the high rates of inflation, further interest rate steps need to be taken."

The ECB subsequently raised the key interest rates again by 0.75 percentage point in its decision on interest rates of 8 September.

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Verbal explanation

T7: **soothing**

[if drandom3 = 7]

The European Central Bank (ECB) aims at an inflation target of 2% over the medium term for the euro area. In a widely regarded speech at the Economic Policy Symposium – an annual meeting of key central bankers in Jackson Hole (Wyoming, United States) – at the end of August, German ECB Executive Board member Isabel Schnabel stated that "high inflation has become the dominant concern of citizens in many countries". She highlighted that central banks would have to act forcefully in times of high inflation so that the general public would not lose confidence in central banks bringing inflation back down to the 2% target. The ECB subsequently raised the key interest rates again by 0.75 percentage point in its decision on interest rates of 8 September.

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Differences in ATEs (October '22)

		revision	table	graph	high infl. out.	h. i. o. + action	soothing
1y	forecast	0.22*	0.12	0.35***	−0.31***	−0.06	0.51***
2-3y	forecast	−0.05	0.07	0.31***	−0.42***	−0.25**	0.05
5-10y	forecast	−0.03	0.09	0.34***	−0.26***	−0.19**	0.06
1y	revision		−0.10	0.13	−0.53***	−0.28**	0.29**
2-3y	revision		0.12	0.36***	−0.37***	−0.20*	0.10
5-10	revision		0.12	0.37***	−0.23**	−0.16*	0.09
1y	table			0.23**	−0.43***	−0.18	0.39***
2-3y	table			0.24**	−0.49***	−0.32***	−0.02
5-10	table			0.25**	−0.35***	−0.28***	−0.03
1y	graph				−0.66***	−0.41***	0.16
2-3y	graph				−0.73***	−0.56***	−0.26**
5-10	graph				−0.60***	−0.53***	−0.28***
1y	high infl. out.					0.25**	0.82***
2-3y	high infl. out.					0.17	0.47***
5-10	high infl. out.					0.07	0.32***
1y	h. i. o. + action						0.57***
2-3y	h. i. o. + action						0.30***
5-10	h. i. o. + action						0.25**

Notes: Each three rows with repeating row name, e.g. 'forecast' represent the difference in expectations between the treatments depicted in the column and row name over three horizons: 1y, 2-3y, 5-10y ahead. The difference tested in the F-tests is always defined as the 'row' variable minus the 'column' variable, e.g. treatment 'forecast' minus 'revision'.

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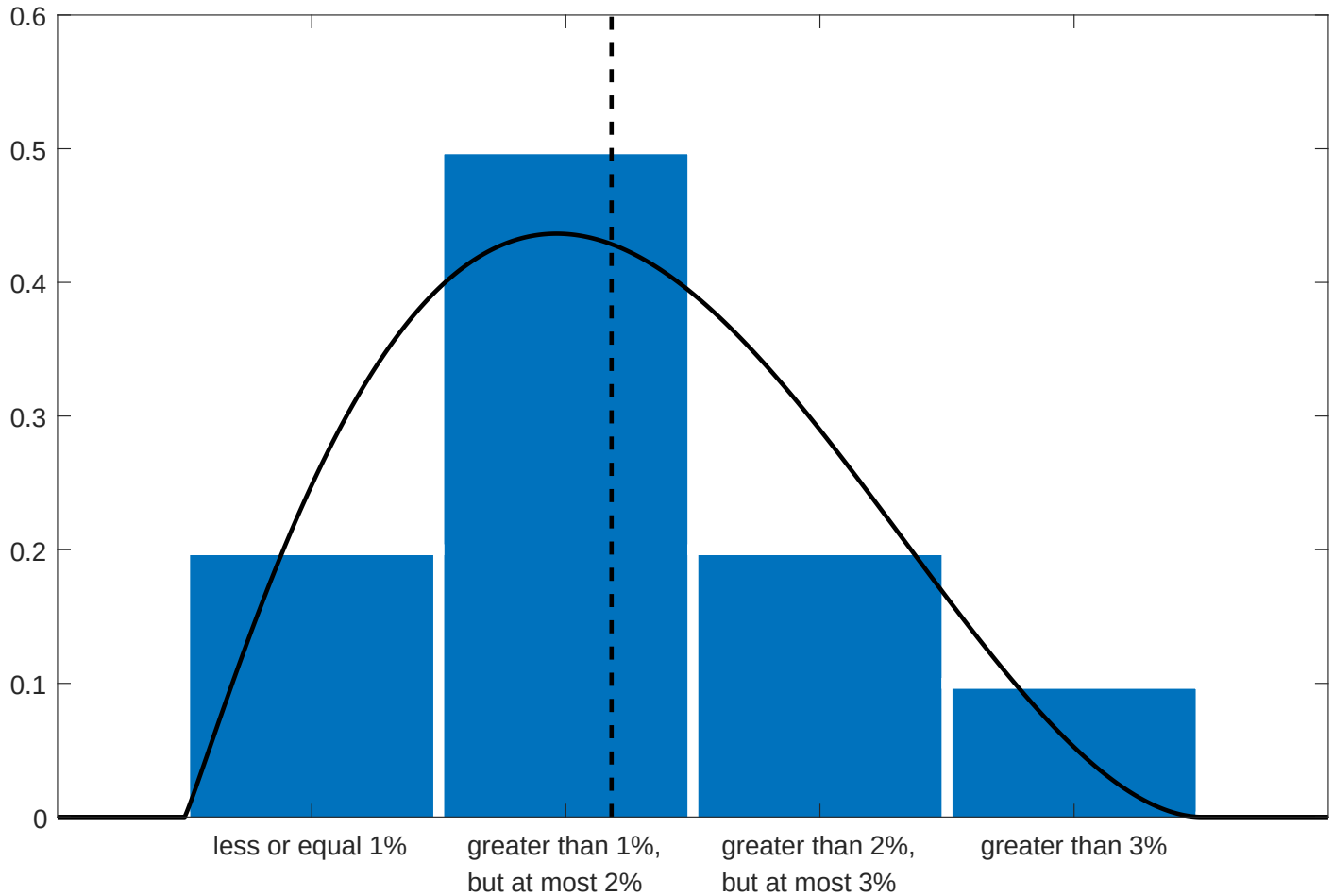
Quantification procedure

Example: A continuous distribution is fitted to an individual's probabilistic assessment to obtain its mean inflation expectation



Quantification procedure

Fit continuous distribution depending on the number of bins with strictly positive probability

- Respondent uses one or two bins: fit triangular distribution; outer bins assumed to have double the width of inner bins
- Respondent uses three bins or more: fit generalized beta distribution

Compute mean and standard deviation for each respondent's subjective histogram

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Further aspects: Attention

Table 1: Sample split: people who pay (more) attention to inflation

	1Y	2-3Y	5-10Y
Control	6.22***	5.43***	4.12***
	(0.22)	(0.22)	(0.19)
Forecast	−0.29**	−0.21	−0.03
	(0.13)	(0.13)	(0.12)
Revision	−0.55***	−0.25*	−0.1
	(0.13)	(0.13)	(0.12)
Table	−0.48***	−0.29**	−0.24**
	(0.13)	(0.13)	(0.12)
Graph	−0.70***	−0.57***	−0.56***
	(0.13)	(0.13)	(0.11)
h. i. o.	−0.07	0.18	0.08
	(0.13)	(0.13)	(0.12)
h. i. o. + action	−0.32**	−0.03	−0.01
	(0.13)	(0.13)	(0.11)
Soothing	−0.73***	−0.36***	−0.30**
	(0.13)	(0.13)	(0.12)
Observations	3842	3852	3841

Notes: Standard errors reported in parenthesis. Asterisks (***,** ,*) denote statistical significance at the 1,5, and 10% levels, respectively. All observations are weighted using survey weights.

Further aspects: Attention

Table 2: Sample split: people who pay less or no attention

	1Y	2-3Y	5-10Y
Control	5.64***	5.31***	4.94***
	(0.37)	(0.36)	(0.36)
Forecast	−0.11	−0.28	−0.63***
	(0.24)	(0.23)	(0.23)
Revision	−0.23	0.13	−0.23
	(0.26)	(0.25)	(0.25)
Table	−0.09	−0.32	−0.47*
	(0.25)	(0.24)	(0.24)
Graph	−0.27	−0.39	−0.35
	(0.25)	(0.24)	(0.24)
h. i. o.	0.44*	0.27	0.12
	(0.25)	(0.24)	(0.24)
h. i. o. + action	0.13	0.18	0.18
	(0.27)	(0.26)	(0.25)
Soothing	−0.82***	−0.05	−0.10
	(0.24)	(0.23)	(0.23)
Observations	913	914	914

Notes: Standard errors reported in parenthesis. Asterisks (***,** ,*) denote statistical significance at the 1,5, and 10% levels, respectively. All observations are weighted using survey weights.

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Effects on inflation uncertainty

Table 3: Effects on uncertainty (std.deviation)

	1Y	2-3Y	5-10Y
Control	1.27***	1.11***	1.09***
	(0.07)	(0.06)	(0.06)
Forecast	−0.16***	−0.07*	−0.03
	(0.04)	(0.04)	(0.04)
Forecast revision	−0.15***	−0.03	0.01
	(0.04)	(0.04)	(0.04)
Table	−0.17***	−0.09**	−0.05
	(0.04)	(0.04)	(0.04)
Graph	−0.14***	−0.07**	−0.05
	(0.04)	(0.04)	(0.04)
h. i. o.	−0.07*	0.01	0.02
	(0.04)	(0.04)	(0.04)
h. i. o. + action	−0.11**	−0.03	0.00
	(0.04)	(0.04)	(0.04)
Soothing	−0.10**	0.01	0.03
	(0.04)	(0.04)	(0.04)
Observations	2521	2739	2686

Notes: Standard errors reported in parenthesis. Asterisks (***,** ,*) denote statistical significance at the 1,5, and 10% levels, respectively. All observations are weighted using survey weights.

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