

The Pass-Through from Inflation Perceptions to Inflation Expectations

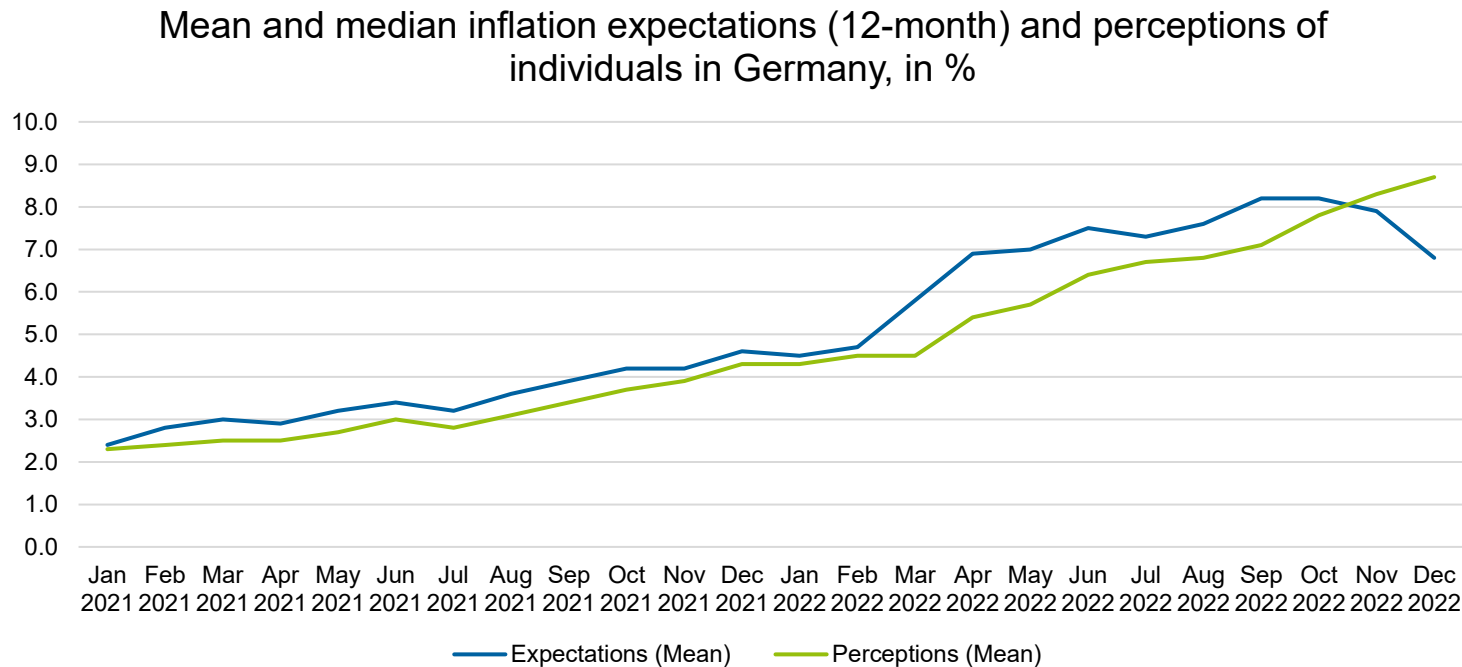
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The views and opinions expressed in this presentation are those of the authors and do not necessarily reflect the view of the Deutsche Bundesbank or the Eurosystem.

Inflation perceptions and expectations show similar trends in Germany



Source: Bundesbank Online Panel Households (BOP-HH). Expectations and perceptions: Weighted means, observations truncated to interval [-12;+12].

What drives inflation expectations?

1. Information and central bank/media communication

(e.g., Lamla and Vinogradov, 2019; Fuester et al. 2018; Kryvtsov and Petersen, 2021)

2. Knowledge, IQ and financial literacy

(e.g., Bruine de Bruin et al., 2010; Burke and Manz, 2014; D'Acunto et al., 2019; Coibion and Gorodnichenko, 2015; Dovern et al. , 2015; Lein and Maag, 2011)

3. Historic inflation experiences

(e.g., Angelico and Di Giacomo 2019; Malmendier et al. 2017; Goldfayn-Frank and Wohlfart 2020)

4. Personal shopping experience

(e.g., Weber et al., 2022; D'Acunto et al., 2021)

5. **Perceptions of price changes in the past**

(e.g., Jonung 1981; Draeger, 2015; Bosch et al., 2015; Arioli et al., 2017; Cavallo et al. 2017; D'Acunto et al., 2021; Weber et al., 2022; Stancheva, 2024)

Overview

1. Data and key variables
2. The perception – expectations link
 - Baseline regressions for short-term and long-term expectations
 - RCT to establish causality
3. Conclusions and policy implications



Data and Key Variables

Data - Bundesbank Online Panel Households (BOP-HH)

- **Monthly online survey of individuals in Germany**, from April to June 2019 (pilot-phase) and April 2020 to November 2023 – Sample for this paper starts in May 2019 and ends in Dec 2022
- Offline-recruited online **panel** with a rotating panel design
- Weighted sample **representative of the German *online* population** along age, gender, school education and region
- Completed **interviews with 2 500 to 5 000 individuals** per month
- **BOP-HH** contains **core questions** included **each month** or quarter and **questions proposed by researchers** in **selected waves**

BOP-HH: Key variables - Inflation Perceptions

What do you think the rate of inflation or deflation in Germany was over the past twelve months?

Note: If you think there was deflation, please enter a negative value. Values may have one decimal point.

[.....] percent

BOP-HH: Key variables – inflation expectations module

Infoscreen: *Inflation is the percentage increase in the general price level. It is usually measured using the consumer price index. A decrease in the price level is generally referred to as “deflation”.*

Q1 (qualitative): What do you think. Will there be inflation or deflation over the next 12 months?

a – rather inflation b – rather deflation

Q2 (quantitative - short-term): What do you think the rate of inflation/deflation will roughly be over the next 12 months?

[...] percent

Q3 (probabilistic – short term) In your opinion, how likely is it that the rate of inflation will develop as follows over the next twelve months? (10 bins as in e.g. SCE by NY Fed)

Q4/5 (quantitative - long-term): What value do you think the rate of inflation or deflation will take on average over the next five/ten years/in three years?

[...] percent

The Perception – Expectations Link: Baseline Regressions

Result 1: Inflation perceptions have a positive, large and significant effect on individuals' short-term inflation expectations.

Inflation Expectations – Next 12 Months							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	OLS	OLS	OLS	Panel: fixed ef.	RE-Panel: random ef.	Panel: change on change
Infl. Perceptions	0.831***	0.759***	0.820***	0.736***	0.749***	0.786***	0.525***
	(0.005)	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)	(0.025)
Wave FEs	No	Yes	No	Yes	-	-	-
Control Variables	No	No	Yes	Yes	-	-	-
N	74,733	74,733	70,816	70,816	50,852	50,852	8,366
R2	0.515	0.545	0.515	0.547	0.457	0.458	0.197

Notes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Robust standard errors (Eicker-White) are reported in parentheses. Wave controls include a dummy for each wave. Socio-demographic controls include gender, household income, education, current employment status, East residence dummy, age, age squared. Perceptions and expectations truncated [30;-5]. The data span waves 3, 5, 8, 9, 11 and 13 to 36 of the survey (May 19, May 20, Aug, Sept, Nov 20, Jan 21 - December 22).

Result 2: Long term expectations related to short-term perceptions and expectations

- Even **after controlling for short-term inflation expectations**, perceptions play a role for long-term inflation expectations

Inflation Expectations – Average Over the Next 5 or 10 Years				
	5-year	5-year	10-year	10-year
Inflation perception past 12 months	0.529***	0.190***	0.545***	0.249***
	(0.013)	(0.014)	(0.015)	(0.017)
Inflation expectations 12 months		0.514***		0.421***
		(0.011)		(0.014)
N	35,491	35,066	26,898	26,574
R2	(0.232)	(0.366)	(0.190)	(0.255)

Notes: OLS estimates. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Robust standard errors (Eicker-White) in parentheses. Perceptions and expectations truncated [30;-5]. Control variables include: gender, household income, education, age, region (East-West), uncertainty about inflation expectations, wave fixed effects. The data span waves 3, 5, 8, 9, 11 and 13 to 36 of the survey (May 19, May 20, Aug, Sept, Nov 20, Jan 21 - December 22).

**The Perception – Expectations Link:
RCT in one wave to establish causality**

Randomized Control Trial (RCT) design to establish causality

Basic idea:

- Randomly split the sample into four equally sized groups
- Provide three of the groups with information on the actual inflation rate and thereby influence their perceptions
- Collect information on expectations after the treatment from all four groups and compare the outcome for the three groups with those for the fourth group not receiving any treatment

Experiment included in only one wave – August 2022

Establishing causality – RCT experiment in August 2022 BOP-HH

Pre-Treatment perceptions *and* expectations from regular core questions

Reminder of respondents' expectation for the inflation rate over past 12 months

Treatment 1

Treatment 2

Treatment 3

Control

Post-treatment perceptions

-

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Post-treatment expectations (min/max/most likely, cf. Coibion et al. 2021)

Establishing causality – RCT experiment in August 2022 BOP-HH

Pre-Treatment perceptions and expectations from regular core questions

Reminder of respondents' expectation for the inflation rate over past 12 months

You indicated that you believe the overall inflation rate, i.e. including energy and food, was [...] over the past twelve months.

Treatment 1: CPI excl. energy

Treatment 2

Treatment 3

Control

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, for the definition excluding energy and food, as being **3.2%** in July 2022.

Post-treatment perceptions

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Post-treatment expectations (min/max/most likely, Coibion et al. 2021)

Establishing causality – RCT experiment in August 2022 BOP-HH

Pre-Treatment perceptions and expectations from regular core questions

Reminder of respondents' expectation for the inflation rate over past 12 months

You indicated that you believe the overall inflation rate, i.e. including energy and food, was [...] over the past twelve months.

You indicated that you believe the inflation rate was [...] over the past twelve months.

Treatment 1: CPI excl. energy

Treatment 2: CPI

Treatment 3

Control

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, for the definition excluding energy and food, as being **3.2%** in July 2022.

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, as measured by the consumer price index, as being **7.5%** in July 2022.

Post-treatment perceptions

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Post-treatment expectations (min/max/most likely, Coibion et al. 2021)

Establishing causality – RCT experiment in August 2022 BOP-HH

Pre-Treatment perceptions and expectations from regular core questions

Reminder of respondents' expectation for the inflation rate over past 12 months

You indicated that you believe the overall inflation rate, i.e. including energy and food, was [...] over the past twelve months.

You indicated that you believe the inflation rate was [...] over the past twelve months.

You indicated that you believe the inflation rate was [...] over the past twelve months.

Treatment 1: CPI excl. energy

Treatment 2: CPI

Treatment 3: HICP

Control

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, for the definition excluding energy and food, as being **3.2%** in July 2022.

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, as measured by the consumer price index, as being **7.5%** in July 2022.

The Federal Statistical Office reported the official inflation rate for Germany for the past twelve months, as measured by the Harmonised Index of Consumer Prices, as being **8.5%** in July 2022.

No information

Post-treatment perceptions

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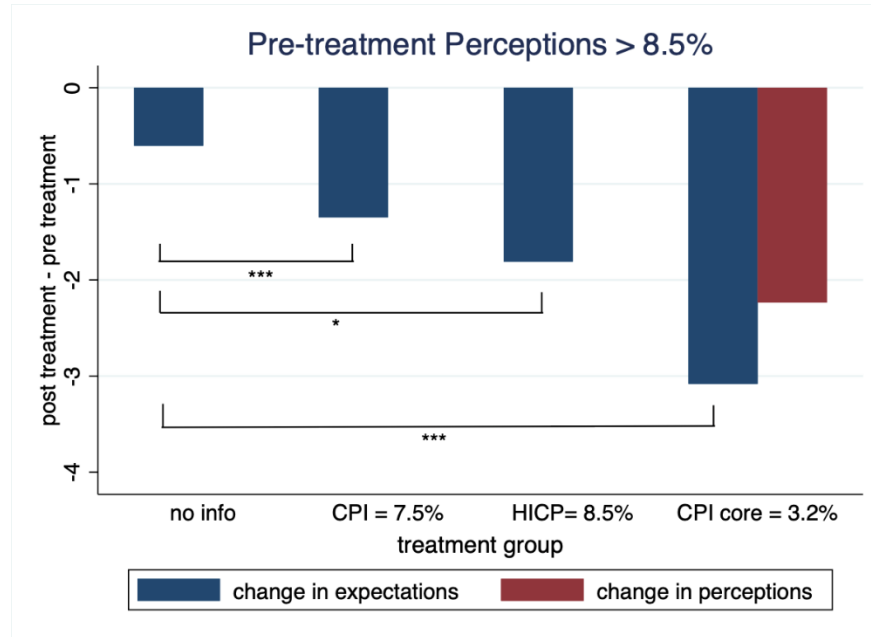
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Post-treatment expectations (min/max/most likely, Coibion et al. 2021)

Result 3: Inflation perceptions and expectations do adjust to treatment

Treatment effect on individuals' expectations and perceptions



Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$, Sample restricted to respondents with pre-treatment inflation perceptions higher than 8.5%.

Result 3: Perception changes cause changes in expectation

$$\mathbb{E} \left(\pi_{i,t \rightarrow t+12}^{post} \right) - \mathbb{E} \left(\pi_{i,t \rightarrow t+12}^{pre} \right) = \beta_0 + \beta_1' X_{i,t} + \beta_2 (\tilde{P}_{i,t}^{post} - \tilde{P}_{i,t}^{pre}) + \varepsilon_{i,t}$$

Change in Inflation Expectations – Next 12 Months				
	T1: CPI Core=3.2%	T2: CPI=7.5%	T3: HICP=8.5%	T1-T3 pooled
Post-Pre	0.258***	0.362***	0.347***	0.326***
	(0.059)	(0.088)	(0.084)	(0.043)
N	580	612	608	1,800
R2	0.133	0.137	0.149	0.119

Notes: Columns 1-4 report OLS estimates. Robust standard errors (Eicker-White) are reported in parentheses. Significance levels: *** p<0.001, ** p<0.01, * p<0.05. Socio-demographic controls include gender, household income, education, current employment status, region, age, age squared. Perceptions and expectations truncated [30;-5]. The data span wave 32 of the survey (August 2022).



Conclusions and Policy Implications

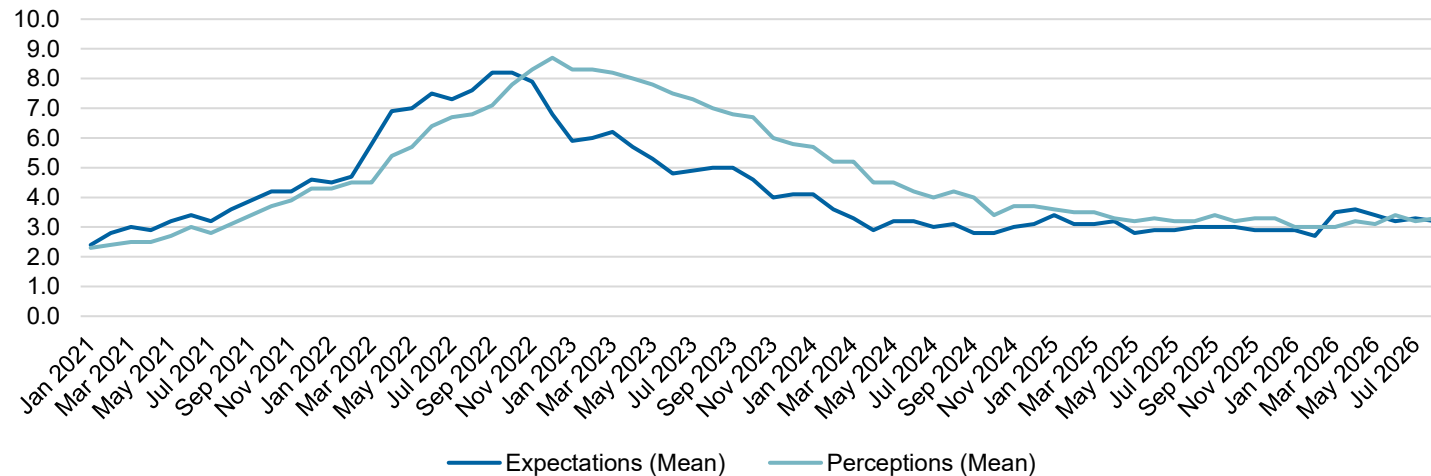
Conclusions and policy implications

- **Short- and long-term inflation expectations** extrapolated from **perceptions** about past inflation
- **Link** between inflation perceptions and expectations **stronger in times of low inflation**
- To what degree can communication influence expectations, if a large part is pure extrapolation from perceptions about past inflation?
- It **may be possible to influence expectations by influencing perceptions** about past inflation rates through communication, but individuals seem to be hard to reach with central bank communication.

Open issues and future work

Extend baseline analysis to most recent waves

Mean and median inflation expectations (12-month) and perceptions of individuals in Germany, in %



Source: Bundesbank Online Panel Households (BOP-HH). Expectations and perceptions: Weighted means, observations truncated to interval [-12;+12].



Thank you for your attention!

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