EUROPEAN CENTRAL BANK

EUROSYSTEM

SAFE to Update Inflation Expectations? New Survey Evidence on Euro Area Firms

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Disclaimer:

The views expressed in the paper are those of the authors and do not necessarily reflect those of the ECB and the Federal Reserve of San Francisco

Overview

1. Motivation
2. Survey and stylized facts
3. Research question in the paper
4. Response of firms' inflation expectations to randomised information treatments
5. Causal effects of firms' inflation expectations on firms' economic plans
6. Follow up on firms' plan
7. Conclusion

1. Motivation

- **Firms' inflation expectations represent a key variable for monetary policy makers**
  - Understanding how firms form and update their inflation expectations
  - Assessing the extent to which these expectations influence firms' plans and actions
- **Still little known about euro area firms' inflation expectations**
  - several national firm surveys cover inflation expectations but at a *national level*, varying significantly in design and making comparisons across countries challenging

- **New questions in ECB Survey on the access to finance of enterprises (SAFE) to fill this gap**
  - covering inflation expectations, uncertainty about the inflation outlook, and firms' own plans

2. Survey: SAFE with inflation expectations

- **Survey on the Access to Finance of Enterprises – so far:**
  - Run twice a year since 2009, **since 2024 quarterly**
  - Approx. 10,000-12,000 euro area firms (in the 12 largest euro area countries)
  - Respondents are owners, finance managers/directors or CFOs
  - Focus on firms' financing and production
  - Answers are qualitative/directional (increase/unchanged/decrease)

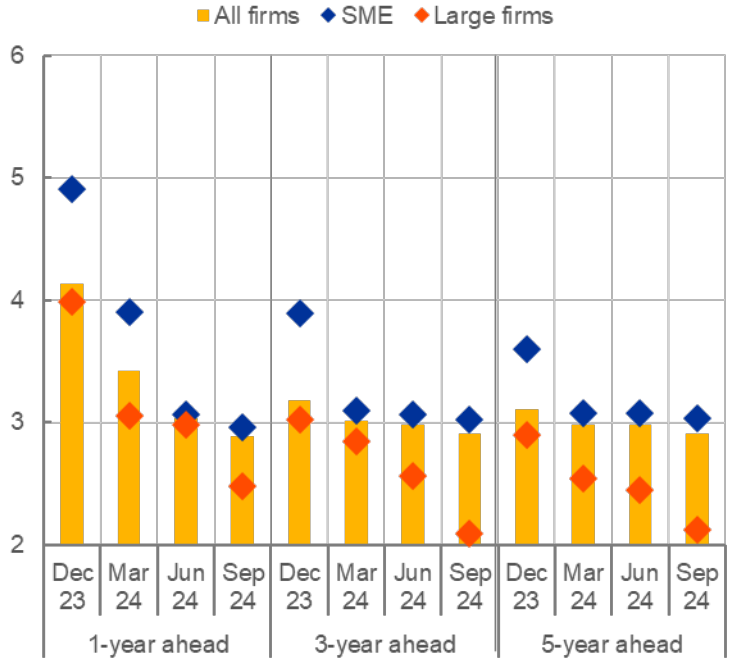
- **2023: two pilot rounds were run to increase frequency to quarterly and increase scope:**
  - **New quantitative questions on firms' inflation expectations: What do you think the EA inflation rate will be in one year; 3 years; 5 years?**
  - Question on uncertainty – risks to the outlook for inflation in five years' time
  - Questions on percentage change in firms selling prices, wages, non-labour costs and number employees over next 12 months

- **Since June 2023: regular reporting of firms' inflation expectations**

2. Stylized facts up to now : heterogeneity across size classes and countries

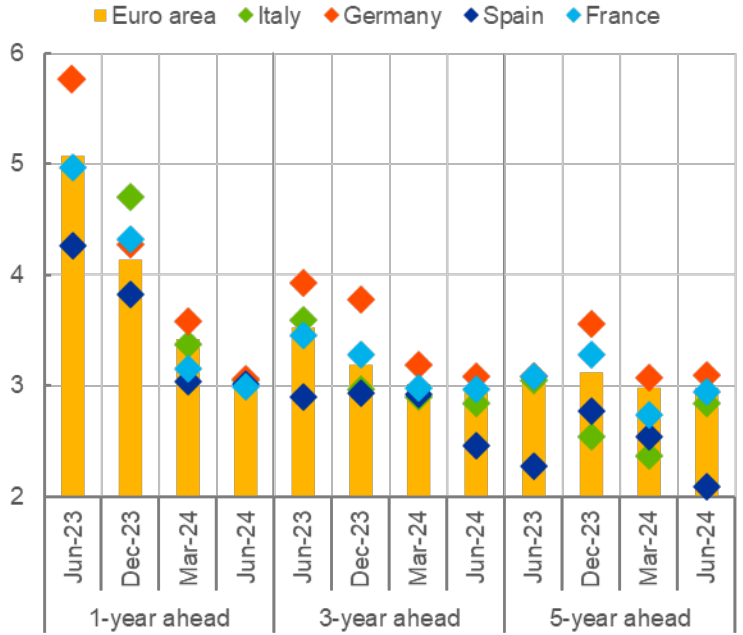
Firms' inflation expectations by size classes

(annual percentages)



Firms' inflation expectations by large countries

(annual percentages)



Sources: ECB SAFE and ECB calculations.

Notes: Survey-weighted median of firms' expectations for euro area inflation in one year, three years and five years. Quantiles are computed by linear interpolation of the mid-distribution function. The statistics are computed after trimming the data at the country-specific 1st and 99th percentiles. Latest observation: June 2024

3. Main research question in the paper

- **Is there evidence of a causal effect of firms' inflation expectations on firms' choices?**

- We focus on the replies in June 2023 (first pilot survey) and December 2023 (second pilot survey) and follow up on business plans in September 2023 and December 2023

- **Novel aspects**: euro area evidence in a high-inflation environment

3. Main findings

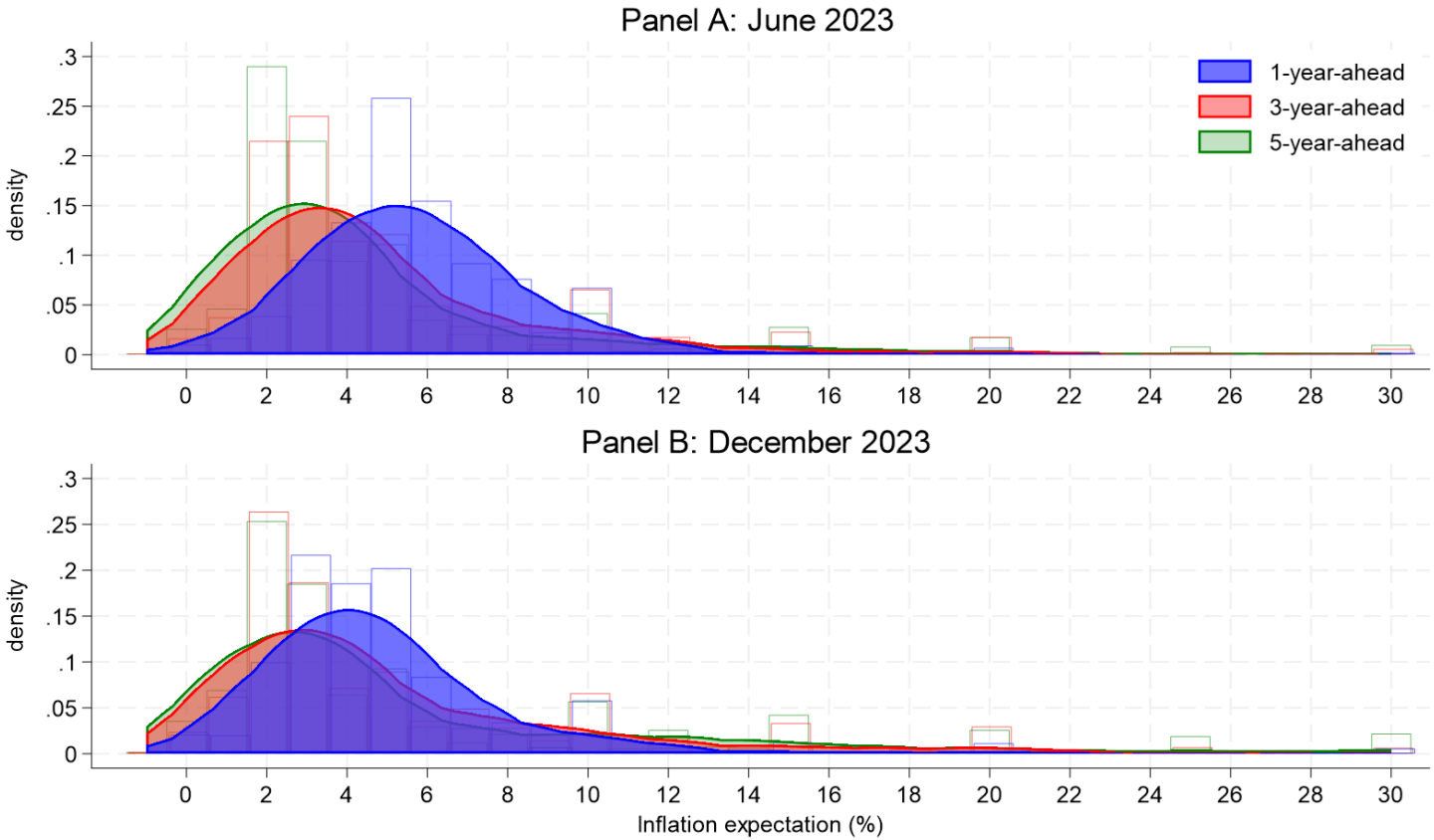
- We find a systematic variation in inflation expectations along firm and manager characteristics with the business environment playing a large role in accounting for cross-sectional variation

- We show, using a randomised controlled trial, that firms update their inflation expectations when they receive new information about past inflation or the inflation outlook

- We find that firms revise their economic plans in response to such information treatments

3. Stylised facts: Expected inflation falls with horizon, amid high disagreement

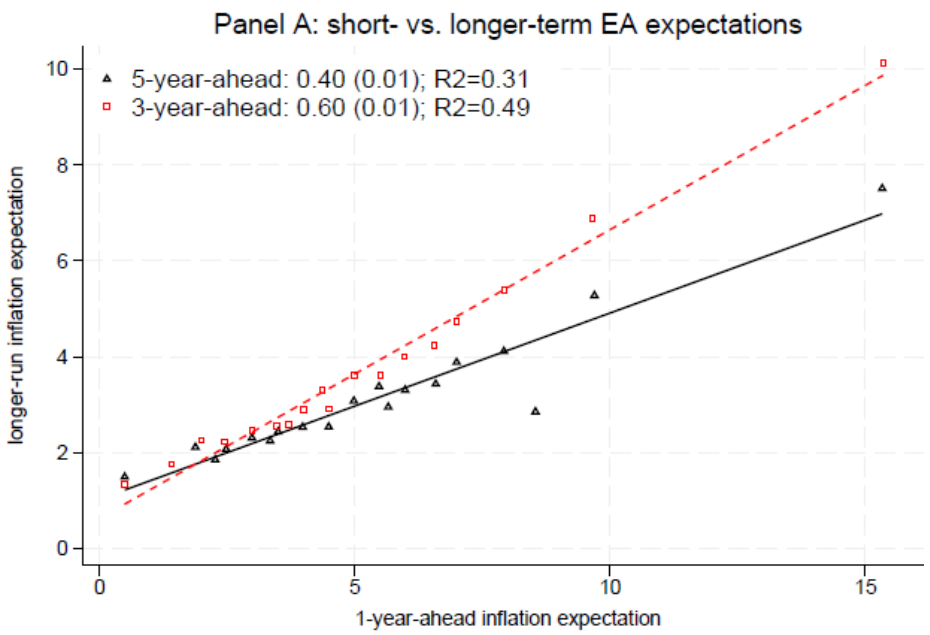
Distribution of firms' inflation expectations at different horizons

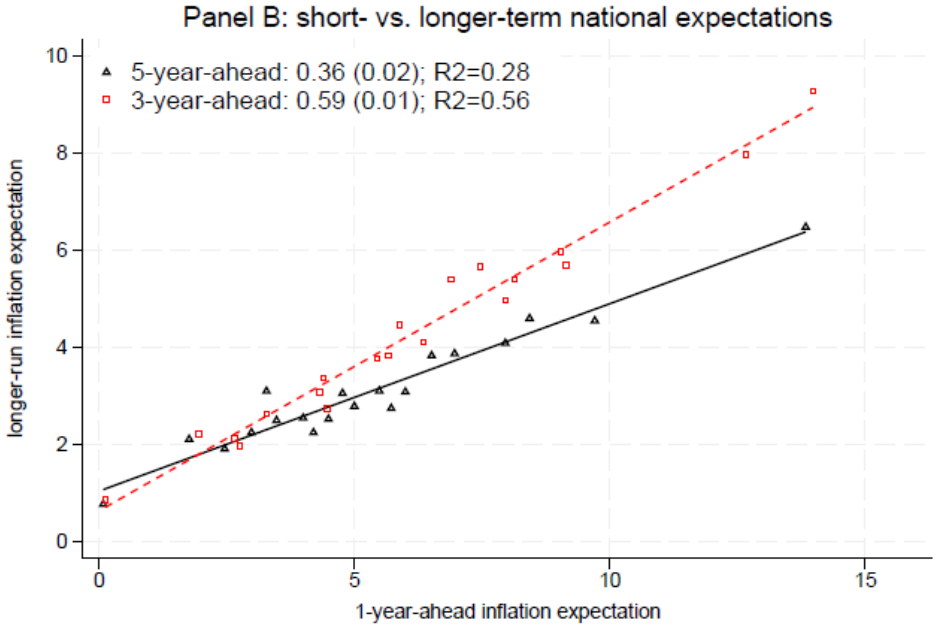


Source: SAFE June 2023 and December 2023 pilot rounds.

3. Stylised facts: Short-term expectations correlated with longer term ones

Correlation of firms' short vs longer term inflation expectations





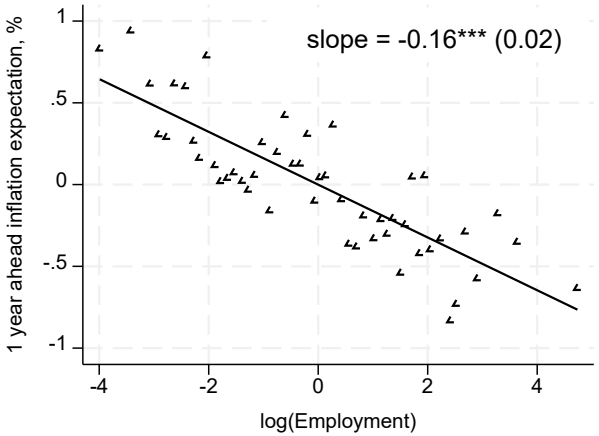
Source: SAFE pilot rounds

Notes: Binscatter plot. R2 and estimated slopes (standard errors are in parentheses) for fitted regressions are reported. Huber weights are applied to minimize the influence of outliers.

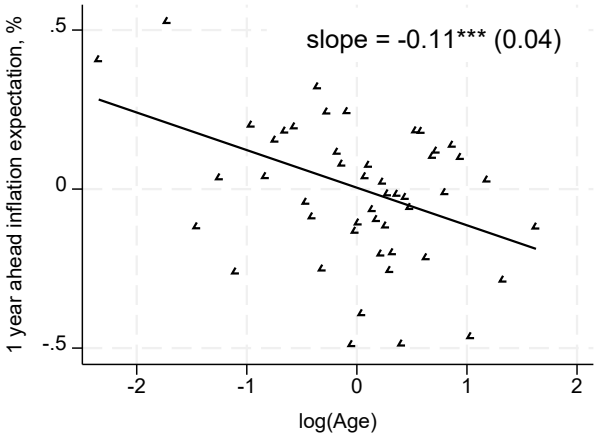
3. Stylised facts: Small, young & leveraged firms have higher infl expectations

Binned scatter plots of firm characteristics and inflation expectations

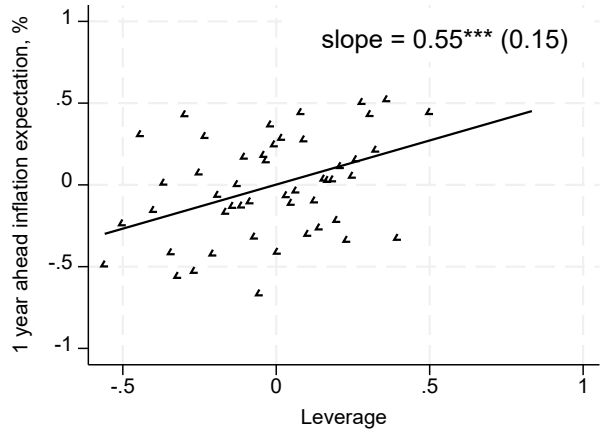
Panel A: Employment



Panel B: Firm age



Panel C: Leverage



Source: SAFE pilot rounds.

Notes: The figure shows binned scatter plots of various firm characteristics against firms' one year ahead inflation expectations, with Huber weights and conditional on country, sector and time fixed effects.

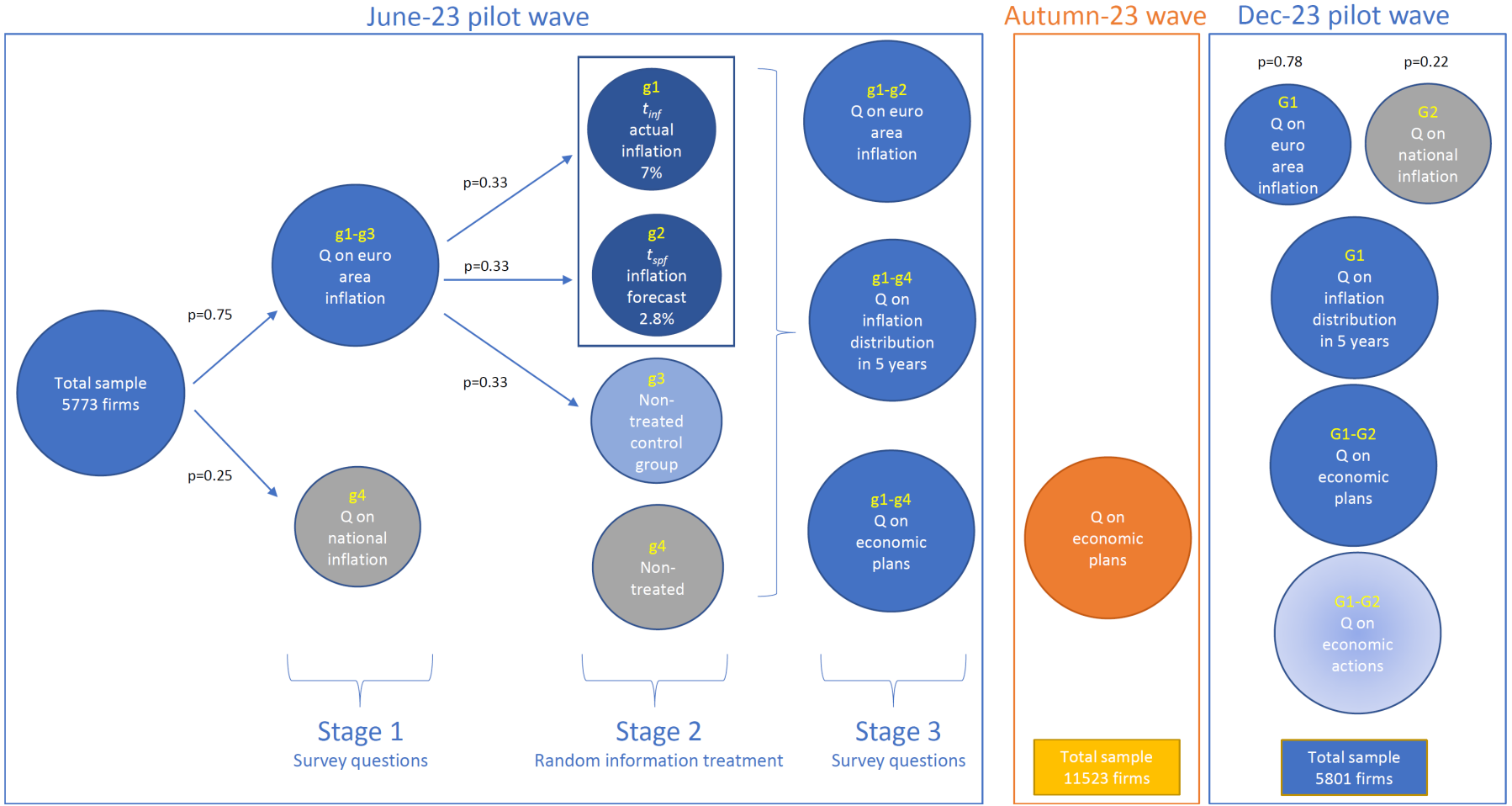
4. Information treatments

- **Fundamental questions**:
  - How do firms' inflation expectations respond to information?
  - Do firms' inflation expectations matter for their decisions, e.g., price setting?

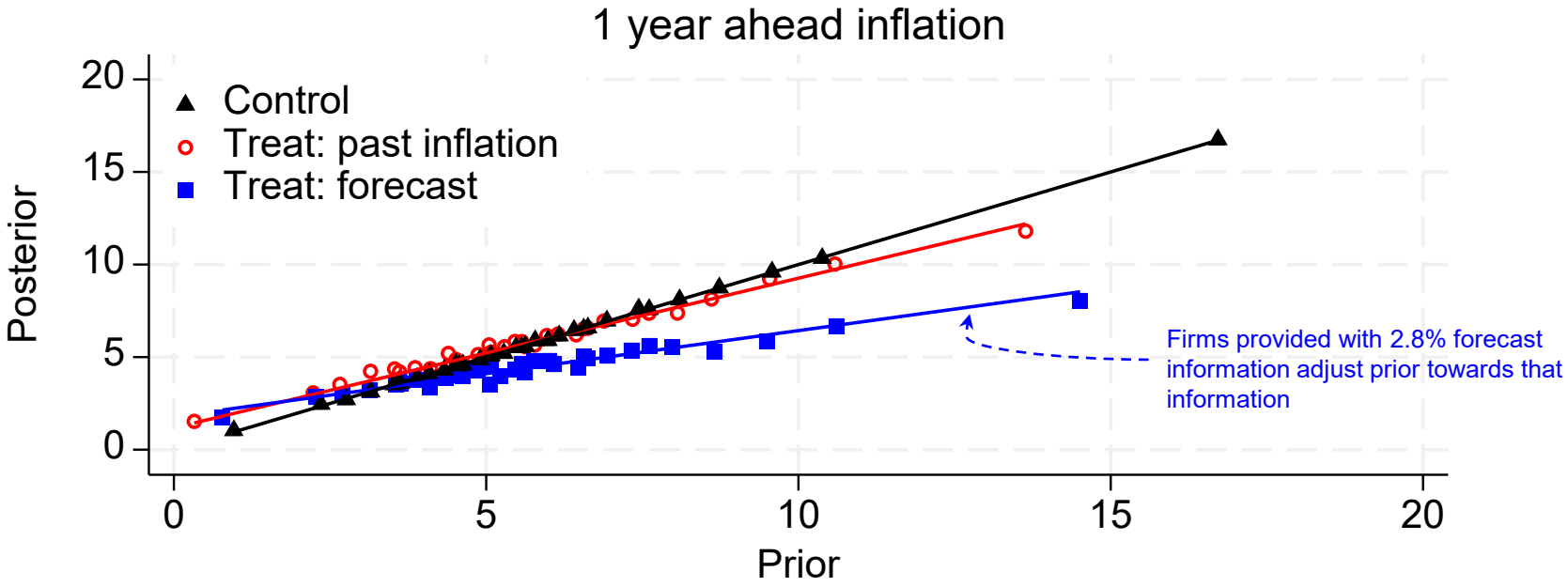
    → **Causal effects of inflation expectations**

- **Answer these questions with randomised information treatment (an RCT)**
  - Firms surveyed in June 2023 were randomly assigned to one of three groups
    - Control group: No information
    - Treatment group A: Information that inflation in April had turned out to be **7.0%**
    - Treatment group B: Information that SPF forecast for 2024Q2 is **2.8%**

4. Structure of the survey rounds



4. Effect of information treatment on inflation expectations



Source: SAFE pilot rounds.

Notes: Binscatter plot of prior vs posterior beliefs. Huber weights are applied to minimize the influence of outliers.

4. Effect of information treatment on inflation expectations in figures

$$E_{i,t}^{post}\pi_{t+h} = a_0 + a_1 \times E_{i,t}^{prior}\pi_{t+h} + \sum_j b_j \times E_{i,t}^{prior}\pi_{t+h} \times \mathbb{I}(i \in Treatment\ j)$$
$$+ \sum_j c_j \times \mathbb{I}(i \in Treatment\ j) + Controls + error$$

Dep. Var.: *Posterior*	Huber		
	1 year ahead	3 year ahead	5 year ahead
	(1)	(2)	(3)
$\mathbb{I}(Treatment = Actual\ \pi)$	1.31***	2.10***	1.28***
	(0.09)	(0.23)	(0.21)
$\mathbb{I}(Treatment = Forecast\ \pi)$	1.71***	0.85***	0.94***
	(0.09)	(0.05)	(0.30)
Prior	1.00	1.00	1.00
$Prior \times \mathbb{I}(Treatment = Actual\ \pi)$	-0.21***	-0.39***	-0.28***
	(0.02)	(0.05)	(0.06)
$Prior \times \mathbb{I}(Treatment = Forecast\ \pi)$	-0.53***	-0.30***	-0.33***
	(0.02)	(0.01)	(0.08)
Observations	2,828	2,664	2,584
R-squared	0.92	0.79	0.82

- **Firms adjust inflation expectations to information**
- Inflation **forecasts are more powerful** in moving expectations compared to past information

5. Causal effect of inflation expectations on firms' decisions

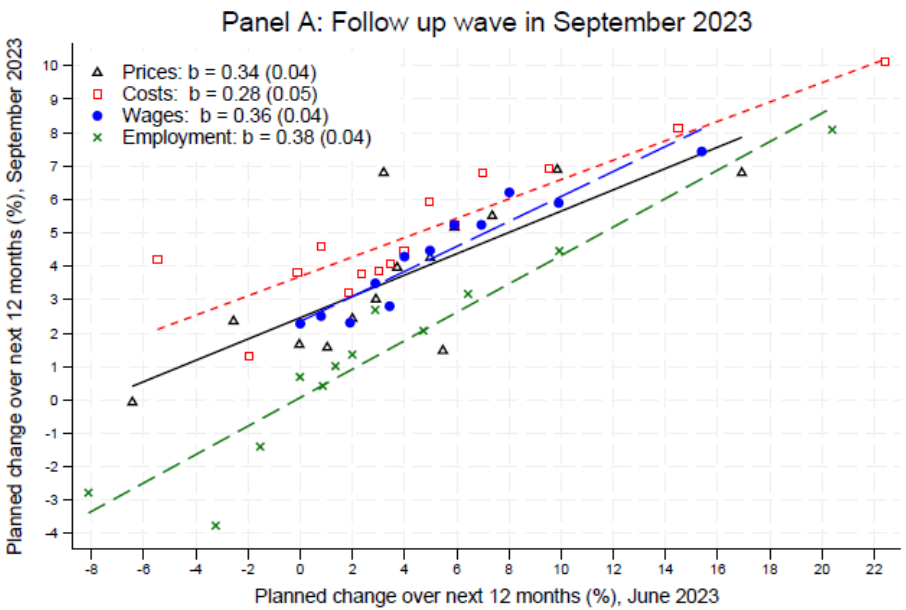
$$Outcome_i = \gamma_1 \times \widehat{E_{i,t}^{post}\pi_{t+h}} + \gamma_2 \times E_{i,t}^{prior}\pi_{t+h} + controls + error_i$$

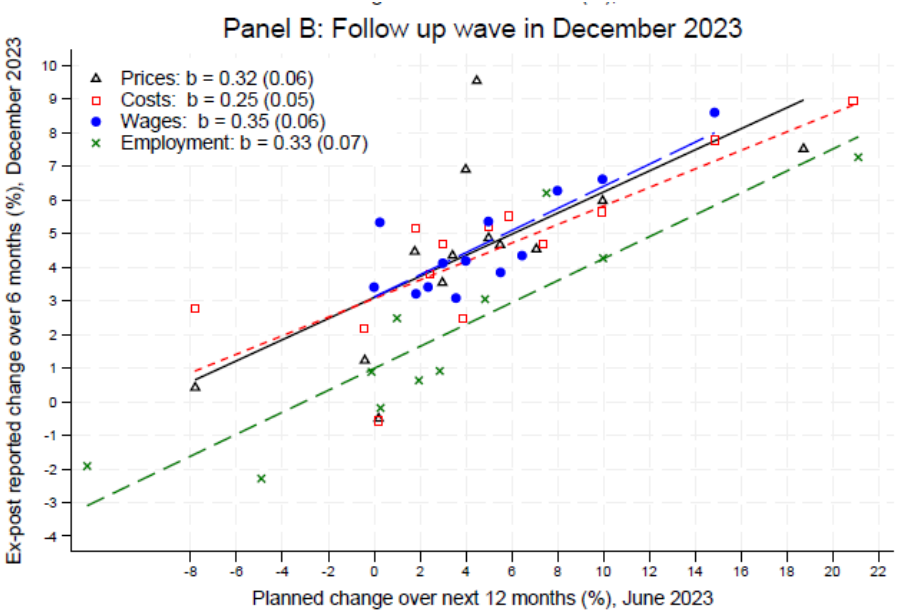
	Change in:			
	Prices	Costs	Wages	Employment
	(1)	(2)	(3)	(4)
Panel A. No controls				
$Posterior\ E_{i,t}^{post}\pi_{t+h}$	0.39**	0.67***	0.15	0.34*
	(0.17)	(0.17)	(0.09)	(0.20)
Observations	2,680	2,724	2,701	2,608
R-squared	0.06	0.08	0.11	0.02
1st stage F-stat	341.9	336.2	332.8	304.2

- **Firms' economic decisions/plans causally depend on inflation expectations**
  - Inflation expectations are instrumented by exogenous information treatment (1st stage given by specification in previous slide)

6. Follow up on economic plans

Planned changes versus actual changes





Source: SAFE

Notes: The figure plots binscatters for planned changes over the next 12 months vs ex-post actual changes over the next 6 months (as reported 6 months after the planned changes) in the second follow-up wave. The lines show fitted relationships (OLS with sampling weights). Slopes and standard errors (in parentheses) are reported in the legend. Planned changes are trimmed at top and bottom 2 %.

7. Conclusion

- **SAFE** provides data on euro area **firms' inflation expectations**
  - The first euro area wide survey to elicit firms' inflation expectations

- Firms **respond to information** provision by adjusting their inflation expectations
  - Especially to forward-looking information (forecast)

- Randomised treatment **creates exogenous variation in expectations**, which we use to show that inflation expectations **matter (causally) for firms' decisions, e.g. price setting**

- More in the paper: Uncertainty about inflation, Role of firm and manager characteristics, Persistent treatment effects in follow-up waves, Heterogeneous responses

Thank you

Background slides

SAFE questions in the pilot survey rounds

- The survey is being extended with quantitative questions on firms' inflation expectations

Q1. What do you think the euro area inflation rate will be in at the following points in time? Please provide your answer as an annual percentage rate.

a) in 12 months
b) in three years, i.e. in 2026
c) in five years, i.e. in 2028

Q3. All expectations regarding future inflation are surrounded by uncertainty. Therefore, still considering inflation in five years, i.e. in 2028, what do you think is the probability of inflation being above or below the following levels? Please consider the following two alternative scenarios and provide your answer as a percentage.

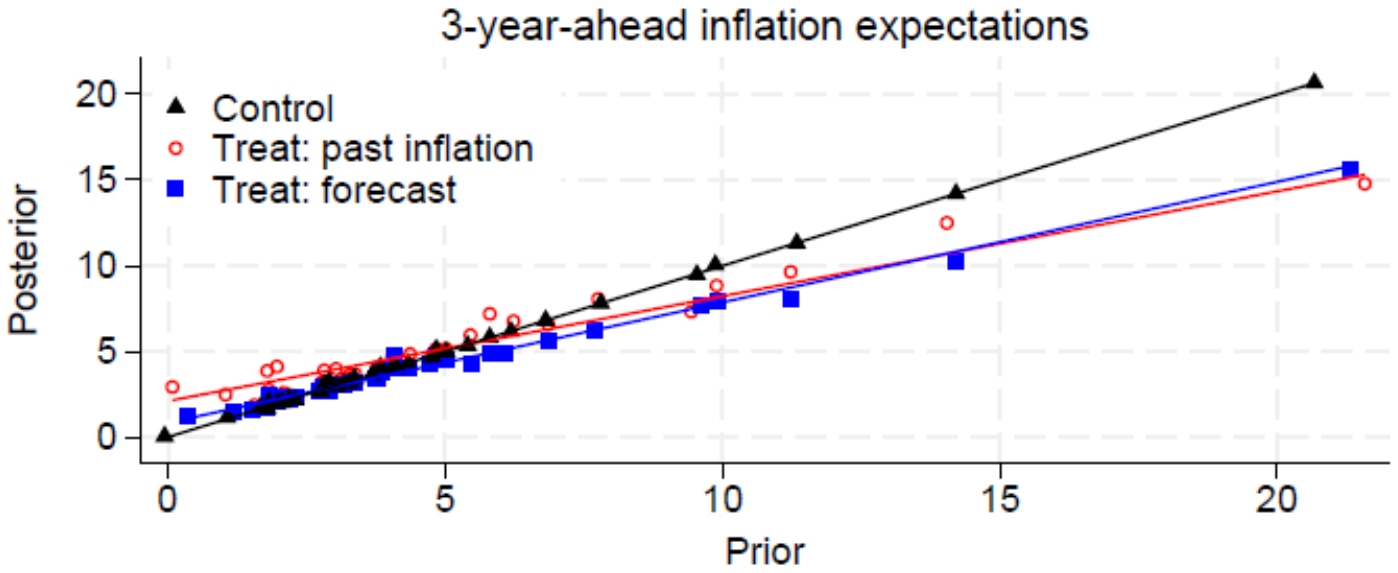
a) above [1.5*point estimate]?
b) below [0.5*point estimate]?

as well as firm's price setting, labour cost, non-labour cost and employment expectations

Q4. Looking ahead, by how much do you expect the following to increase or decrease over the next 12 months? Please provide your answer as a percentage change.

a) Your average selling price of products or services in your main markets
b) The average prices of production inputs (non-labour costs such as materials and energy)
c) The average wage of your current employees
d) Your number of employees

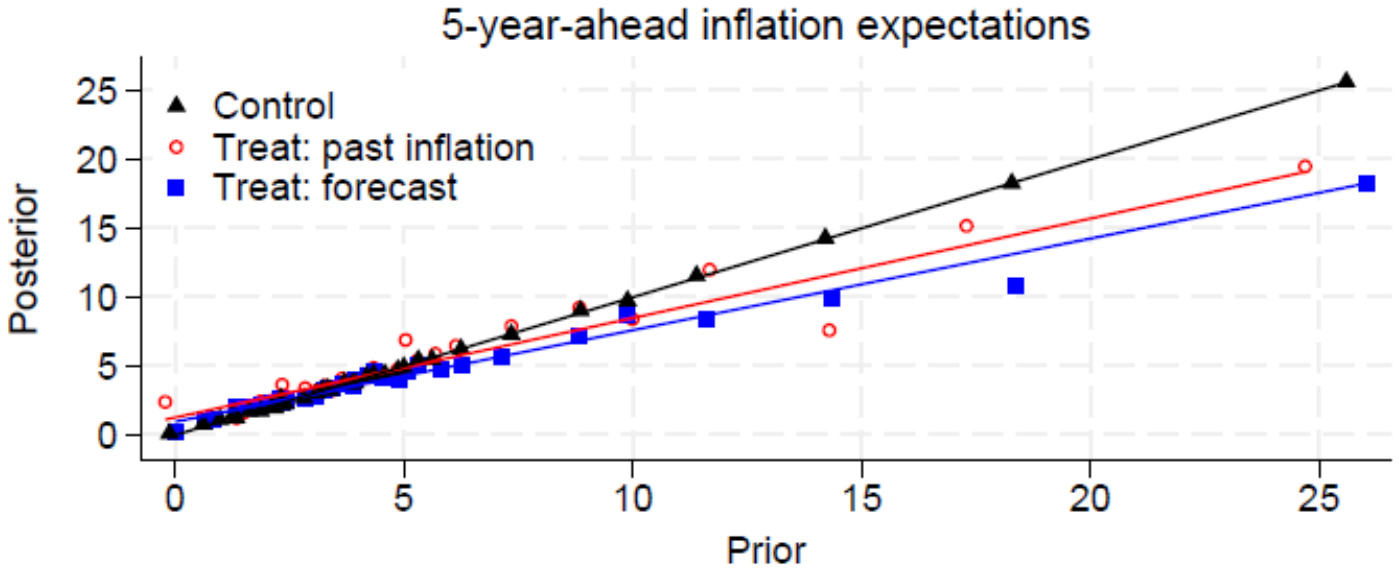
4. Effect of information treatment on inflation expectations: 3-year ahead



Source: SAFE pilot rounds.

Notes: Binscatter plot of prior vs posterior beliefs. Huber weights are applied to minimize the influence of outliers.

4. Effect of information treatment on inflation expectations: 5-year-ahead



Source: SAFE pilot rounds.

Notes: Binscatter plot of prior vs posterior beliefs. Huber weights are applied to minimize the influence of outliers.

4. Effect of information treatment on inflation expectations: 6 months after

$$E_{i,t}^{post}\pi_{t+h} = a_0 + a_1 \times E_{i,t}^{prior}\pi_{t+h} + \sum_j b_j \times E_{i,t}^{prior}\pi_{t+h} \times \mathbb{I}(i \in Treatment\ j)$$

$$+ \sum_j c_j \times \mathbb{I}(i \in Treatment\ j) + Controls + error$$

Dep. Var.: $Posterior$ 6 months after the treatment	Huber		
	1 year ahead	3 year ahead	5 year ahead
	(1)	(2)	(3)
$\mathbb{I}(Treatment = Actual\ \pi)$	-0.55	-1.81*	-3.35**
	(0.92)	(1.00)	(1.65)
$\mathbb{I}(Treatment = Forecast\ \pi)$	2.27**	-0.64	-2.25
	(0.98)	(0.99)	(1.39)
$Prior$	0.46***	0.42***	0.27*
	(0.13)	(0.12)	(0.16)
$Prior \times \mathbb{I}(Treatment = Actual\ \pi)$	0.04	0.04	0.24
	(0.16)	(0.13)	(0.15)
$Prior \times \mathbb{I}(Treatment = Forecast\ \pi)$	-0.32**	-0.27*	-0.20
	(0.16)	(0.14)	(0.13)
Observations	264	226	194
R-squared	0.25	0.27	0.27

- **Still significant effects**
- **Results suggest not only a powerful, long-lived effect of the treatments**