

INFLATION EXPECTATIONS AND FIRMS' DECISIONS IN HIGH INFLATION: EVIDENCE FROM A RANDOMIZED CONTROL TRIAL

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CBRT & NBER Monetary Policy in Emerging Markets



Outline

- 1 Introduction and Research Questions
- 2 Methodology and Empirical Setting
- 3 Causal Impact on Firms' Decisions and Expectations
 - Firms' Wage, Price and Economic Outlook Expectations
 - Borrowing Behavior
 - Real Outcome (employment, sales, inventory)
- 4 Conclusion

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Why Do Central Banks Need Firms' Inflation Expectations?

- **Firms' are price and wage-setters**

- ▶ Ben Bernanke (2007): *"... Information on the price expectations of businesses—who are, after all, the **price setters** in the first instance—... is particularly scarce."*

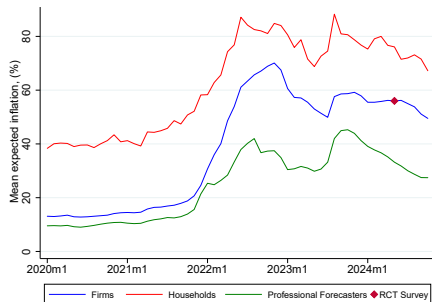
- **Anchored expectations reflect the credibility of CBs**

- ▶ Jerome Powell (2025): *"Our obligation is to keep longer-term inflation expectations **well-anchored** and to make certain that a one-time increase in the price level does not become an ongoing inflation problem."*

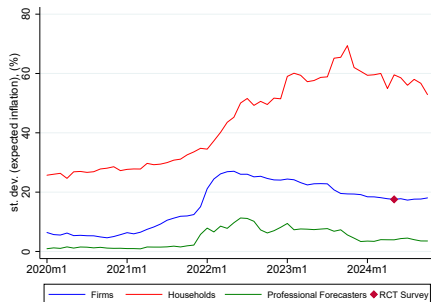
Inflation expectations and (in)attention?

- Expectations: part of decision-making process of firms
 - ▶ Phillips Curve, Euler Equation, Tobin's Q, Asset Pricing, Taylor rule
 - ▶ Empirically challenging to identify the **causal impact**
- Firms deviate from full-information rational expectations
- Yet, evidence from **high-inflation** environments is scarce
- **1st randomized information experiment (RCT)** in high-inflation
 - ▶ Annual inflation was around 75%
- Information treatments conducted immediately after the May 2024 wave of the CBRT's regular monthly firm expectations survey
- Examine **causal impacts of expectations** on firm decisions
 - ▶ Post-treatment behavior is tracked using **administrative data**

Expectations in Turkey



(a) Mean Expected Inflation



(b) Disagreement in Expected Inflation

Figure: One-Year-Ahead Inflation Expectations of HHs, Firms, and Professionals

Research Questions

- Are information treatments effective in high-inflation?
- How do inflation expectations shape firms' price and wage expectations? **Pass-through rates?**
- Is there a **causal relationship** between inflation expectations and pessimism?
- What are the effects on **borrowing behavior, credit costs, liability composition, and FX market transactions?**
- Do heightened inflation expectations affect **real outcomes** such as employment, sales, and purchasing activity?

Shocks to Inflation Expectations

New Keynesian Phillips curve:

$$\pi_t = \beta \pi_{f,t}^{e,1} + \kappa y_t$$

Euler equation:

$$i_t = \mathbb{E}_t[\gamma(y_{t+1} - y_t)] + \pi_{hh,t}^{e,1}$$

Modified Taylor rule:

$$i_t = \phi_y y_t + \phi_\pi \pi_t + \phi_e \pi_{cb,t}^{e,1}$$

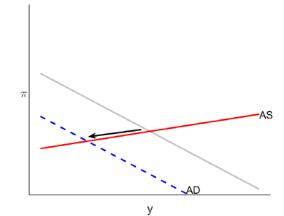
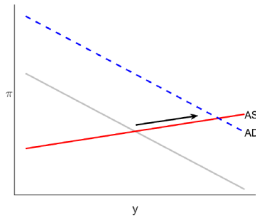
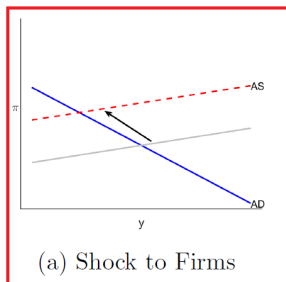


Figure: Response to Expectation Shocks, Adams and Barrett (2024)

- *Reactions differ depending on whose expectations are being shocked*

Literature Review

- **Pass-through:** Coibion et al. (2018), Hajdini et al. (2023), Buchheim et al. (2024), Baumann et al. (2024), Abberger et al. (2024)
 - ▶ From inflation expectation to firms' own prices: 0% ~ 30%
 - ▶ From inflation expectation to wage expectations: 0% ~ 25%
- **Impact on Firms' Decisions:**
 - ▶ Coibion et al. (2020)
 - ▶ Ropele et al. (2022)
 - ▶ Kumar et al. (2023)
 - ▶ Delgado et al. (2024)
- **First RCT in a high-inflation setting** to causally identify the impact of inflation expectations on firm decisions
- **Post-treatment behavior tracked using a rich set of administrative data**

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- Post-treatment behavior **tracked using a rich set of administrative data**

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ① **Fact 1: Higher wage, cost, and price expectations**
 - ▶ Pass-through rates to wage and price expectations are **60%**.

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ① **Fact 1:** Higher wage, cost, and price expectations
- ② **Fact 2: Increased pessimism about aggregate and firm outlook**
 - ▶ Supply-sided view of the economy
 - ▶ Higher inflation \Rightarrow lower output expectation

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ① **Fact 1:** Higher wage, cost, and price expectations
- ② **Fact 2:** Increased pessimism about aggregate and firm outlook

- ③ **Fact 3: Increased credit usage (with compositional shift)**
 - ▶ More long-term credit (10 pp \uparrow in expect \Rightarrow 3 percent more use)
 - ▶ Less short-term credit (10 pp \uparrow in expect \Rightarrow 1 percent less use)

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ① **Fact 1:** Higher wage, cost, and price expectations
- ② **Fact 2:** Increased pessimism about aggregate and firm outlook

- ③ **Fact 3:** Increased credit usage (with compositional shift)
- ④ **Fact 4: More borrowing in TL, less in foreign currency**
 - ▶ Liability-side **dedollarisation**

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ① **Fact 1:** Higher wage, cost, and price expectations
- ② **Fact 2:** Increased pessimism about aggregate and firm outlook

- ③ **Fact 3:** Increased credit usage (with compositional shift)
- ④ **Fact 4:** More borrowing in TL, less in foreign currency
- ⑤ **Fact 5: Increased foreign currency holdings (asset dollarization)**
 - ▶ Inflation hedging against depreciation, with more FC holding

Main Findings (Preview)

Higher firm inflation expectations lead to:

- ➊ **Fact 1:** Higher wage, cost, and price expectations
- ➋ **Fact 2:** Increased pessimism about aggregate and firm outlook

- ➌ **Fact 3:** Increased credit usage (with compositional shift)
- ➍ **Fact 4:** More borrowing in TL, less in foreign currency
- ➎ **Fact 5:** Increased foreign currency holdings (asset dollarization)
- ➏ **Fact 6: Lower growth in sales and employment, higher purchases**
 - ▶ 10 pp \uparrow in expectation \Rightarrow 0.5 percent **decline** in employment
 - ▶ 10 pp \uparrow in expectation \Rightarrow 0.2 percent **decline** in sales
 - ▶ 10 pp \uparrow in expectation \Rightarrow 0.2 percent **increase** in purchases

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Methodology: Randomized Controlled Trial

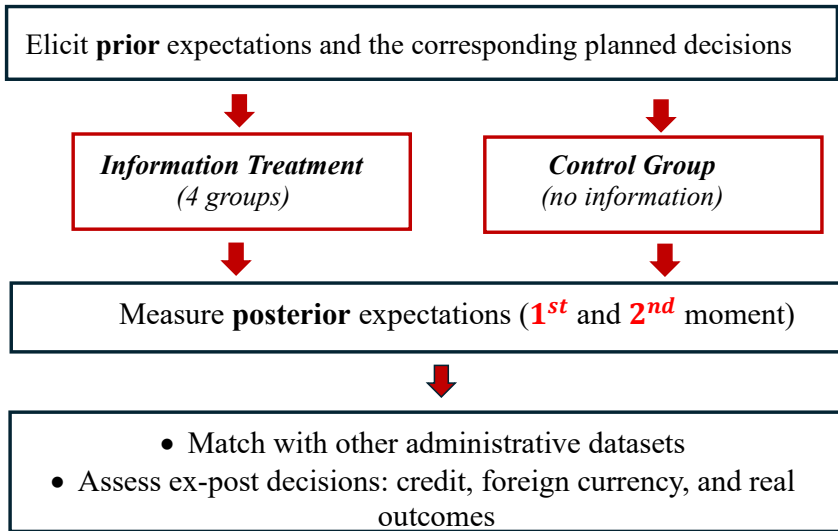
- **Sample:** Over 1,200 firms surveyed in May 2024
- High inflation context:
 - ▶ Annual inflation rate was $\approx 75\%$
 - ▶ Policy rate was 50%
 - ▶ Mean inflation expectation was 58%
- Firms divided into 5 groups: Descriptive Stats
 - ▶ 4 treatment groups
 - ▶ 1 control group
- **Info treatments:** Professional forecasts, CBRT projections-target
- **Matched firm-level administrative data** sources
 - ▶ Balance Sheet and Income Statement
 - ▶ Credit registry (stock and flow)
 - ▶ Firm-level Employment and wage
 - ▶ B2B Sales
 - ▶ Foreign Currency Transactions

RCT Procedure

- **Stage 1:** Regular **May BTS** conducted (priors collected)
 - **Stage 2:** RCT conducted **two days later** (information provided)
 - **Stage 3:** Following 4 months, post-treatment behavior monitored
-

- Inflation Expectations of Firms
- Mean inflation expectation is 58%.
 - ▶ 10th percentile expects 30%
 - ▶ 90th percentile expects 89%
- Real sale growth expectation 4.4%.
 - ▶ 10th percentile expects -16%
 - ▶ 90th percentile expects 36%

RCT Procedure



Information Treatments

- T-1 (SPF): *According to the results of the Market Participants Survey for May 2024: The participants' expectation for the Consumer Price Index (CPI) 12 months from now is 33.21%. In other words, professionals expect general prices to increase by 33.21% over the next 12 months.*
- T-2 (CBRT): *"According to the Central Bank of the Republic of Turkey's Inflation Report for May 2024: The Central Bank predicts that annual inflation will be 38% by the end of 2024. In other words, the Central Bank expects general prices to increase by 38% in 2024."*
- T-3 (CBRT): *"According to the Central Bank of the Republic of Turkey's Inflation Report for May 2024: The Central Bank predicts that annual inflation will be 14% by the end of 2025. In other words, the Central Bank expects general prices to increase by 14% in 2025."*
- T-4 (Target): *"Within the framework of the inflation targeting regime, the Central Bank's inflation target is 5%. In other words, the Central Bank aims for the general price level to rise by approximately 5% annually in the medium term."*

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Treatment Effects on Expectations

- Assess the impact of the information treatments on expectations

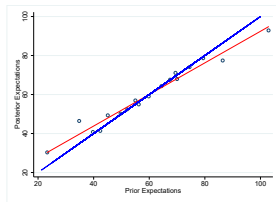
$$\begin{aligned}\text{Posterior}_i &= \alpha_0 + \beta_0 \text{Prior}_i \\ &+ \sum_{j=1}^4 \beta_j \times I\{i \in \text{Treat } j\} \times \text{Prior}_i \\ &+ \sum_{j=1}^4 \alpha_j \times I\{i \in \text{Treat } j\} + \gamma X_i + \varepsilon_i\end{aligned}$$

- Key components:
 - ▶ i : Respondent in the firm.
 - ▶ Prior_i : Firm's prior (pre-treatment) inflation expectation.
 - ▶ Posterior_i : Firm's posterior (post-treatment) inflation expectation.
- Interpretation of coefficients:
 - ▶ β_0 : Strength of prior beliefs in shaping posterior expectations (1 under FIRE).
 - ▶ β_j : Effectiveness of treatments in influencing expectations (0 under FIRE).
- Create **exogenous variation in expectations**, enabling causal analysis.

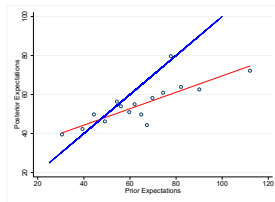
Treatment Effects on Expectations

	CPI		PPI	
	(1) mean	(2) variance	(3) mean	(4) variance
Revisions in beliefs immediately after treatment				
Prior mean	0.81*** (0.05)	0.05*** (0.01)	0.80*** (0.04)	0.04*** (0.01)
Prior mean × T1	-0.27*** (0.07)	-0.01 (0.01)	-0.37*** (0.07)	-0.02*** (0.01)
Prior mean × T2	-0.23*** (0.07)	-0.01 (0.01)	-0.29*** (0.06)	-0.01*** (0.01)
Prior mean × T3	-0.12** (0.06)	-0.02 (0.01)	-0.22*** (0.07)	-0.01 (0.01)
Prior mean × T4	-0.13*** (0.0654)	-0.03*** (0.0122)	-0.18*** (0.0680)	-0.02*** (0.0102)
T1 (SPF expectations)	10.13*** (3.75)	0.18 (0.77)	18.92*** (3.94)	1.23*** (0.61)
T2 (CBRT 1-y ahead forecast)	10.52*** (4.01)	0.42 (0.74)	16.14*** (3.71)	0.21 (0.62)
T3 (CBRT 2-y ahead forecast)	1.73 (3.95)	1.02*** (0.61)	9.96*** (3.76)	1.03*** (0.58)
T4 (Inflation Target)	7.51*** (3.94)	2.05*** (0.72)	11.13*** (3.78)	1.29*** (0.62)
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
R-squared	0.72	0.41	0.74	0.40
Observations	1,181	1,181	1,181	1,181

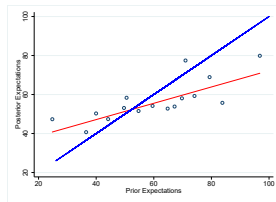
Treatment Effects on Expectations



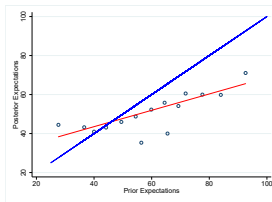
(a) Control



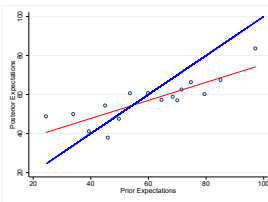
(b) Treatment #1



(c) Treatment #2



(d) Treatment #3



(e) Treatment #4

Figure: Prior and Posterior CPI Beliefs for Control/Treatment Groups

Treatment Effects on Expectations

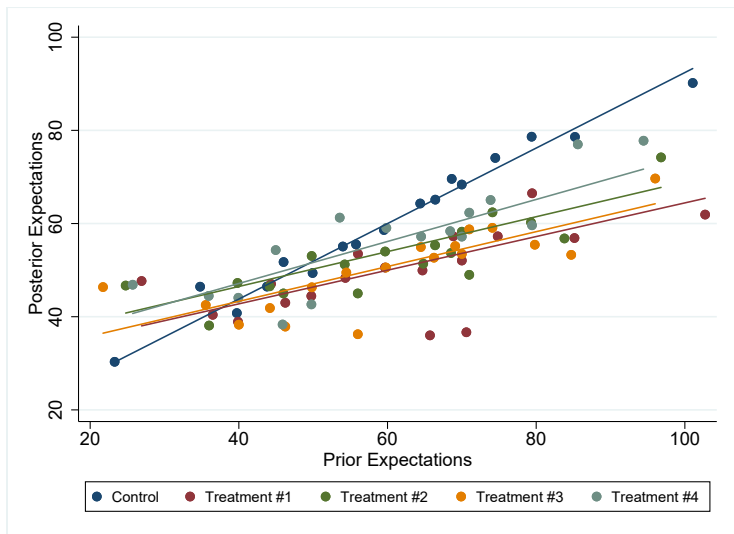


Figure: Response of Inflation Expectations by Treatment Type

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Causal Impact on Expectations

- Analyze the causal impact of exogenous variation in inflation expectations on firms' decisions (Coibion et al., 2022):

$$Y_{i,t+h} = \beta_1 \mathbf{Post}_{i,t}^{mean} + \beta_2 \mathbf{Prior}_{i,t}^{mean} + \gamma X_{i,t-1} + \delta_s + \phi_p + \varepsilon_{i,t+h}$$

- $Y_{i,t+h}$ includes:
 - ▶ Quantitative expectations: wages, unit costs, prices (12 months ahead)
 - ▶ Realized outcomes: credit amount, cost, employment, wages, sales, purchases
- $\mathbf{Post}_{i,t}^{mean}$: Posterior mean inflation expectation
- Posterior expectation is instrumented with:

$$\mathbf{Post}_{i,t}^{mean} = \alpha_0 + \sum_{j=1}^4 \beta_j \times I\{i \in \text{Treat } j\} \times \mathbf{Prior}_{i,t}^{mean} + \sum_{j=1}^4 \alpha_j \times I\{i \in \text{Treat } j\} + \varepsilon_{i,t}$$

Fact #1: Strong Impact on Expectations

	Panel A: Effect on Wage Expectations		
	(1) All Sample	(2) Large Firms	(3) SMEs
Posterior Mean	0.58** (0.25)	0.48** (0.24)	0.92*** (0.27)
Prior Wage Growth Perception	0.25*** (0.05)	0.25*** (0.06)	0.21*** (0.04)
First Stage F-stat (KP Wald)	50.17	24.21	24.91
R-squared	0.25	0.31	0.24
Observations	1,189	588	601
	Panel B: Effect on Unit Cost Expectations		
	(1)	(2)	(3)
Posterior Mean	0.53*** (0.18)	0.50*** (0.20)	0.97*** (0.30)
Prior Wage Growth Perception	0.10*** (0.03)	0.09** (0.04)	0.13*** (0.04)
First Stage F-stat (KP Wald)	49.91	24.65	24.27
R-squared	0.32	0.37	0.31
Observations	1,187	587	600
	Panel C: Effect on Price Expectations		
	(1)	(2)	(3)
Posterior Mean	0.55*** (0.18)	0.47*** (0.16)	1.01*** (0.26)
Prior Price Growth Perception	0.30*** (0.03)	0.31*** (0.05)	0.28*** (0.06)
First Stage F-stat (KP Wald)	48.96	22.27	26.04
R-squared	0.30	0.39	0.24
Observations	1,183	585	598
Firm Controls, Sector FE, Province FE	✓	✓	✓

Fact #1: Strong Pass-through to Price-Wage Expectations

- Pass-through rates from next 12-month inflation expectations:
 - ▶ To **wage** expectations: 58%
 - ▶ To **unit cost** expectations: 53%
 - ▶ To **own price** expectations: 55%

- Pass-through rates in low inflation environments are **low**: $\approx 25\%$
 - ▶ Hajdini et al. (2023), Abberger et al. (2024), Baumann et al. (2024)
- Contrast with Savignac et al. (2024):
 - ▶ **No significant link** between wage and price expectations in their findings

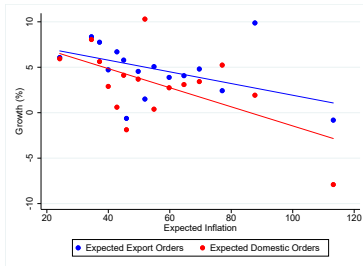
Fact #2: Higher expectation \Rightarrow increased pessimism

Panel A: Effect on Firm's Own Business Expectations			
	(1) All Sample	(2) Large Firms	(3) SMEs
Posterior Mean	0.014*** (0.003)	0.011*** (0.004)	0.019*** (0.004)
Prior Economic Perception	0.23*** (0.032)	0.31*** (0.054)	0.19*** (0.058)
First Stage F-stat (KP Wald)	49.91	24.46	24.43
R-squared	0.12	0.14	0.13
Observations	1,173	587	583
Panel B: Effect on Economic Expectations			
Posterior Mean	0.024*** (0.002)	0.021*** (0.003)	0.029*** (0.004)
Prior Economic Perception	0.263*** (0.030)	0.334*** (0.052)	0.201*** (0.055)
First Stage F-stat (KP Wald)	50.25	24.20	24.71
R-squared	0.17	0.22	0.19
Observations	1,187	587	600
Panel C: Effect on Credit Conditions Expectations			
Posterior Mean	0.012*** (0.002)	0.009*** (0.004)	0.014*** (0.003)
Prior Borrowing Cost Expectation	0.166*** (0.039)	0.119*** (0.055)	0.185*** (0.058)
First Stage F-stat (KP Wald)	50.53	24.73	24.93
R-squared	0.10	0.12	0.16
Observations	1,169	582	587
Firm Controls, Sector FE, Province FE	✓	✓	✓

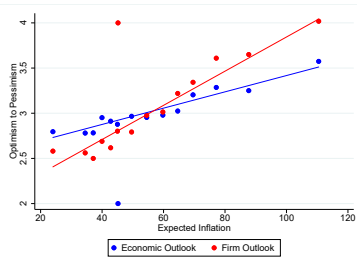
Fact #2: Higher expectation \Rightarrow increased pessimism

- A 1 SD (20pp) rise in inflation expectations increases **pessimism**:
 - ▶ By 0.48 points for **aggregate economic outlook** next 3 months
 - ▶ By 0.28 points for **firms' own business expectations**
 - Higher expectations \Rightarrow tighter credit conditions
 - ▶ More so for small firms (financially more vulnerable)
-
- **Supply-sided mindset of firms:**
 - ▶ \uparrow inflation expectation \Rightarrow **weaker** growth and **costlier** financing
 - ▶ \downarrow inflation expectation \Rightarrow **stronger** growth and **cheaper** financing

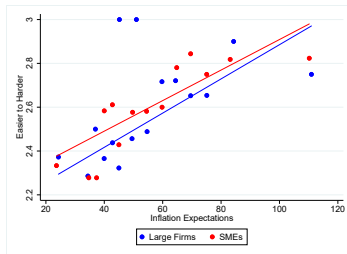
Fact #2: Descriptive Evidence



(a) Export and Domestic Order



(b) Aggregate and Firm Outlook



(c) Financial Conditions

Borrowing: Impact on Credit and Financing Cost

	(1)	(2)	(3)	(4)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$
Panel A: Effect on Credit				
Posterior Mean	0.30** (0.14)	0.37** (0.16)	0.38*** (0.13)	0.17 (0.11)
First Stage F-stat (KP Wald)	59.77	59.77	59.77	59.78
Observations	1,181	1,181	1,181	1,181
Panel B: Effect on Borrowing Cost				
Posterior Mean	-0.28*** (0.08)	-0.28*** (0.10)	-0.33** (0.15)	-0.31* (0.17)
First Stage F-stat (KP Wald)	20.63	20.62	20.63	20.63
Observations	595	567	534	582
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓

- More credit with lower cost (compositional shift)

Fact #3: Higher expectation \Rightarrow increased credit usage

- **Higher Credit Demand:**

- ▶ 10 pp rise in expectations \Rightarrow 3 percent **rise in new credit** usage
- ▶ Shift borrowing from **short-term** to **long-term** credit
- ▶ Cost decline due to shift in maturity

- **Refinancing Channel as Key Driver:**

- ▶ **Lock-in current interest rates** to mitigate future cost increases
- ▶ Real value of debt will erode over time
- ▶ Other Possible Channels

- Yet, why do price and quantity move in different directions?

Borrowing: Impact on Short vs Long Term Credit

	(1)	(2)	(3)	(4)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$
Panel A: Effect on Long-term Credit				
Posterior Mean	0.33** (0.14)	0.36** (0.16)	0.40** (0.13)	0.03 (0.10)
First Stage F-stat (KP Wald)	59.77	59.77	59.77	59.78
Observations	1,181	1,181	1,181	1,181
Panel B: Effect on Short-term Credit				
Posterior Mean	-0.07* (0.04)	-0.02 (0.02)	-0.04*** (0.02)	-0.04 (0.03)
First Stage F-stat (KP Wald)	59.77	59.77	59.77	59.78
Observations	1,181	1,181	1,181	1,181
Panel C: Effect on Long-term Borrowing Cost				
Posterior Mean	0.16*** (0.03)	0.18*** (0.04)	0.14** (0.07)	0.10* (0.06)
First Stage F-stat (KP Wald)	20.56	17.38	18.89	21.31
Observations	271	254	251	261
Panel D: Effect on Short-term Borrowing Cost				
Posterior Mean	-0.05** (0.02)	-0.07*** (0.02)	-0.06** (0.03)	-0.05 (0.03)
First Stage F-stat (KP Wald)	10.92	11.47	10.85	13.12
Observations	324	313	283	321
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓

- The changes are demand-driven (price and quantity movements)

Fact #3: Higher expectation \Rightarrow long-term credit usage

- **Long-Term** financing dominates:

- ▶ Higher demand for long-term credit drives down average costs
- ▶ **Long-term** financing cost: 48%
- ▶ **Short-term** cost: 52%

- Channels in Play:

- ▶ **Refinancing Channel:** Major driver; firms **extend debt maturities**
- ▶ **Working Capital Channel:** Contributes minimally; reduced short-term credit demand (reduced need for working capital)

- **Key Finding:**

- ▶ Higher inflation expectations reshape firms' borrowing behavior, favoring long-term credit at a reduced average cost.

Outstanding Credit and Liability Composition

	(1)	(2)	(3)	(4)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$
Panel A: Effect on Total Outstanding Credit				
Posterior Mean	0.15*** (0.01)	0.14*** (0.01)	0.16*** (0.01)	0.14*** (0.01)
Panel B: Effect on Long-term Outstanding Credit				
Posterior Mean	0.16*** (0.01)	0.15*** (0.02)	0.17*** (0.01)	0.15*** (0.01)
Panel C: Effect on Short-term Outstanding Credit				
Posterior Mean	-0.02** (0.01)	-0.01 (0.01)	-0.01 (0.02)	-0.01 (0.02)
Panel D: Effect on TL Denominated Outstanding Credit				
Posterior Mean	0.15*** (0.02)	0.14*** (0.01)	0.16*** (0.02)	0.14*** (0.02)
Panel E: Effect on FX Denominated Outstanding Credit				
Posterior Mean	-0.02** (0.01)	-0.02 (0.02)	-0.02 (0.02)	-0.01 (0.01)
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
First Stage F-stat (KP Wald)	69.54	69.54	69.54	69.54
Observations	1,181	1,181	1,181	1,181

Fact #4: Higher Expectation \Rightarrow shift towards Lira credits

Firms with heightened inflation expectations:

- Rise in **Lira-denominated** credit
 - ▶ 10 pp \uparrow in expectations \Rightarrow 1.5 percent rise in TL credit
 - ★ Debt erosion impact of inflation
- Decline in **FX-denominated** credit
 - ▶ 10 pp \uparrow in expectations \Rightarrow 0.2 percent decline in FX credit
 - ★ Higher perceived costs from currency depreciation.

● Key Finding: Liability-side dedollarisation

- ▶ Shift in the composition of liabilities toward Lira-denom credit
- ▶ Firms perceive borrowing in TL as cheaper than FX

Asset Side: Foreign Currency Purchases and Sales

	(1)	(2)	(3)	(4)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$
Panel A: Effect on Foreign Currency Buying				
Posterior Mean	0.06*** (0.02)	0.03* (0.02)	0.05* (0.03)	0.02 (0.02)
First Stage F-stat (KP Wald)	58.45	58.46	58.45	58.45
Observations	1,181	1,181	1,181	1,181
Panel B: Effect on Foreign Currency Selling				
Posterior Mean	-0.16*** (0.05)	-0.05 (0.05)	-0.14*** (0.06)	-0.15*** (0.06)
First Stage F-stat (KP Wald)	54.04	54.04	54.04	54.04
Observations	1,181	1,181	1,181	1,181
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓

Fact #5: Higher Expectation \Rightarrow more FX holdings

Firms with heightened inflation expectations:

- Rise in **Foreign Currency Purchases:**

- ▶ 10 pp \uparrow in expectations \Rightarrow 0.6 pp increase in FX purchases

- Decline in **Foreign Currency Sales:**

- ▶ 10 pp \uparrow in inflation expectations \Rightarrow 1.6 pp decrease in FX sales

- **Key Insight: Asset-side dollarisation**

- ▶ Reflects hedging behavior against domestic inflation
 - ★ a common behavior in emerging markets

Real Outcome: Impact on employment, sales, inventory

	(1)	(2)	(3)	(4)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$
Panel A: Effect on Employment				
Posterior Mean	-0.05*** (0.02)	-0.04** (0.02)	-0.05*** (0.02)	-0.03* (0.02)
First Stage F-stat (KP Wald)	69.54	69.54	69.54	69.54
R-Squared	0.12	0.13	0.12	0.10
Panel B: Effect on Total Sales				
Posterior Mean	-0.01*** (0.006)	-0.02** (0.01)	-0.01 (0.14)	-0.03 (0.10)
First Stage F-stat (KP Wald)	68.19	68.19	68.19	68.19
R-Squared	0.14	0.15	0.13	0.12
Panel C: Effect on Total Purchases				
Posterior Mean	0.01*** (0.002)	0.02*** (0.003)	0.01*** (0.004)	0.01*** (0.005)
First Stage F-stat (KP Wald)	69.24	69.24	69.24	69.24
R-Squared	0.10	0.11	0.09	0.13
Panel D: Effect on Wages				
Posterior Mean	0.04 (0.02)	0.07** (0.03)	0.05* (0.03)	0.02 (0.02)
First Stage F-stat (KP Wald)	69.75	69.75	69.75	69.75
R-Squared	0.13	0.12	0.09	0.13
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Observations	1,181	1,181	1,181	1,181

Fact #6: Higher Expectation \Rightarrow depressed real activity

Impact on Real Firm-Level Outcomes:

- Sales and Employment:
 - ▶ 10 pp rise in inf. expectations leads to:
 - ★ 0.5 percent decline in employment growth
 - ★ 0.2 percent decline in sales growth
 - ▶ "Supply-sided" view of the economy
 - Wages:
 - ▶ 10 pp rise in expectations \Rightarrow 0.7% increase in wage
 - ▶ Sticky wages lead to a slower adjustment in the short run
-
- Key Insight:
 - ▶ Reduce employment and sales consistent with their expectations

Fact #6: Higher Expectation \Rightarrow more purchasing

- **Purchases:**

- ▶ 10 pp increase in inf. expectations \Rightarrow 0.2% rise in purchasing

- **Key Channels:**

- ▶ **Inflation Hedge:** Firms purchase in advance to avoid future price increases
 - ★ Better to hold goods than lose value holding money
 - ★ Mirrors consumer hoarding behavior
- ▶ **Just-in-Case Inventory:** Firms secure materials early to lock in current prices and stabilize costs
 - ★ Price volatility and delivery delays are more common in high-inflation environments

- **Overall Effect:**

- ▶ Despite reduction in employment and sales, firms increase purchases \Rightarrow cost-cutting measures

Outline

- 1 Introduction and Research Questions
- 2 Methodology and Empirical Setting
- 3 Causal Impact on Firms' Decisions and Expectations
 - Firms' Wage, Price and Economic Outlook Expectations
 - Borrowing Behavior
 - Real Outcome (employment, sales, inventory)
- 4 Conclusion

Conclusion

- Inflation expectations have significant causal impacts on firm decisions.
 - ▶ Wage and price expectations: 60% pass-through
 - ▶ More credit usage, lower cost, shift from short-term to long-term
 - ▶ Lower employment and sales, higher purchases
- Evidence supports the "supply-sided" view of the economy.
- Future research: Role of inflation uncertainty and its second-moment effects.

State-Dependence of Results

- Real outcomes are consistent with firms' expectations.
- However, what about external validity?
- To test the robustness of our findings, we utilize the unexpected interest rate cut in 2021 as a quasi-experiment in a separate paper.

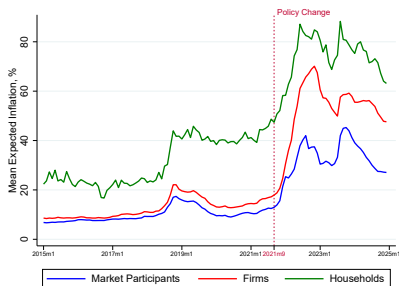
External Validity of Results - Akarsu et al. (2025)

Akarsu et al. (2025)

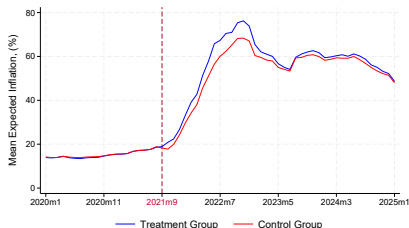
Quasi-Experiment in Monetary Policy:

The Impact of 2021 Rate Cut on Inflation Expectations and Firm Behavior

- Unexpected policy rate cut in September 2021
- New evidence obtained from the period between Sep-Dec 2021



(a) Quasi-experimental Setting



(b) Firms (Control vs Treatment)

Akarsu et al. (2025) - Impact on Expectations

	(1)	(2)	(3)	(4)	(5)	(6)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$	$y_{i,t+5}$	$y_{i,t+6}$
Panel A: Effect on Perception of Economic Outlook						
Posterior CPI Expectation	0.014***	0.021***	0.020***	0.021***	0.019***	0.023***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.005)	(0.006)
Prior Economic Outlook	0.412***	0.356***	0.425***	0.334***	0.344***	0.352***
	(0.036)	(0.036)	(0.031)	(0.036)	(0.035)	(0.033)
First Stage F-stat (KP Wald)	65.55	56.39	55.51	53.33	54.61	58.53
Observations	1,184	1,198	1,183	1,179	1,172	1,164
R-Squared	0.225	0.169	0.233	0.172	0.173	0.197
Panel B: Effect on Expected Orders						
Posterior CPI Expectation	-0.007**	-0.011***	-0.006*	-0.007*	-0.011**	-0.007
	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)
Prior Order Expectation	0.442***	0.277***	0.292***	0.241***	0.175***	0.193***
	(0.032)	(0.036)	(0.035)	(0.034)	(0.035)	(0.034)
First Stage F-stat (KP Wald)	67.04	67.99	64.91	59.85	65.74	58.69
Observations	1,175	1,170	1,164	1,150	1,156	1,145
R-Squared	0.197	0.079	0.089	0.063	0.036	0.046
Panel C: Effect on Expected Employment						
Posterior CPI Expectation	-0.005**	-0.009***	-0.009***	-0.004	-0.010***	-0.006**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
Prior Sales Expectation	0.413***	0.328***	0.254***	0.275***	0.301***	0.200***
	(0.036)	(0.039)	(0.039)	(0.036)	(0.036)	(0.037)
First Stage F-stat (KP Wald)	66.85	69.13	65.16	61.81	64.92	62.76
Observations	1,190	1,176	1,151	1,148	1,159	1,133
R-Squared	0.18	0.12	0.08	0.09	0.11	0.05
Firm Controls, Sector FE, Province FE	✓	✓	✓	✓	✓	✓

Takeaways #1

- Higher inflation expectations worsen firms' economic outlook.
 - ▶ 10-pp rise in inflation expectations reduces economic sentiment by 0.21 points
- Firms cut back on expected orders and employment
- Results align with uncertainty and real-options theory.

Akarsu et al. (2025) - Impact on Capacity Utilization

	(1)	(2)	(3)	(4)	(5)	(6)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$	$y_{i,t+5}$	$y_{i,t+6}$
Panel A: Effect on Domestic Sales Price Expectation						
Posterior CPI Expectation	0.015* (0.008)	0.012** (0.006)	0.012** (0.006)	0.009*** (0.004)	0.013** (0.007)	0.007* (0.004)
Prior Domestic Price Expectation	0.392*** (0.033)	0.358*** (0.030)	0.365*** (0.030)	0.390*** (0.030)	0.365*** (0.032)	0.351*** (0.031)
First Stage F-stat (KP Wald)	66.31	58.51	53.77	57.01	56.24	52.68
Observations	1,184	1,202	1,182	1,170	1,178	1,168
R-Squared	0.172	0.154	0.154	0.172	0.162	0.144
Panel B: Effect on Unit Cost Expectation						
Posterior CPI Expectation	0.010 (0.008)	0.018** (0.009)	0.019** (0.009)	0.016** (0.008)	0.016 (0.010)	0.018** (0.009)
Prior Unit Cost Expectation	0.376*** (0.028)	0.298*** (0.026)	0.316*** (0.028)	0.326*** (0.028)	0.324*** (0.027)	0.315*** (0.028)
First Stage F-stat (KP Wald)	50.93	48.71	46.26	47.12	57.05	46.75
Observations	1,196	1,209	1,192	1,177	1,194	1,179
R-Squared	0.231	0.171	0.170	0.184	0.175	0.178
Panel C: Effect on Capacity Utilization Ratio						
Posterior CPI Expectation	-0.171** (0.085)	-0.172* (0.093)	-0.308*** (0.110)	-0.330** (0.150)	-0.293*** (0.126)	-0.298*** (0.138)
Prior Capacity Utilization	0.792*** (0.027)	0.754*** (0.028)	0.735*** (0.032)	0.731*** (0.030)	0.748*** (0.027)	0.702*** (0.030)
First Stage F-stat (KP Wald)	67.95	67.45	65.91	63.61	65.49	63.65
Observations	1,251	1,265	1,249	1,235	1,249	1,230
R-Squared	0.71	0.65	0.59	0.60	0.61	0.57
Firm Controls, Sector FE, Province FE	✓	✓	✓	✓	✓	✓

Takeaways #2

- Inflation expectations significantly **reduce** firms' capacity utilization.
 - ▶ A 10-pp increase in inflation expectations leads to **a 3.3 percentage point drop**
- Reflects expectations of weaker future demand and uncertainty
- Firms respond by scaling back production (and maybe investment?)

Takeaways #3

- Firms revise up both **price** and **cost expectations** when inflation expectations rise.
- A 10-pp increase in CPI expectations raises:
 - ▶ **Domestic sales price expectations by 0.15 points.**
 - ▶ **Unit cost expectations by 0.19 points.**
- Indicates strong inflation pass-through to firm pricing strategies.
- Firms internalize macroeconomic signals quickly in setting expectations.
- Consistent with evidence from firm-level surveys and RCTs
 - ▶ Coibion and Gorodnichenko (2015); Kumar et al. (2023); Akarsu et al. (2024)

Akarsu et al. (2025) - Impact on Borrowing Behavior

	(1)	(2)	(3)	(4)	(5)	(6)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$	$y_{i,t+5}$	$y_{i,t+6}$
Panel A: Effect on Credit						
Posterior CPI Expectation	0.248**	0.260**	0.248**	0.268*	0.230*	0.202
	(0.124)	(0.125)	(0.127)	(0.129)	(0.130)	(0.133)
First Stage F-stat (KP Wald)	55.53	55.53	55.53	55.53	55.53	55.53
Observations	1,287	1,287	1,287	1,287	1,287	1,287
R-Squared	0.39	0.41	0.41	0.40	0.39	0.44
Panel B: Effect on Borrowing Cost						
Posterior CPI Expectation	0.132***	0.141***	0.141**	0.145***	0.138***	0.149**
	(0.053)	(0.052)	(0.064)	(0.048)	(0.045)	(0.070)
First Stage F-stat (KP Wald)	31.41	29.49	32.93	35.01	38.12	30.71
Observations	630	616	633	644	729	625
R-Squared	0.57	0.53	0.58	0.60	0.61	0.64
Panel C: Effect on Foreign Currency Selling						
Posterior CPI Expectation	-0.336***	-0.295***	-0.252***	-0.182*	-0.277***	-0.192
	(0.095)	(0.102)	(0.073)	(0.105)	(0.096)	(0.125)
First Stage F-stat (KP Wald)	55.76	55.76	55.76	55.76	55.76	55.76
Observations	1,268	1,268	1,268	1,268	1,268	1,268
R-Squared	0.35	0.39	0.35	0.38	0.31	0.35
Panel D: Effect on Foreign Currency Buying						
Posterior CPI Expectation	0.148*	0.146*	0.197**	0.206**	0.192***	0.188**
	(0.090)	(0.085)	(0.082)	(0.102)	(0.072)	(0.095)
Observations	1,268	1,268	1,268	1,268	1,268	1,268
R-Squared	0.29	0.27	0.28	0.28	0.30	0.30
Firm Controls, Sector FE, Province FE	✓	✓	✓	✓	✓	✓

Takeaways #4 – Credit, Borrowing Cost, and FX Behavior

- 10-pp increase in inflation expectations:
 - ▶ raises credit by 2.5%
 - ▶ and borrowing costs by 1.5 pp.
- Firms borrow more despite weaker sales and employment outlook
 - ▶ motivated by locking in lower rates
 - ▶ or expecting debt erosion via inflation
- Asset-side dollarization
 - ▶ FX purchases rise by 2%
 - ▶ sales fall by 2.5%
- Firms hedge against inflation and currency risk
 - ▶ through borrowing and FX positioning
 - ▶ driven by financial, operational, and precautionary motives

Akarsu et al. (2025) - Impact on Real Activity

	(1)	(2)	(3)	(4)	(5)	(6)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$	$y_{i,t+5}$	$y_{i,t+6}$
Panel A: Effect on Sales						
Posterior CPI Expectation	-0.022***	-0.021***	-0.017**	-0.014*	-0.016**	-0.013
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
First Stage F-stat (KP Wald)	55.84	55.84	55.78	55.78	55.79	55.79
Observations	1,263	1,263	1,258	1,257	1,261	1,259
R-Squared	0.23	0.25	0.27	0.25	0.26	0.23
Panel B: Effect on Exports						
Posterior CPI Expectation	0.005	0.003	0.004	0.014*	0.019**	0.019***
	(0.007)	(0.012)	(0.007)	(0.008)	(0.008)	(0.007)
First Stage F-stat (KP Wald)	55.07	55.07	55.07	55.07	55.07	55.07
Observations	1,145	1,145	1,145	1,145	1,145	1,145
R-Squared	0.12	0.13	0.12	0.11	0.13	0.12
Panel C: Effect on Purchases						
Posterior CPI Expectation	0.009	0.017	0.032***	0.017*	0.022**	0.020*
	(0.015)	(0.012)	(0.010)	(0.009)	(0.011)	(0.012)
First Stage F-stat (KP Wald)	55.66	55.66	55.66	55.66	55.66	55.66
Observations	1,261	1,265	1,265	1,264	1,265	1,263
R-Squared	0.16	0.18	0.20	0.15	0.16	0.12
Firm Controls, Sector FE, Province FE	✓	✓	✓	✓	✓	✓

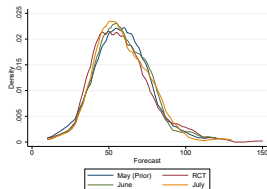
Akarsu et al. (2025) - Impact on Real Activity

	(1)	(2)	(3)	(4)	(5)	(6)
	$y_{i,t+1}$	$y_{i,t+2}$	$y_{i,t+3}$	$y_{i,t+4}$	$y_{i,t+5}$	$y_{i,t+6}$
Panel D: Effect on Employment						
Posterior CPI Expectation	-0.011	-0.014	-0.024***	-0.023***	-0.022**	-0.018
	(0.010)	(0.010)	(0.008)	(0.008)	(0.010)	(0.013)
R-Squared	0.09	0.11	0.11	0.10	0.09	0.08
First Stage F-stat (KP Wald)	55.79	55.79	55.79	55.79	55.79	55.79
Observations	1,263	1,262	1,260	1,260	1,260	1,260
Panel E: Effect on Wage						
Posterior CPI Expectation	0.003	0.005***	0.013***	0.010***	0.019***	0.018*
	(0.002)	(0.002)	(0.004)	(0.004)	(0.006)	(0.010)
R-Squared	0.05	0.07	0.09	0.09	0.11	0.09
First Stage F-stat (KP Wald)	55.79	55.79	55.79	55.79	55.79	55.79
Observations	1,263	1,262	1,260	1,260	1,260	1,260
Firm Controls	✓	✓	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓

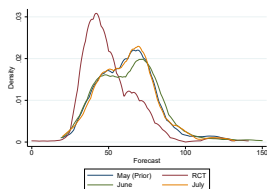
Takeaways #5 – Real Firm Outcomes

- A 10-pp rise in inflation expectations:
 - ▶ **reduces domestic sales by 0.21%**
 - ▶ **reduces employment by 0.24%** within 3 months
- Firms shift toward **exports (0.14%)**
 - ▶ aiming to generate FX revenue amid currency depreciation fears
- Firms increase **purchases (0.32%)**
 - ▶ firms front-load input buying to hedge against future cost increases
- Nominal **wages rise (0.13%)**, reflecting partial cost pass-through

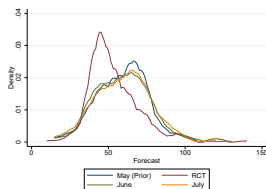
Inflation Expectations of Firms



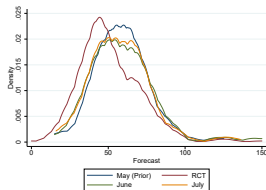
(a) Control



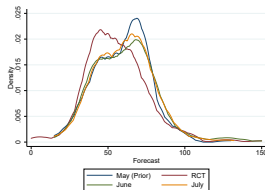
(b) Treatment #1



(c) Treatment #2



(d) Treatment #3



(e) Treatment #4

Figure: Distributions of CPI Forecasts (for each group)

Descriptive Statistics

Table: Descriptive statistics by treatment status

Variable	Control		Treat #1		Treat #2		Treat #3		Treat #4		Full sample		Manufacturing firms	
	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd	mean	sd
Net Sales (billion TL)	1.31	3.41	1.34	3.91	1.57	4.24	1.47	3.92	1.32	3.85	1.41	4.18	1.67	5.15
Assets (billion TL)	1.21	2.88	1.36	4.31	1.31	4.27	1.32	3.44	1.31	3.62	1.30	3.95	1.82	4.99
Capital (K) (billion TL)	0.25	0.72	0.34	0.42	0.27	0.91	0.23	0.71	0.21	0.62	0.26	0.76	0.32	0.89
Exports (billion TL)	0.41	0.19	0.45	0.24	0.46	0.31	0.52	0.27	0.48	0.29	0.47	0.21	1.17	4.09
Net Profit (billion TL)	0.81	0.17	0.87	0.34	0.88	0.29	0.88	0.27	0.89	0.30	0.87	0.29	0.89	1.81
Age	22.85	12.42	22.55	11.36	22.90	12.71	23.44	12.09	22.71	12.86	22.89	12.97	23.14	16.51
Number of Employees	615.17	910.86	637.65	842.25	624.49	886.26	662.75	851.02	621.67	798.04	632.18	874.21	649.83	1330.41
Prior Expectations														
CPI (implied mean)	58.63	18.23	62.48	18.73	59.14	16.65	58.61	17.82	59.31	17.56	59.55	17.56	-	-
PPI (implied mean)	58.45	20.09	60.28	20.05	57.91	18.81	58.99	20.18	57.25	18.82	58.19	19.29	-	-
Production Capacity Utilization	68.62	19.75	69.81	19.27	69.38	19.47	69.29	20.65	69.47	21.51	69.29	21.51	-	-
Posterior Expectations (RCT)														
CPI (posterior mean)	58.79	21.24	51.73	20.65	53.66	19.41	51.27	19.99	55.77	20.01	54.52	20.44	-	-
PPI (posterior mean)	55.66	28.18	50.52	22.12	51.84	18.09	49.18	19.69	52.15	19.79	51.93	19.79	-	-
Wage Expectations	41.82	19.22	38.22	19.31	37.62	21.09	38.25	18.84	39.94	18.99	39.19	19.04	-	-
Unit Cost Expectations	40.93	25.85	37.68	19.92	39.26	21.67	37.71	22.02	38.67	20.83	38.95	22.26	-	-
Price Expectations	33.86	21.12	30.88	20.56	30.81	20.96	30.12	22.36	32.19	21.12	31.75	21.41	-	-
No of obs	303		257		274		291		271		1,396		129,041	

Descriptive Statistics

Table: Assignment into Treatment

	Dependent Variable: Treatment dummy				
	(1)	(2)	(3)	(4)	(5)
Number of Employees	0.006 (0.008)	0.005 (0.008)	0.005 (0.009)	0.006 (0.009)	0.002 (0.009)
Age		0.009 (0.019)	0.009 (0.018)	0.010 (0.019)	0.013 (0.021)
Export Share			-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Profit Margin			0.009 (0.038)	0.014 (0.039)	0.015 (0.036)
Leverage			0.002 (0.004)	0.001 (0.005)	0.001 (0.006)
Constant	0.771*** (0.046)	0.784*** (0.071)	0.793*** (0.069)	0.791*** (0.062)	0.792*** (0.059)
Sector FE				✓	✓
Province FE					✓
R-squared	0.0004	0.0006	0.0006	0.0007	0.0009
Observations	1,390	1,390	1,390	1,390	1,390
p-value (F-stat)	1.000	0.782	0.924	1.0000	0.964

Treatment Effect

	One Month after Treatment		Two Months after Treatment	
	CPI	PPI	CPI	PPI
Prior mean	0.59*** (0.05)	0.62*** (0.04)	0.65*** (0.02)	0.68*** (0.02)
Prior mean \times T1	-0.08*** (0.04)	-0.12*** (0.05)	-0.02 (0.03)	0.03 (0.02)
Prior mean \times T2	-0.11*** (0.05)	-0.13*** (0.05)	-0.01 (0.03)	0.03 (0.03)
Prior mean \times T3	-0.13*** (0.07)	-0.14*** (0.05)	0.01 (0.02)	-0.04 (0.03)
Prior mean \times T4	-0.06 (0.07)	-0.05 (0.06)	0.01 (0.02)	-0.03 (0.03)
T1 (SPF expectations)	-7.14*** (3.41)	-6.10*** (3.06)	1.23 (1.58)	-1.21 (1.71)
T2 (CBRT 1-y ahead forecast)	-6.31*** (3.11)	-6.92*** (3.06)	0.69 (1.67)	-1.01 (1.66)
T3 (CBRT 2-y ahead forecast)	-8.96*** (3.54)	-5.99*** (2.97)	-0.59 (1.48)	1.29 (1.73)
T4 (Inflation Target)	-3.42 (4.06)	-2.51 (3.17)	0.69 (1.64)	1.65 (1.82)
Firm Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
R-squared	0.71	0.68	0.66	0.67
Observations	1,160	1,160	1,151	1,151

Borrowing and Real Outcomes

Inflation expectations influence borrowing decisions through 4 channels:

- ➊ **Investment demand channel:** Firms may lower investment, reducing the need for long-term credit.
- ➋ **Precautionary reallocation channel:** Firms shift to short-term debt to better manage cash flow shocks in uncertain environments.
- ➌ **Working capital channel:** Higher inflation expectations reduce short-term credit demand, as they expect to cut employment costs often funded by short-term credit lines.
- ➍ **Refinancing channel:** Firms secure long-term loans to **lock in current rates** before inflation raises future costs.