Mining the Gap: Firm Inflation expectations, Inattention and Monetary Policy Effectiveness

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Motivation

Yellen's speech on *Inflation, Uncertainty, and Monetary Policy* (2017):

- *[Firms'] Inflation expectations are an important determinant of actual inflation*
- *Monetary policy **presumably** plays a key role in shaping these expectations*
- *We have to contend with the fact that we do not directly observe the inflation expectations relevant to wage and price setting*

Our contribution: closing gap by using text mining

- Create a new earnings calls-based proxy for firms inflation expectations (39 countries starting from 2002).
- Assess the effectiveness of MP conditional on firms attention to central bank and state dependency (macroeconomic uncertainty).
- Propose a rational inattention model to rationalize the empirical findings.

Related Literature

- **Text-based measures of firms attention, earnings calls based indicators**

  Song and Stern (2024); Flynn and Sastry (2024); Hassan et al. (2019); Hassan et al.(2021a); Gallemore et al.(2021); Chava et al. (2022); Konchitchki and Xie (2023)

- **Firms inflation expectations**

  Weber et al. (2023), Andrade et al.(2022); Candia et al.(2024); Fiori and Scoccianti, (2023); Coibion et al. (2020); Coibion et al.(2022); Coibion et al. (2023); Coibion et al.(2024); Frache et al. (2023); Baumann et al. (2024)

- **State-dependent attention models**

  Afrouzi and Yang (2021); Pfäuti (2023); Flynn and Sastry (2024); Turen (2023)

Earnings Calls-based Firm's Inflation Expectations Index (ECFIE)

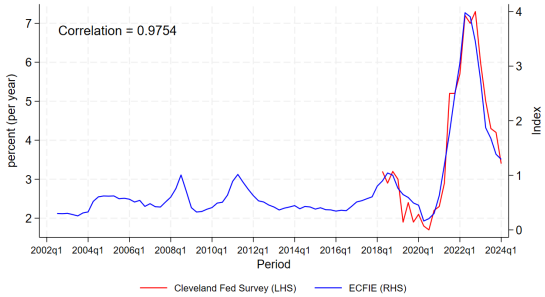
- Hypothesis: the more firms are concerned about future inflation, the more they discuss it → Intensity of discussion as proxy for inflation expectations.

- The ECFIE index is constructed using dictionary-based frequency counts that identify when firms discuss: 1) inflation AND 2) expectations

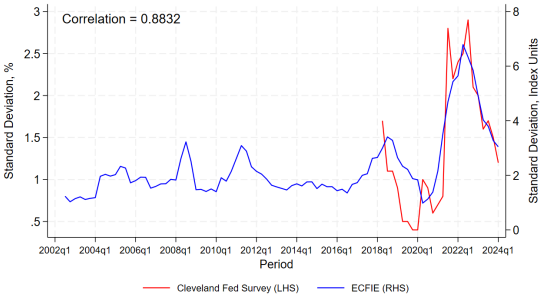
$$\text{ECFIE Index}_{it} = 1000 \times \frac{\sum \text{Sentences with Inflation} \cap \text{Expectations}_{it}}{\sum \text{Sentences}_{it}}$$

Validation: ECFIE vs SoFIE

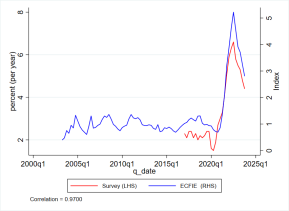
Inflation Expectations



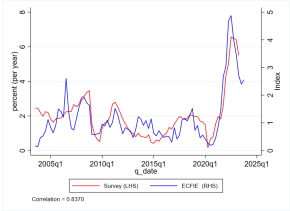
Disagreement



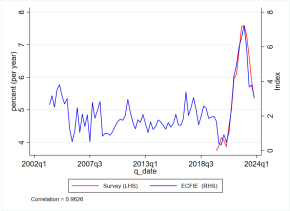
ECFIE Validation II



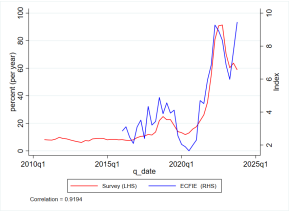
(a) UK



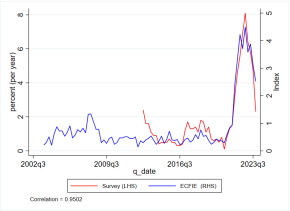
(b) Sweden



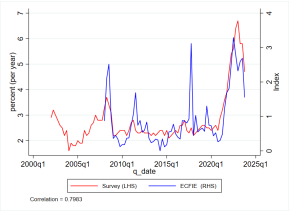
(c) Mexico



(d) Turkey

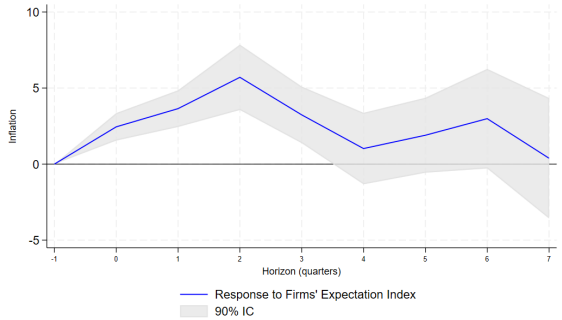


(e) Italy



(f) Norway

ECFIE: predictive power



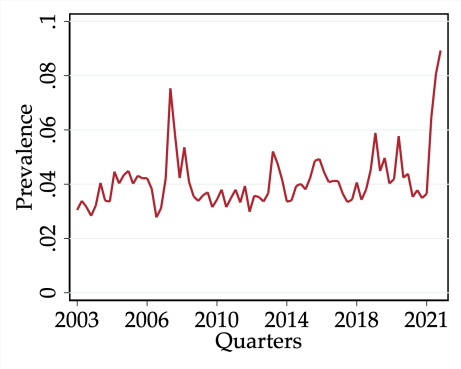
IRF of 12m CPI inflation (YoY) to lagged ECFIE controlling for consensus forecasts, four lags of CPI YoY, GDP growth YoY, ECFIE and unemployment rate

Monetary policy effectiveness

Assess the effectiveness of MP conditional on firms attention to central bank and state dependency (macroeconomic uncertainty)

Firm attention to Central Bank

Dictionary-based frequency counts that identify when firms discuss Fed or MP, similarly to Song and Stern (2024)

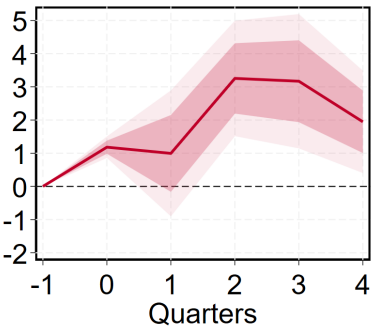


Fraction of attentive firms

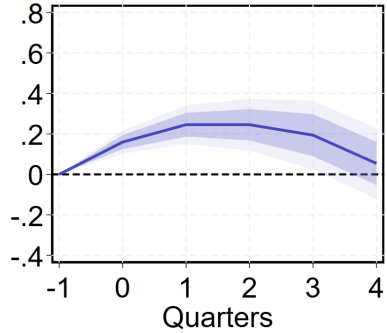
- Small fraction of attentive firms (4%)
- More firms pay attention in high uncertainty

Monetary policy effectiveness: unconditional effect

$$\pi^e_{i,t+h} = \alpha^s_i + \alpha^s_q + \gamma^S_h A_{i,t-1} + \delta^S_h MP_t + \beta^S_h MP_t A_{i,t-1} + \eta^S_h \sum_{n=1}^{3} x_{i,t-n} + \gamma^S_h \sum_{n=1}^{3} w_{t-n} + \epsilon^s_{i,t+h}$$



(a) High uncertainty

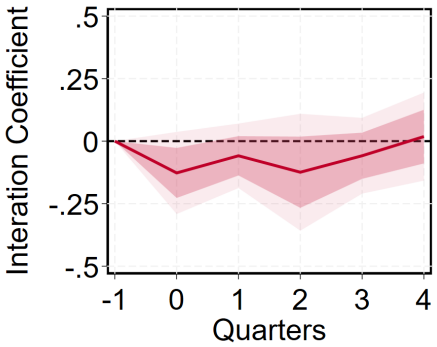


(b) Low uncertainty

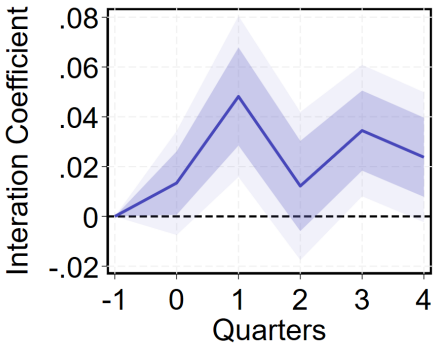
- $S = H, L$ for high or low macro economic uncertainty (Jurado et al. 2015). α_i is firm fixed effect, α_q is quarter fixed effect, MP_t measures an expansionary monetary policy shock (GSS 2005), x_i is a vector of firm i's characteristics and w is a vector with macro variables. Sample: US 2002q1-2024q1.

Conditional effect of attention to central bank

$$\pi^e_{i,t+h} = \alpha^s_i + \alpha^s_q + \gamma^S_h A_{i,t-1} + \delta^S_h MP_t + \beta^S_h MP_t A_{i,t-1} + \eta^S_h \sum_{n=1}^{3} x_{i,t-n} + \gamma^S_h \sum_{n=1}^{3} w_{t-n} + \epsilon^s_{i,t+h}$$



(a) High uncertainty

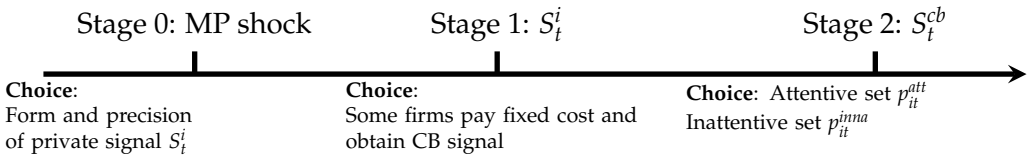


(b) Low uncertainty

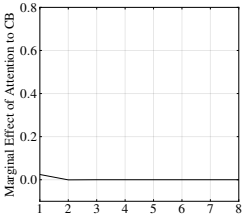
- $A_{i,t-1}$ is z-score w.r.t to the industry of firm i at time $t-1$.
- Attention amplifies the sensitivity by 25% after 1 quarter in low uncertainty, but muted in high uncertainty.
- Average MSPE for low (high) attentive firms in low uncertainty is 0.77 (0.61) and in high uncertainty is 22.4 (22.8)

Theoretical Model - timeline

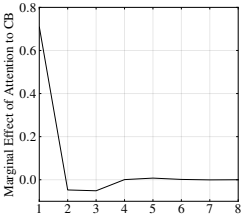
- A representative household with full information
- The central bank sets interest rate following a standard Taylor rule
- Rational inattention firms choose signals to learn about macro variables and set prices:
  1. Each firm obtain a private signal S^i on macro economy that depends on attention effort
  2. Some firms might obtain a signal from the central bank S^{cb} at a fixed cost



Muted Marginal Effect of attention to CB in High Uncertainty



(a) High uncertainty



(b) Low uncertainty

$$\mathbb{E}\left[\pi_t | S_t^i, S_t^{cb}\right] - \mathbb{E}\left[\pi_t | S_t^i\right] = f\Big(\underbrace{\omega_{it}}_{\text{relative weight} \uparrow} \quad \underbrace{\left(S_t^{cb} - \mathbb{E}\left[S_t^{cb} | S_t^i\right]\right)}_{\downarrow \text{ marginal new info from} S_t^{cb}} \Big) \tag{1}$$

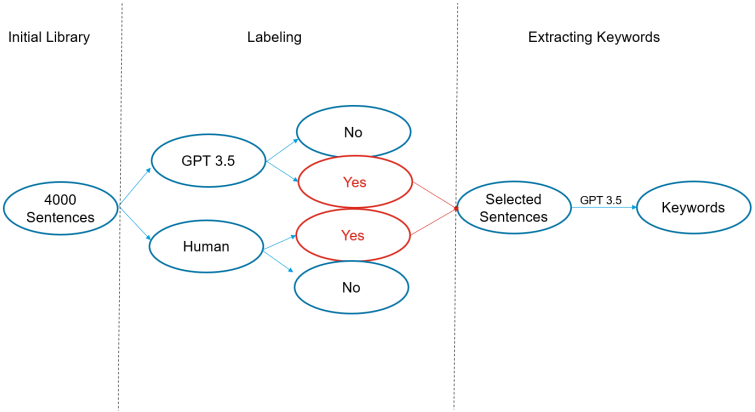
The marginal effect is muted under high uncertainty because the reduction in information content outweighs the increased reliance on the central bank's signal, given that firms are already well-informed.

Policy Implications

- How to enhance the marginal effectiveness of MP in uncertainty states?
  - Lower the fixed costs of accessing CB information through CB targeted communication, improve financial literacy, etc. $\Rightarrow$ higher share of firms access the info.
  - Reduce uncertainty around the signal, especially under uncertainty. $\Rightarrow$ lower CB posterior. How? forward guidance , scenarios, dot plots?

Thank you for your attention!

Selecting the Keywords



Textual measure of attention

- Attention to the central bank index is constructed using dictionary-based frequency counts that identify when firms discuss Federal Reserve or monetary policy
  - **Intensity:** the average intensity with which *attentive* firms pay attention to CB

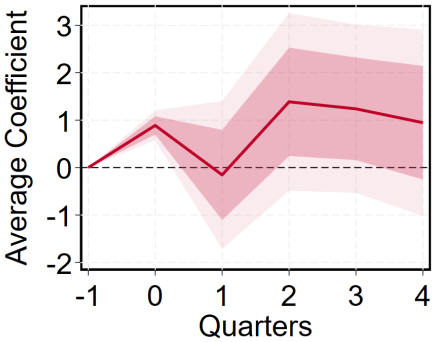
$$\lambda_t = \frac{\sum_i \text{Attention Index}_{it} \cdot \mathbf{1}(\text{Attention Index}_{i,t-1} > 0)}{\mathbf{1}(\text{Attention Index}_{i,t-1} > 0)}$$

  - **Prevalence:** share of attentive firms at each t

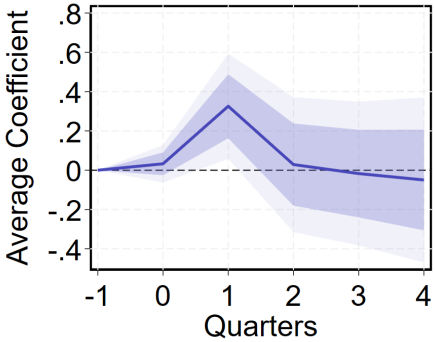
$$\omega_t = \frac{1}{N} \sum_i \mathbf{1}(\text{Attention Index}_{i,t} > 0)$$

Monetary policy effectiveness: the expectation channel

$$\pi^e_{i,t+h} = \alpha_i + \alpha_q + (\delta^H_h MP_t + \beta^H_h MP_t A_{i,t-1} + \eta^H_h \sum_{n=1}^{3} x_{i,t-n} + \gamma^H_h \sum_{n=1}^{3} w_{t-n}) F(z_{s,t-1}) + (\delta^L_h MP_t + \beta^L_h MP_t A_{i,t-1} + \eta^L_h \sum_{n=1}^{3} x_{i,t-3} + \gamma^L_h \sum_{n=1}^{3} w_{t-3})(1 - F(z_{s,t-1})) + \epsilon_{i,t+h}$$



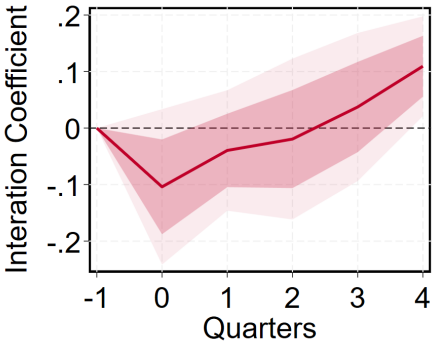
(a) High uncertainty



(b) Low uncertainty

Marginal effects of attention to central bank

$$\pi^e_{i,t+h} = \alpha_i + \alpha_q + (\gamma^H_h A_{i,t-1} + \delta^H_h MP_t + \beta^H_h MP_t A_{i,t-1} + \eta^H_h \sum_{n=1}^{3} x_{i,t-n} + \gamma^H_h \sum_{n=1}^{3} w_{t-n}) F(z_{s,t-1}) + (\gamma^L_h A_{i,t-1} + \delta^L_h MP_t + \beta^L_h MP_t A_{i,t-1} + \eta^L_h \sum_{n=1}^{3} x_{i,t-n} + \gamma^L_h \sum_{n=1}^{3} w_{t-n})(1 - F(z_{s,t-1})) + \epsilon_{i,t+h}$$



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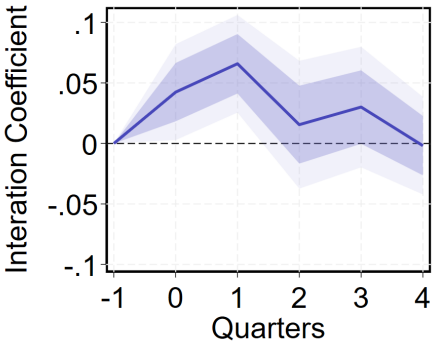

(b) Low uncertainty