When Communication Fails: The Ineffectiveness of Disclosure Under Trend Inflation

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Motivation

- Do CB disclosures effectively attenuate uncertainty in the economy?
- A common view states that CB releases enhance the efficacy of MP (Blinder et al., 2008)
- However, the recent surge in global inflation has undermined both the informativeness of prices and the CBs' credibility
- This paper investigates the consequences of trend inflation for the social value of policymaker announcements

Literature Review

- **Theories of the costs of CB disclosure**
  - Information content of prices (Morris and Shin, 2005)
  - Firms' responses to inefficient shocks (Angeletos et al., 2016)
- **Higher-order expectations and MP**
  - Private sector knowledge and the efficacy of FG (Wiederholt, 2017; Angeletos and Lian, 2018)
  - Two-sided information flow and incomplete CK (Kohlhas, 2022)
- **CB disclosure during inflationary surges**
  - Diminished effects of CB releases during high inflation (Jarociński and Karadi, 2020; Andrade et al., 2023; Bianchi et al., 2023)

Contribution

- Resolution to the transparency paradox (Morris and Shin, 2005)
- Implications for how inflationary surges alter CB disclosure efficacy
  - In moderate-inflation regimes, releases increase common knowledge
  - As trend inflation rises, disclosure decreases the CB's own information about the economy
- Extensions to the Kohlhas (2022) framework by incorporating:
  - a fixed rate of trend inflation (Ascari and Sbordone, 2014)
  - endogenous price stickiness (Kurozumi, 2016)

Households

- A representative household maximizes an intertemporal utility function, separable in consumption C_t and labor N_t:

$$U(C_t, N_t) = \mathbb{E}_t^h \sum_{t=0}^{\infty} \beta^t \left(\frac{C_t^{1-\sigma}}{1-\sigma} - \frac{N_t^{1+\varphi}}{1+\varphi} \right) \quad (1)$$

- where the household bases its expectations $\mathbb{E}_t^h[\cdot] = \mathbb{E}[\cdot|\Omega_t^h]$ upon the information set Ω_t^h

- subject to the period-by-period budget constraint:

$$P_t C_t + (1 + i_t) B_t \leq W_t N_t + B_{t-1} + T_t \quad (2)$$

Firms

- Firms interact under monopolistic competition
- Calvo pricing (Calvo, 1983)
- To reoptimize the price, firms maximize the expected discounted value of its profit subject to the demand function for goods
- The aggregate price index can be rewritten as a weighted average of newly set prices and those set in the previous period

$$P_t^{\frac{\epsilon-1}{\epsilon}} = \left[\theta(P_{t-1})^{\frac{\epsilon-1}{\epsilon}} + (1-\theta)(P_t^*)^{\frac{\epsilon-1}{\epsilon}}\right] \tag{3}$$

- where θ measures the degree of nominal rigidity

Price Dispersion and Implications of Trend Inflation

- The aggregate labor demand is derived as:

$$N_t = \frac{Y_t}{A_t} \int_0^1 \left(\frac{P_{i,t}}{P_t} \right)^{-\epsilon} di \tag{4}$$

- Denoting by s_t, the following measure of price dispersion:

$$s_t = \int_0^1 \left(\frac{P_{i,t}}{P_t} \right)^{-\epsilon} di \tag{5}$$

- Aggregate output is expressed as:

$$Y_t = \frac{A_t}{s_t} N_t = \tilde{A}_t N_t \tag{6}$$

- where $\tilde{A}_t$ is a measure of 'effective' aggregate productivity

Information Structure | Private Sector

- Firms' information set includes:

$$\Omega_{it}^{f} = \{x_{it-j}, \omega_{t-j}, \hat{\pi}_{t-j}, i_{t-j}\}_{j=0}^{\infty}$$

- where $\{x_{it-j}\}$ contains firms' private signals, $\{\omega_{t-j}\}$ is comprised of two public signals sent by the CB of its own private information pertain to the levels of a_t and μ_t
- Firms observe and learn about CB expectations from the current value of interest rate
- Households' information set is Ω_t^h, such that $\mathbb{E}_t^h[\cdot] = \bar{\mathbb{E}}_t^f[\cdot]$

Information Structure | CB

- The CB uses its private information to set interest rate in accordance with simple Taylor rule
- CB's information set includes:

$$\Omega_t^{cb} = \{z_{t-j}, \omega_{t-j}, \hat{\pi}_{t-j}, i_{t-j}\}_{j=0}^{\infty}$$

- where $\{z_{t-j}\}$ denotes the CB's noisy private signals about the levels of a_t and μ_t
- To infer firms' private information, the CB uses the inflation rate, which evolves according to $\hat{\pi}_t = \pi_t + \epsilon_{\pi t}, \epsilon_{\pi t} \sim N(0, \tau_\pi^{-1})$

Disclosure Under Low Trend Inflation | Mark-Up Shocks

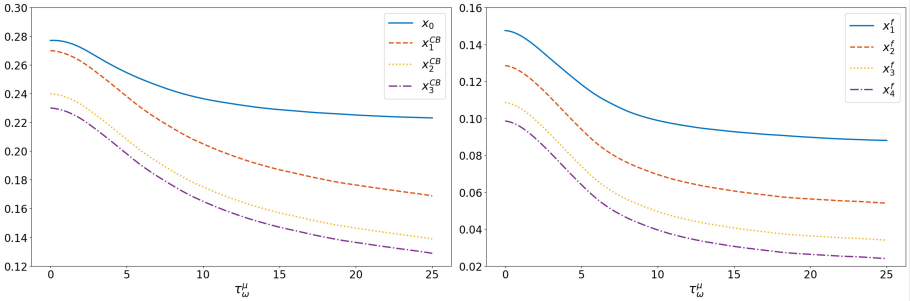

Figure 1: Private Sector and CB Uncertainty with Mark-up Shocks

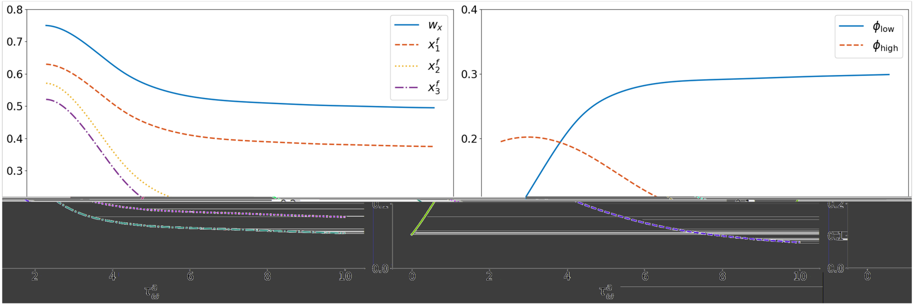

Figure 2: CB Uncertainty with Productivity Shocks

Welfare Analysis in a Low Inflation Environment

- **Mark-up shocks**
  - Fall in higher-order uncertainty vs. larger private sector responses
  - Disclosure reduces welfare losses relative to the opacity baseline
- **Productivity shocks**
  - Fall in the CB's uncertainty vs. low informativeness of inflation
  - Disclosure alleviates the identification problem for large values of MP
  - Welfare benefits arise from **learning by sharing effect**

CB Disclosure Under Higher Trend Inflation

- Full disclosure is no longer optimal
- Regardless of large values of MP, CB releases amplify uncertainty

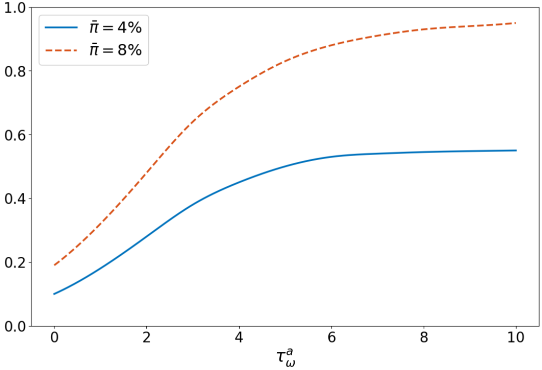

Figure 3: CB Uncertainty with Productivity Shocks Under Higher Inflation

Endogenous Price Stickiness (Kurozumi, 2016)

- Firms engage in a two-stage optimization process for price setting
  - A symmetric Nash equilibrium is analyzed
  - Each firm selects optimal θ to maximize expected discounted profits
  - Conditional on this chosen θ, the firm determines its P_{it}^*
- Consistent with the baseline NK model, the general expression for the optimal reset price remains the same
- This approach matches increased price flexibility in high-inflation regimes while maintaining analytical tractability

CB Disclosure and Endogenous Price Stickiness

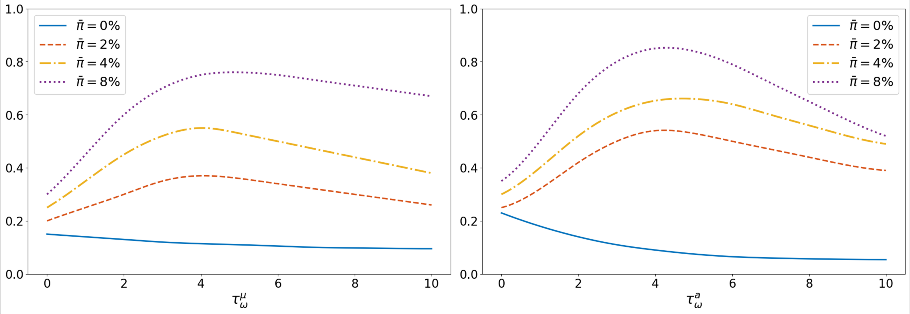

Figure 4: CB Uncertainty with Mark-up and Productivity Shocks

Sensitivity of the Quantitative Results

- Disclosure is more beneficial with dispersed information and lower discount rate
- The benefits of CB releases are smaller with rational households

	$\bar{\pi} = 2\%$ (Baseline)	Dispersed	Households	Discount rate
Mark-up shock				
$\phi_\pi = 1.5, \phi_y = 0.25$	-48.94	-55.82	-8.72	-52.54
$\phi_\pi = 2.25, \phi_y = 0.5$	-16.14	-36.22	-6.71	-22.38
Productivity shock				
$\phi_\pi = 1.5, \phi_y = 0.25$	+11.53	+12.09	+0.18	+17.88
$\phi_\pi = 2.25, \phi_y = 0.5$	-18.52	-22.94	-10.40	-25.84

Table 1: Welfare Effects of Disclosure: Alternative Specifications

Conclusion

- Theory rationalizes concerns about ambiguous effectiveness of FG
- Rather than change average future interest rate expectations, FG often simply creates less dispersed expectations (Weale, 2013)
- In moderate inflationary regimes, CB releases increase welfare by reducing higher-order uncertainty and strengthening CK
- Partial disclosure during high inflation may be destabilizing
- Future research could validate predicted overreactions to CB releases during inflationary surges

Appendix

Calibration

- Standard parameters are set within the range of existing studies
- Shock parameters are set to match the one-quarter-ahead RMSE of GDP forecasts from SPF and Greenbook (El-Shagi et al., 2014)
- Inflation precision is calibrated to match the relative SDs of the measurement error and the innovation to inflation (Lorenzoni, 2009)

Table 2: Baseline Shock and Information Parameters

Productivity Shock				Mark-up Shock			
ρ_a	0.80	σ_θ	0.60	ρ_μ	0.70	σ_ξ	0.16
σ_x^a	0.65	σ_z^a	0.40	σ_x^μ	0.20	σ_z^μ	0.10
σ_π	0.28	σ_ω^a	$\to \infty$	σ_π	1.30	σ_ω^μ	$\to \infty$

Note: The mapping between standard deviation and precision is $\tau = 1/\sigma^2$

Solution

- The approximate law of motion for endogenous variables $q_t = [\pi_t, y_t, \psi_t, x_t, i_t]'$ admits the form

$$q_t = \alpha_0 X_t^{(0:\bar{k})} + \alpha_1 u_t \tag{7}$$

- where $X_t^{(0:\bar{k})}$ denotes the expectational state vector comprised of the entire hierarchy of private sector and CB higher-order expectations about the persistent fundamental $X_t^{(0)} = \{a_t, \mu_t\}$ up to $k - th$ order

$$X_t^{(0:\bar{k})} = \left[X_t^{(0)}, X_t^{(1)\prime}, ..., X_t^{(\bar{k})'}\right]' \ , \ X_t^{(k)} = \left[\bar{E}_t^f X_t^{(k-1)} \ \bar{E}_t^{cb} X_t^{(k-1)}\right]' \tag{8}$$

- while the true equilibrium law of motion has $\bar{k} \to \infty$, expectational state vector is truncated at $\bar{k} = 50$ for solution properties

Solution

- Similar to Nimark (2017), CK about individual rationality, combined with the Kalman filter, ensures that $X_t^{(0:\bar{k})}$ follows a VAR(1)

$$X_t^{(0:\bar{k})} = MX_{t-1}^{(0:\bar{k})} + Nu_t \tag{9}$$

- Because the private sector and the CB learn from the observation of each other's actions, the matrices M and N depend on the coefficients in α_0 and α_1, and vice versa
- The problem is solved for the fixed point $\{M, N\} \to \{\alpha_0, \alpha_1\} \to$ $\to \{M, N\}$ by iteration until convergence