Central Bank Information or Neo-Fisher Effect?

by

Stephanie Schmitt-Grohé and Martín Uribe
Columbia University and NBER

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Motivation

Observation. Central bank information (CBI) and neo-Fisher effects can occur **simultaneously** and can generate **similar outcomes:**

• Both can give rise to short-run increases in inflation and aggregate activity in response to a surprise increase in the policy interest rate.

Question: What role do each of these to mechanisms play and how important are they quantitatively?

Why Is This Question Important? Separate estimates of these effects run the risk of confounding one with the other.

This Paper

provides an answer to this question from the perspective of a dynamic general equilibrium model estimated using postwar U.S. data.

Key Features of the Model

– A permanent monetary shock generates neo-Fisher effects.

– A preference shock to which the Fed responds directly generates CBI effects.

Main Results:

• Both the neo-Fisher and CBI effects are important:

– Permanent monetary shocks (neo-Fisher effect) explain between 20 and 30 percent of the variance of inflation changes.

– shutting down the central bank's direct response to the preference shock (CBI channel) causes the variances of changes in inflation and output explained by this shock to increase by 50 and 15 percentage points, respectively.

• We find no evidence of an information advantage of the central bank.

Related Literature

This paper bridges two literatures:

Estimation and Evaluation of the Neo-Fisher Effect: Schmitt-Grohé and Uribe (2010, 2012, 2022), Cochrane (2016), Williamson (2016), Uribe (2017,2022), Garín, Lester, and Sims (2018), Valle e Azevedo, Ritto, and Teles (2022), Lukmanova and Rabitsch (2023), Carvalho, Valle e Azevedo, and Pires Ribeiro (2024), García-Cicco, Goldstein, and Sturzenegger (2024), and Bouakez and Kano (2024).

Estimation and Evaluation of the CBI Effect: Romer and Romer (2000), Faust, Swanson, and Wright (2004), Barakchian and Crowe (2013), Miranda-Agrippino (2016), Hansen and McMahon (2016), Campbell, Fisher, Justiniano, and Melosi (2017), Melosi (2017), Nakamura and Steinsson (2018), Cieslak and Schrimpf (2019), Jarociński and Karadi (2020), Kerssenfischer (2022), Acosta (2023), Bauer and Swanson (2023), and García-Schmidt (2024).

Relation: This paper estimates jointly the contributions of shocks that generate neo-Fisher and CBI effects. This is important because ignoring the simultaneous presence of neo-Fisher and CBI effects can lead to overestimating the influence of each channel individually.

Households

$$\max \; E_0 \sum_{t=0}^{\infty} \beta^t e^{\xi_t} \left\{ \frac{\left[(C_t - \delta \widetilde{C}_{t-1})(1-\theta h_t)^{\chi}\right]^{1-\sigma} - 1}{1-\sigma} \right\},$$

subject to

$$P_t C_t + \frac{B_t}{1+I_t} + T_t = B_{t-1} + W_t h_t + \Phi_t.$$

Two Preference Shocks

$$\xi_t = \xi_t^h + \xi_t^c.$$

- The central bank observes and responds to ξ_t^c.
- Full information: Households observe ξ_t^h and ξ_t^c.
- Imperfect information: Households observe ξ_t, but not ξ_t^h or ξ_t^c.

Firms

$$\max \; E_0 \sum_{t=0}^{\infty} q_t \left[\frac{P_{it}}{P_t} C_{it} - \frac{W_t}{P_t} h_{it} - \frac{\phi}{2} \Omega_t \left(\frac{P_{it}/P_{it-1}}{1+\tilde{\Pi}_t} - 1 \right)^2 \right],$$

subject to

$$C_{it} = \left(\frac{P_{it}}{P_t} \right)^{-\eta} C_t$$

$$Y_{it} \geq C_{it}$$

$$Y_{it} = e^{z_t} \Omega_t h_{it}^{\alpha},$$

where z_t is a stationary productivity shock and Ω_t is a permanent productivity shock: z_t and $\Delta\Omega_t$ follow AR(1) processes. The variable $\tilde{\Pi}_t$ is an average of past inflation rates.

Monetary Policy

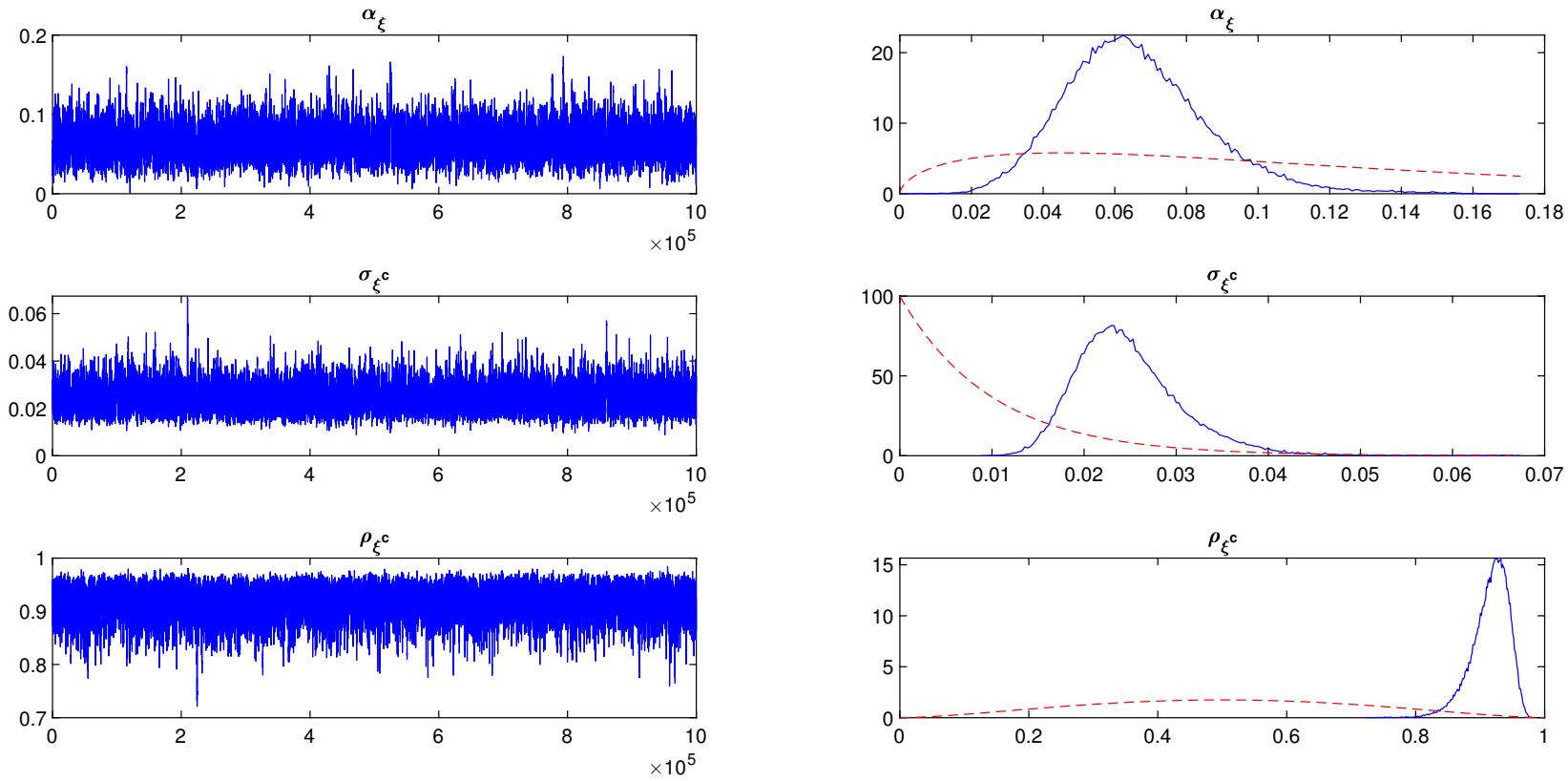
$$\frac{1+I_t}{X_t^m} = \left[\Gamma\left(\frac{1+\Pi_t}{X_t^m}\right)^{\alpha_\pi}\left(\frac{Y_t}{Y_t^n}\right)^{\alpha_y}\right]^{1-\gamma_I}\left(\frac{1+I_{t-1}}{X_{t-1}^m}\right)^{\gamma_I} e^{z_t^m+\alpha_\xi\xi_t^c}$$

X_t^m Permanent monetary shock $\Rightarrow$ neo-Fisher effects.
z_t^m Transitory monetary shock.
ξ_t^c Preference shock to which the central bank responds.
α_ξ parameter defining the CBI channel.

- Perfect information: private agents observe I_t, Π_t, Y_t, Y_t^n, z_t^m, X_t^m, and ξ_t^c.
- Imperfect information: private agents observe I_t, Π_t, Y_t, and Y_t^n.

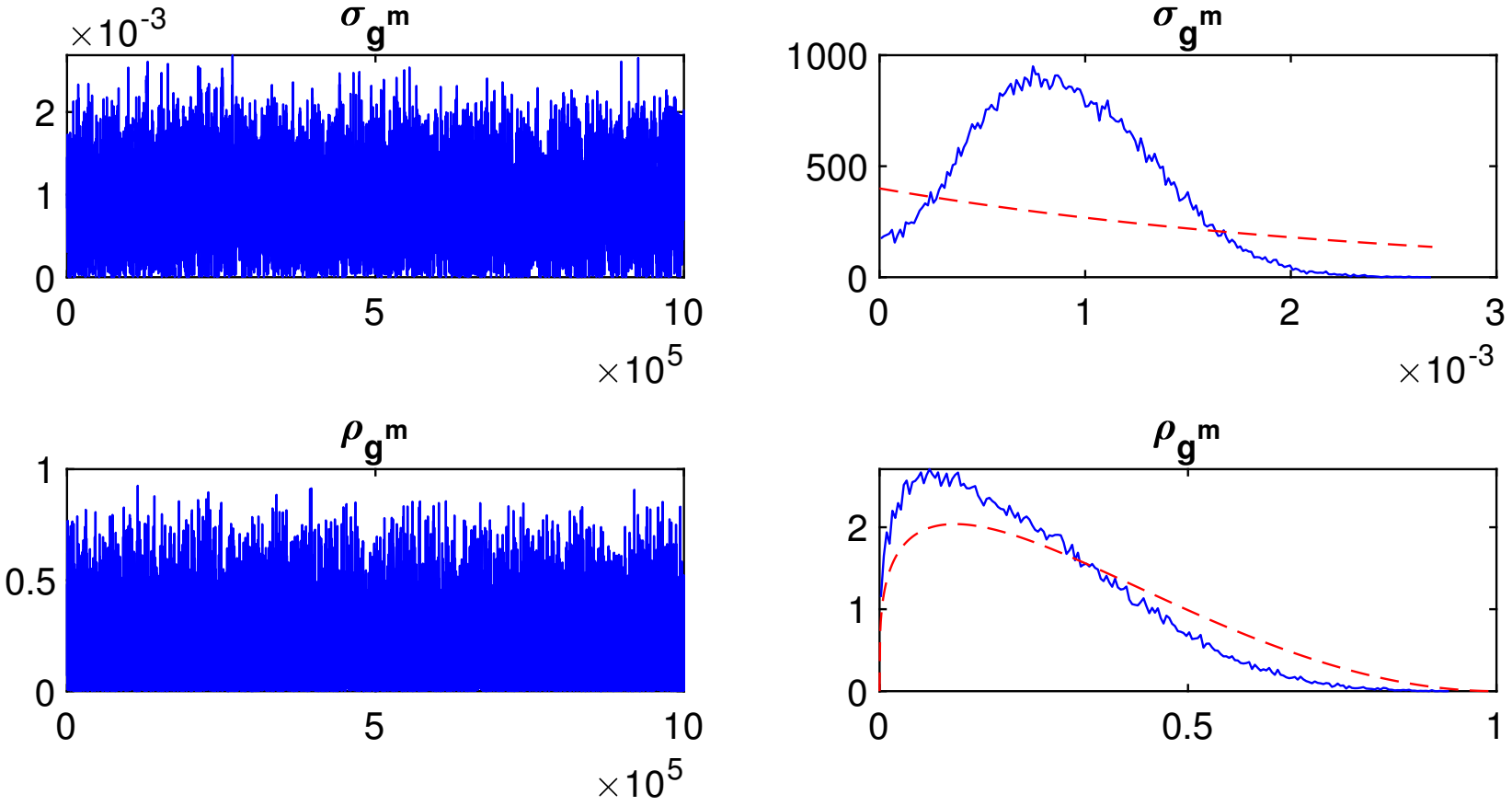
ΔX_t^m, z_t^m, and ξ_t^c all follow AR(1) processes.

Parameters Defining the CBI Channel: Priors and Posteriors



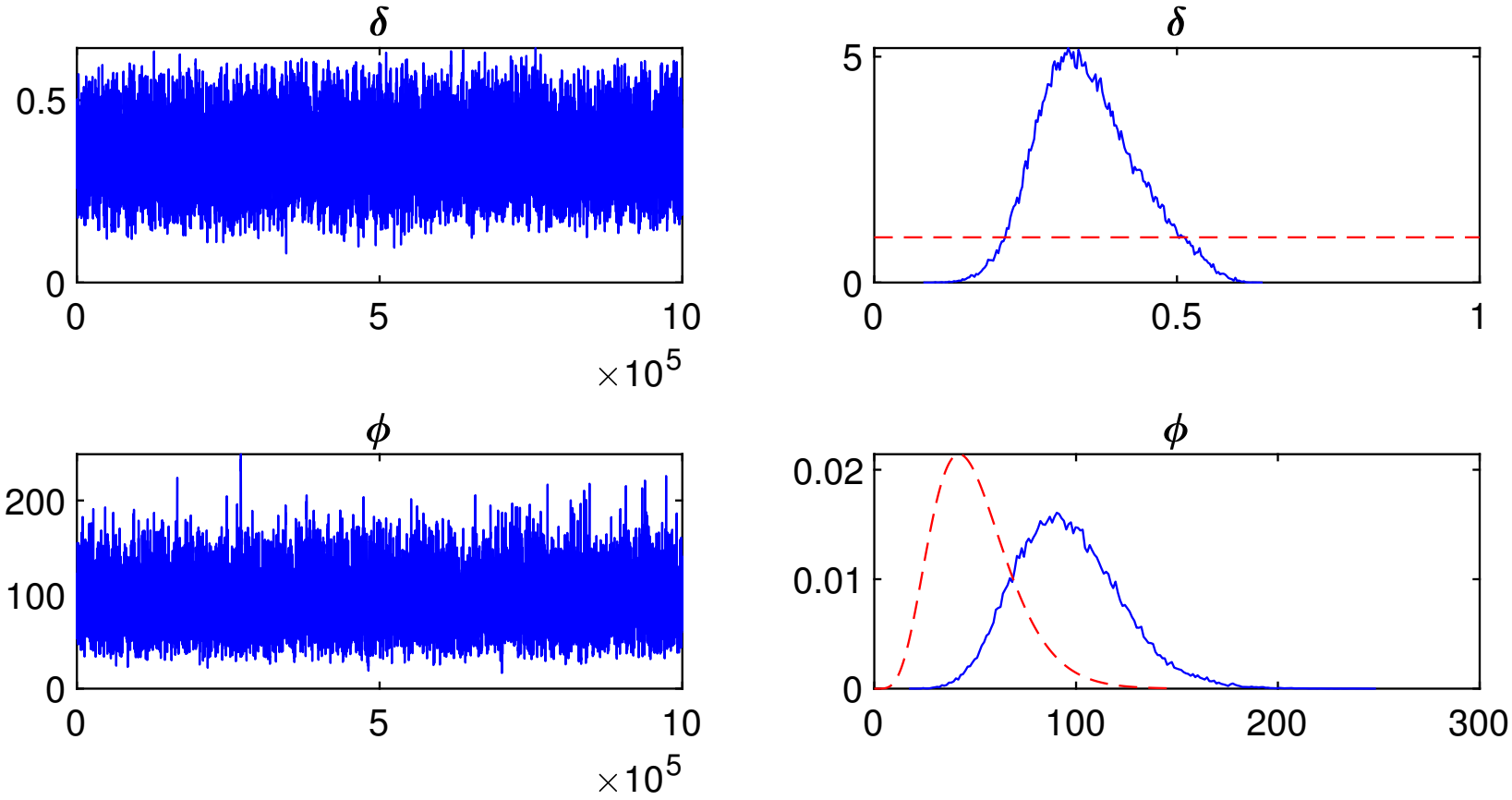
The central bank responds to the preference shock ξ_t^c through the Taylor rule, with coefficient α_ξ (the CBI channel). The shock ξ_t^c follows the AR(1) process $\xi_t^c = \rho_{\xi^c}\xi_{t-1}^c + \sigma_{\xi^c}\epsilon_t^{\xi^c}$.

Parameters Defining the Neo-Fisher Effect: Priors and Posteriors



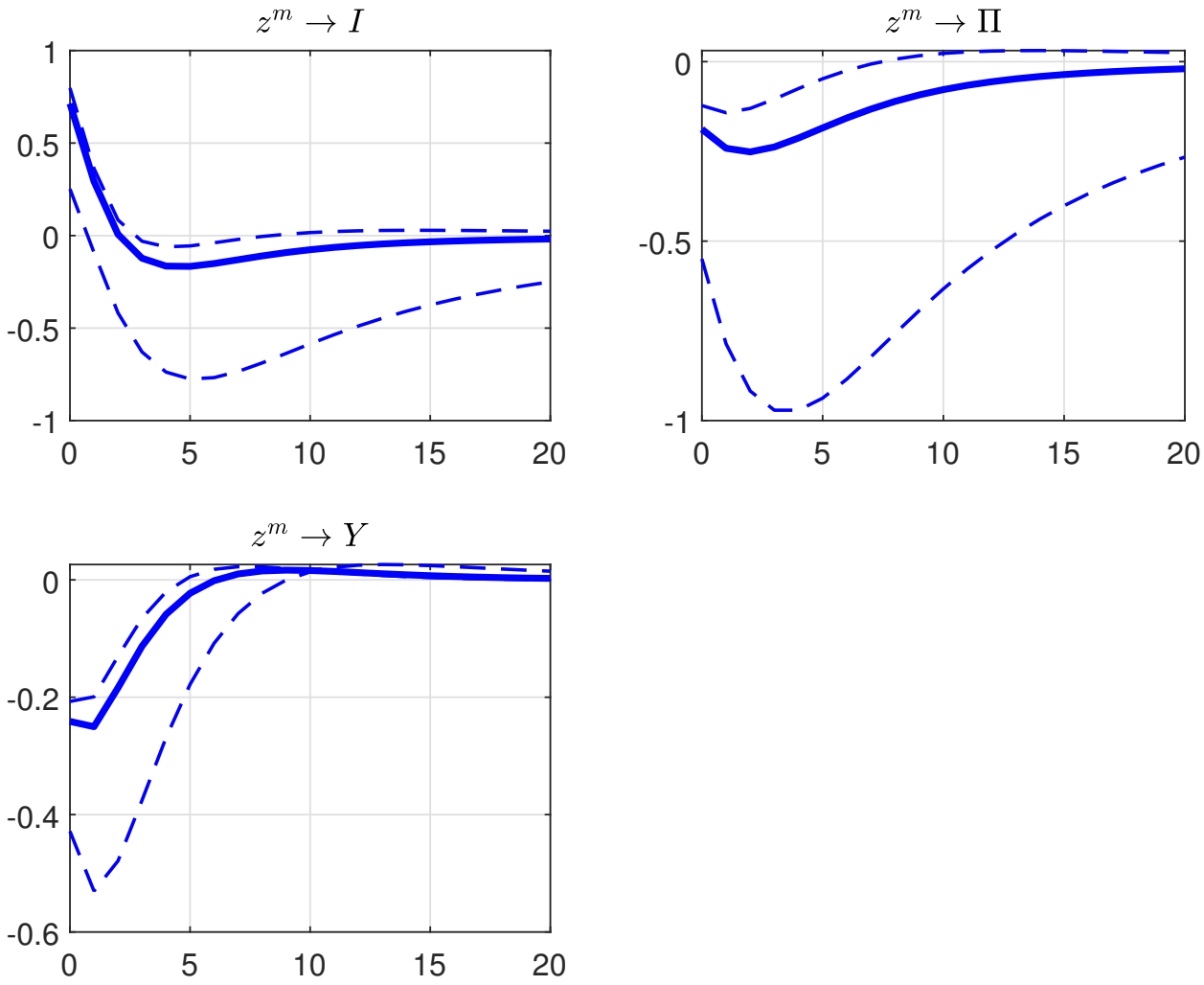
The permanent monetary shock is X_t^m. Its growth rate, $g_t^m \equiv \Delta \ln X_t^m$, follows the AR(1) process $g_t^m = \rho_{g^m} g_{t-1}^m + \sigma_{g^m} \epsilon_t^{g^m}$.

Parameters Governing Propagation: Priors and Posteriors



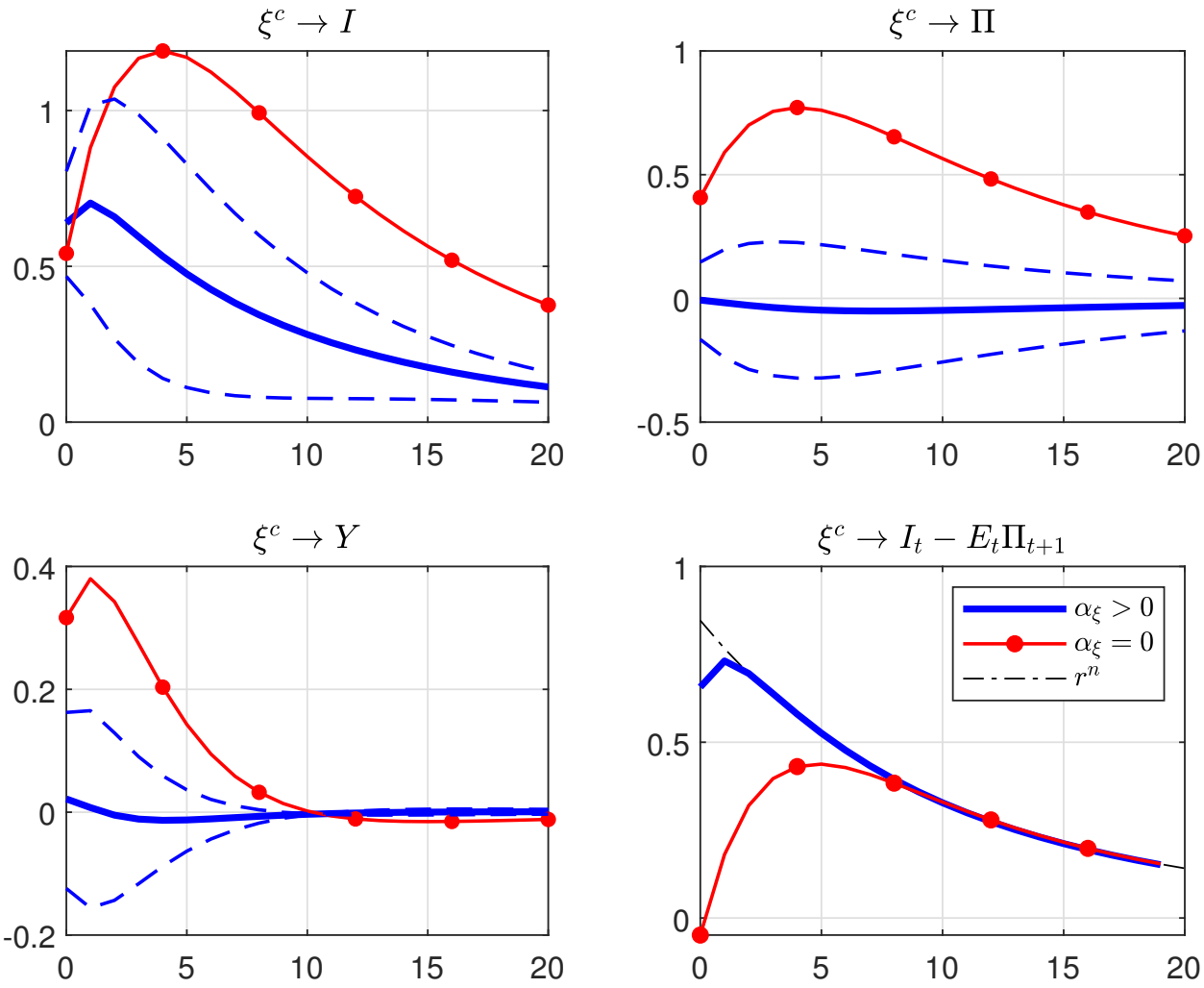
δ habit formation; ϕ price stickiness.

Impulse Response to Transitory Monetary Shock ($z_t^m \uparrow$)
Full Information



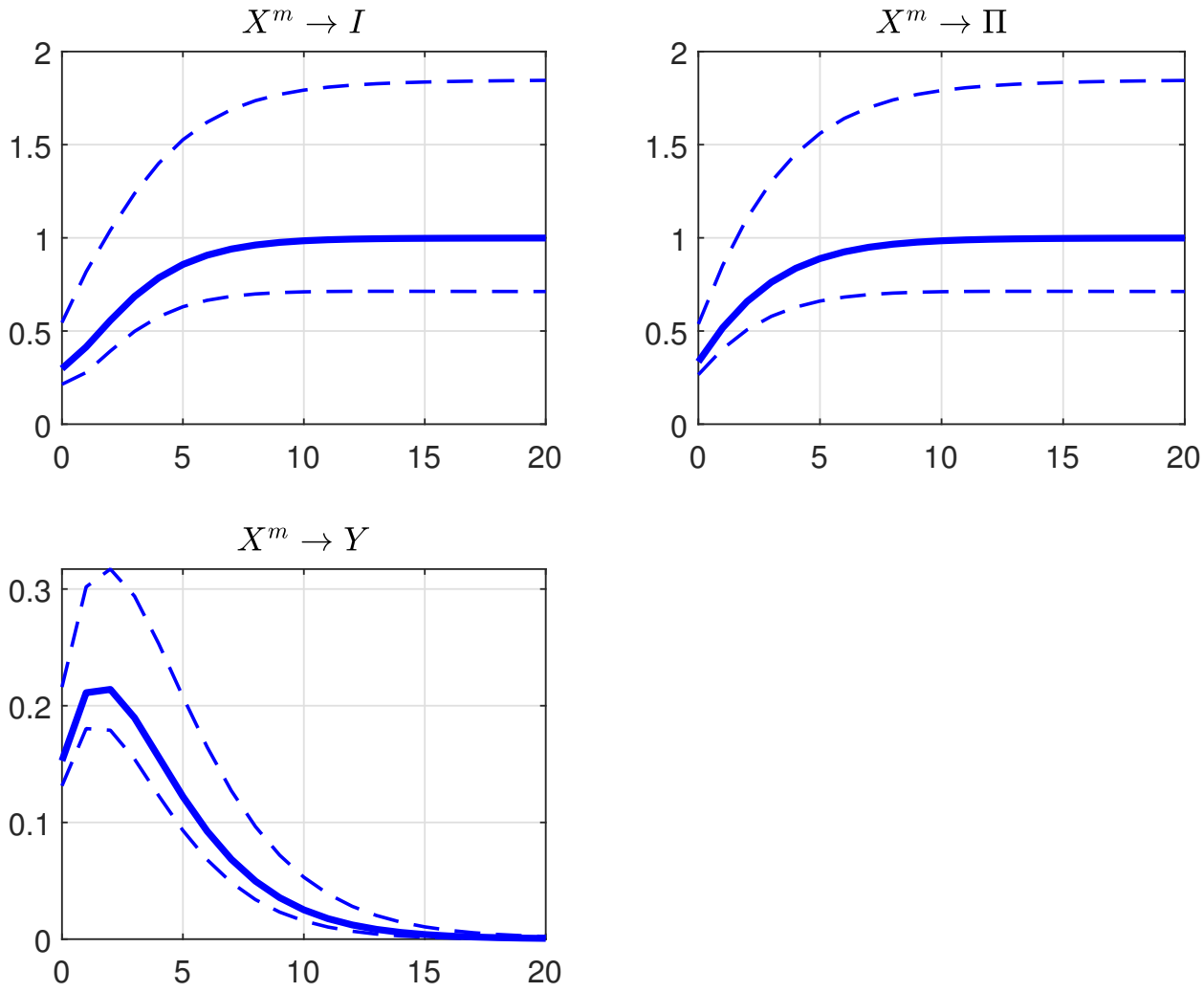
Notes. Solid lines are posterior means and dashed lines 95% asymmetric Sims-Zha error bands.

Impulse Response to the Preference Shock to which the CB responds ($\xi_t^c \uparrow$), Full Information



Notes. Solid lines are posterior means and dashed lines 95% asymmetric Sims-Zha error bands.

Impulse Response to Permanent Monetary Shock ($X_t^m \uparrow$)
Full Information



Notes. Solid lines are posterior means and dashed lines 95% asymmetric Sims-Zha error bands.

Variance Decomposition Under Full Information

Shock	ΔI_t	$\Delta \Pi_t$	ΔY_t
Permanent Monetary Shock, X_t^m	6	33	2
Demand Shock to which CB responds, ξ_t^c	53	7	2
Demand Shock to which CB responds with $\alpha_\xi = 0$	56	57	18

Notes. Posterior means. Shares are expressed in percent. The variables ΔI_t, $\Delta \Pi_t$, and ΔY_t denote the change in the nominal interest rate, the change in the inflation rate, and the output growth rate.

Takeaway: Both the neo-Fisher effect and the CBI channel are quantitatively important.

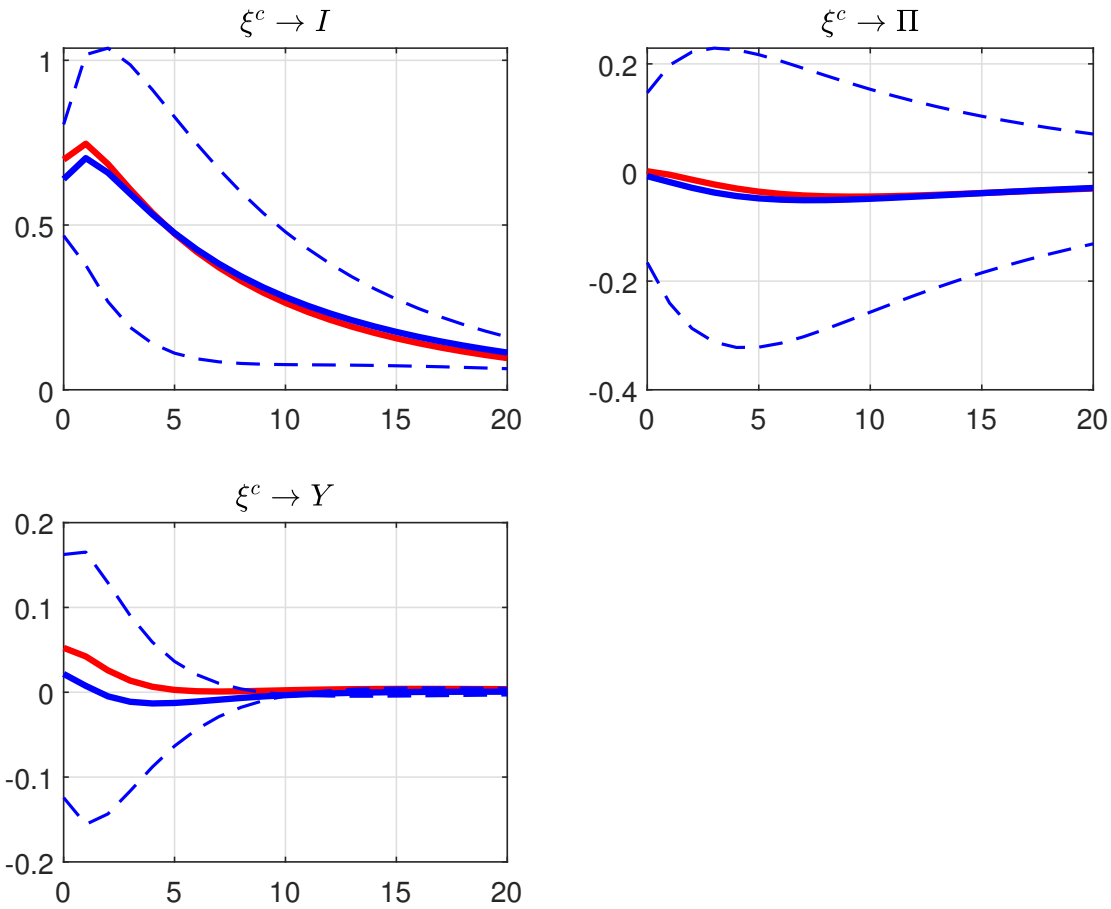
Imperfect Information

Households observe:

• I_t, Π_t, Y_t, but not the individual shocks to which the CB responds, namely, the permanent monetary shock X_t^m, the transitory monetary shock, z_t^m, and the preference shock, ξ_t^c.

• the preference shock $\xi_t = \xi_t^h + \xi_t^c$, but not ξ_t^h or ξ_t^c individually.

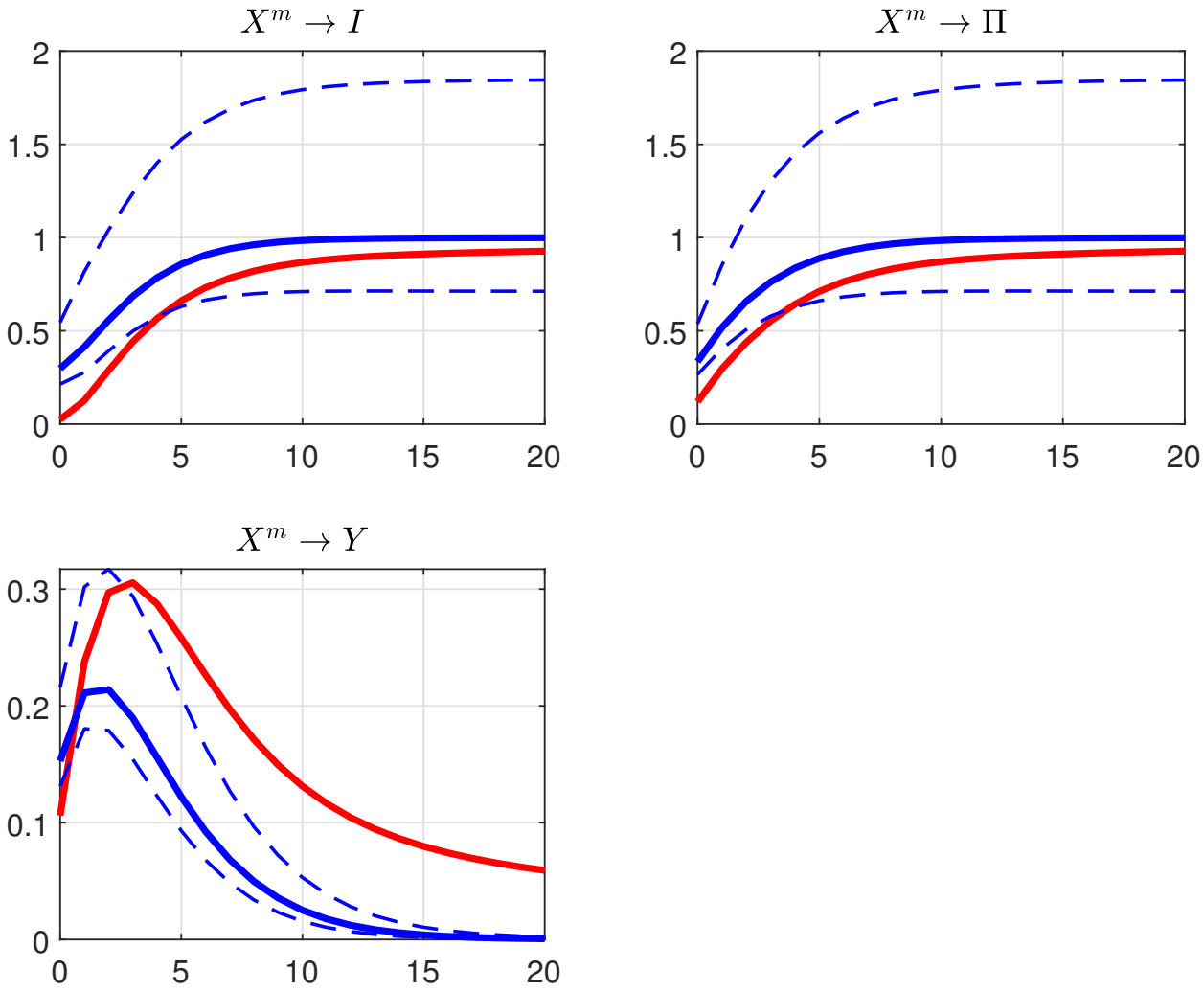
Impulse Response to the Preference Shock to which the CB responds ($\xi_t^c \uparrow$), Full versus Imperfect Information



Notes. Blue lines full information with 95% error bands. Red lines imperfect information

Takeaway: No evidence of a central bank information advantage.

Impulse Response to Permanent Monetary Shock ($X_t^m \uparrow$)
Full versus Imperfect Information



Notes. Blue lines full information with 95% error bands. Red lines imperfect information

Robustness

Results continue to hold when:

- high-frequency monetary shocks are included as an additional observable.

- long-maturity bond yields are included as an additional observable.

Conclusions

• The neo-Fisher effect (permanent monetary shocks) and the central bank information (CBI) channel can each lead to cases where tightening fails to lower inflation or output.

• Estimating them separately risks conflating their effects.

• We estimate an NK model incorporating both mechanisms.

• The CBI channel is modeled as a preference shock to which the central bank responds directly.

• Both mechanisms matter: the neo-Fisher effect explains 30 percent of inflation changes, and removing the central bank's direct response to the preference shock raises that shock's contribution to inflation and output variance by 50 and 15 percentage points, respectively.

• We find no evidence of an informational advantage of the central bank.